Port of Brisbane Sediment Sampling and Analysis Plan Implementation Report – 2020

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Synopsis:	**A report describing the physio-chemical characteristics of sediment to be dredging during the maintenance dredging program at the Port of Brisbane (2020). The assessment was carried out in accordance with the project sampling and analysis plan (SAP) and the National Assessment Guidelines for Dredging (2009).**	

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Executive Summary

Port of Brisbane Pty Ltd (PBPL) undertakes annual maintenance dredging within the navigational areas of the Brisbane River and western Moreton Bay, primarily using the Trailer Suction Hopper Dredge 'Brisbane'. The physical and chemical properties of proposed dredged sediment were characterised in accordance with the National Assessment Guidelines for Dredging (NAGD) to assess the suitability of dredged material for unconfined ocean disposal.

The dredge area was divided into different dredging subareas based on existing contaminant data, comprising Zone 2 (Colmslie to Pinkenba), Zone 3 (within Port reaches) and Zone 4 (Entrance Channel). Zone 1 (upstream of the dredge area) is not part of the annual dredging and samples from this zone were collected as 'background' samples upstream of dredged areas. Sediment was also sampled at the Mud Island Dredge Material Placement Area (MIDMPA) and reference sites in Bramble Bay north of the Port of Brisbane.

Zone 2 sediments had variable physical properties were characterised by a higher proportion of fines (clays and silts) than other zones. Sediments in Zones 3 and 4 had a higher proportion of sands. The Moreton Bay reference sites were comprised almost entirely of fines, whereas the MIDMPA was similar to Zone 4. These results are consistent with previous sampling.

The sediments in the dredging zones were found to be suitable for ocean disposal in accordance with the NAGD based on the following results:

- The 95% UCL value for nickel exceeded the NAGD screening level at Zone 2 (22.24 mg/kg) but was below screening level at Zone 3 (19.66 mg/kg) and Zone 4 (20.01 mg/kg). The 95% UCL for nickel at dredge zones was less than that of reference sites (22.78 mg/kg), and on this basis was considered suitable for ocean disposal in accordance with NAGD.
- Bioavailability testing was conservatively undertaken for nickel and mercury. All concentrations were less than relevant guideline values, and therefore considered suitable for ocean disposal in accordance with NAGD.
- All other metals/metalloids had concentrations less than screening levels.
- All organic contaminants including organotins, Total Petroleum Hydrocarbons (TPHs), Polyaromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs) and organochlorine pesticides (OCPs) had concentrations below the LOR or the 95% UCLs were below the respective NAGD screening levels. The 95% UCL was not calculated at the reference sites due to the large number of non-detects.
- Acid Sulfate Soil testing indicated that potential acid sulphate soils were absent.

The evaluation of laboratory and field QA/QC procedures and assessments indicated that all sampling, sample handling and storage and laboratory analysis was undertaken to a high standard providing scientific confidence that the presented results are valid to allow an assessment of sediment quality against the NAGD.

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1 Introduction

1.1 Background

Port of Brisbane Pty Ltd (PBPL) is required to maintain a minimum depth of clearance below the keel of vessels calling at the port to allow for effective shipping access to the port and ensure ship safety. PBPL undertakes an annual maintenance dredging program to ensure these minimum depths are maintained.

PBPL propose to undertake its annual maintenance dredging within the navigational areas of the Brisbane River and Moreton Bay, primarily using the Trailer Suction Hopper Dredge (TSHD) 'Brisbane'. Maintenance dredging works extend from the Hamilton Reach of the Brisbane River to the North West Channel located in northern Moreton Bay.

It is proposed that dredged material is placed at sea within the Mud Island Dredge Material Placement Area (MIDMPA) or on land in the Future Port Expansion (FPE) reclamation area. To assess suitability of dredged material for unconfined ocean placement, characterisation of the physical and chemical properties of proposed dredged sediment was required to be undertaken in accordance with the National Assessment Guidelines for Dredging (Commonwealth of Australia 2009; henceforth NAGD).

This report documents the findings of a sampling campaign conducted in October 2020. The overall aim of this study is to assess the physical and chemical properties of sediments to be dredged from the Port of Brisbane, and based on the approach set out in the NAGD, assess the suitability of dredged material for unconfined ocean disposal (if required). The specific objectives of the study were to:

- Describe and quantify the physical properties of sediments to be dredged;
- Quantify concentrations of potential contaminants in sediments to be dredged;
- Compare contaminant concentrations to screening levels set out in the NAGD to determine whether there is a need for further assessment; and
- Assess the bioavailability of contaminants and potential toxicity effects based on comparisons of contaminant concentrations to guideline values.

1.2 Proposed Dredging

PBPL's area of responsibility in relation to maintenance and capital dredging within port limits can be broadly divided into two locations based on the water body type, navigable depths and nature of dredged material:

- Moreton Bay dredge area (enclosed/open coastal waters); and
- Brisbane River dredge area, including the Port of Brisbane (middle/lower estuary).

This SAP specifically focusses on sediments in the Brisbane River dredge area, as well as the MIDMPA and 'reference' areas in western Moreton Bay. The Brisbane River dredge area extends from Hamilton Reach to the Outer Bar Cutting. Annual maintenance dredging is required to remove sediments accumulated by natural siltation processes within the catchment.

To ensure that declared depths of navigational channels are maintained at all times, PBPL undertakes 'insurance' dredging of up to -0.5 metres below the declared depth. On average, PBPL dredges about 300,000 m^3 to 350,000 m^3 of material each year. Dredging volumes are predominantly driven by catchment rainfall events and subsequently additional dredging needs to be undertaken following major flood events, as occurred in 2011 and 2013.

The Brisbane River zone is divided into different dredging subareas based on existing contaminant data, comprising Zone 2, Zone 3 and Zone 4. It is noted that Zone 1 is not part of the annual dredging and samples from this zone have been used to collect reference samples upstream of the actual dredging areas.

The following average dredge volumes apply to the dredge subareas (Table 1-1).

Table 1-1 Approximate Maintenance Dredge Volumes

Dredging Subarea	Location	Average Dredge Volume (m^3)
Zone 2	Hamilton Reach to Lytton Rocks Cutting	83,000
Zone 3	Pelican Banks to Inner Bar Cutting	241,000
Zone 4	Outer Bar Cutting	26,000

The maintenance dredging program is structured to maximise efficiencies and utilisation of PBPL's largest dredger, the *TSHD Brisbane*. The *TSHD Brisbane* typically carries out the majority of the port's maintenance dredging over a two-month period between January and May (actual period varies depending on other commitments of the *TSHD Brisbane* and siltation patterns). The PBPL may also utilise smaller, more manoeuvrable dredging plant, such as grab dredgers and bed levellers, to maintain more confined areas within the Port Limits.

1.3 Offshore Disposal

The PBPL's policy with regard to dredged material is to maximise its beneficial reuse. In general, most of the material dredged by the PBPL from within Port Limits is used in reclamation works associated with development of the port. The reuse of this dredged material provides several benefits, including:

- Reduced pressure on sea disposal sites;
- The placement of any actual or potential acid sulphate material at depth beneath the water surface; and
- The containment of any contaminated material within a designated boundary, disconnected from the marine system and monitored to ensure the immobility of identified contaminants.

In 2009, the reclamation life of the FPE area was estimated to be approximately 30 years, based on the current level of port development at that time. Following extreme flood events in both 2011 and 2013 and the subsequent disposal of additional material in the FPE area, the estimated life of the FPE area was reduced by 20 years to 10 years. Given the importance of the FPE as an area to dispose of material unsuitable for ocean disposal, there has been a shift in thinking around the management of the FPE area.

The current proposed management of dredged material is to, where practical, dispose at sea all dredged material deemed suitable for ocean disposal. This proposed management initiative will ensure the long-term viability of the FPE area for the disposal of material deemed unsuitable for ocean disposal.

In the past, significant quantities of dredged material from the Brisbane River have been placed offshore at the MIDMPA. In recent years, only smaller volumes of dredged material from boat harbours in southern Moreton Bay were placed at the MIDMPA. However, it is proposed that the MIDMPA will be utilised for material found suitable for ocean disposal in future PBPL maintenance dredging campaigns.

1.4 Marine Communities and Environmental Values

The loading (dredging) site is located within the lower Brisbane River. The foreshore of the lower Brisbane River is in a highly modified condition, but still retains isolated patches of mangrove forest and tidal flats. The river channel is comprised of muds and sands and supports a locally important trawl fishery (BMT WBM 2008c).

The Port of Brisbane port facilities are located at the Brisbane River mouth on land reclaimed over a shallow sub-tidal river delta containing a series of low-lying mangrove islands, collectively called the Fisherman Islands. Brisbane River and adjacent waters of Moreton Bay experiences freshwater flows and ongoing inputs of sediments and contaminants derived from human activities in its catchment. Two major sewage treatment plants also have their sewage discharges within kilometres of the Port facilities (Luggage Point and Wynnum North wastewater treatment plant).

Construction of the present-day port facilities over intertidal and subtidal areas has resulted in extensive changes to the environmental character of the Fisherman Islands area. However, significant areas of mangrove, saltmarsh and seagrass have also been retained, and form part of the Fisherman Islands wetland complex on the south eastern side of the Port of Brisbane (BMT WBM 2014). Moreton Bay Marine Park is situated to the south and east of the FPE seawall. This area contains one of the largest semi-contiguous seagrass beds in western Moreton Bay. A Ramsar listed wetland (Moreton Bay Ramsar site) is situated only kilometres to the south of the port facilities, comprising intertidal portions of the Fisherman Islands wetland complex. The seagrass and mudflats of the Ramsar site are recognised for their importance to dugong, marine turtles and migratory and resident shorebirds (BMT WBM 2008a).

MIDMPA is located between Mud Island and Fisherman Islands. Mud Island is an ancient coral reef that is no longer actively accreting coral skeletons, but still contains coral communities (Johnson and Neil 1998). MIDMPA is comprised of a mix of mud and sand substrates that provide habitat for a benthic invertebrate (BMT WBM 2008b) and fish assemblages.

2 Methodology

2.1 Compliance with SAP and Guidelines

All sampling and analysis of sediments was undertaken in accordance with the NAGD (Commonwealth of Australia 2009). All sampling and analysis procedures followed the approach outlined in the sampling and analysis plan (SAP) provided in Appendix A.

2.2 Timing of Sampling

Sampling was undertaken between the 7th and 9th of October 2020 during daylight hours.

2.3 Sampling Locations and Sample Numbers

2.3.1 Sampling Locations

A map showing the sampling locations is provided in Figure 2-1. Thirty-five locations were sampled with a Van Veen grab sampler in accordance with the SAP and NAGD requirements. This included 26 sample locations within the proposed dredging area (Zones 2, 3 and 4) and nine reference locations (Zone 1, MIDMPA and Moreton Bay reference sites).

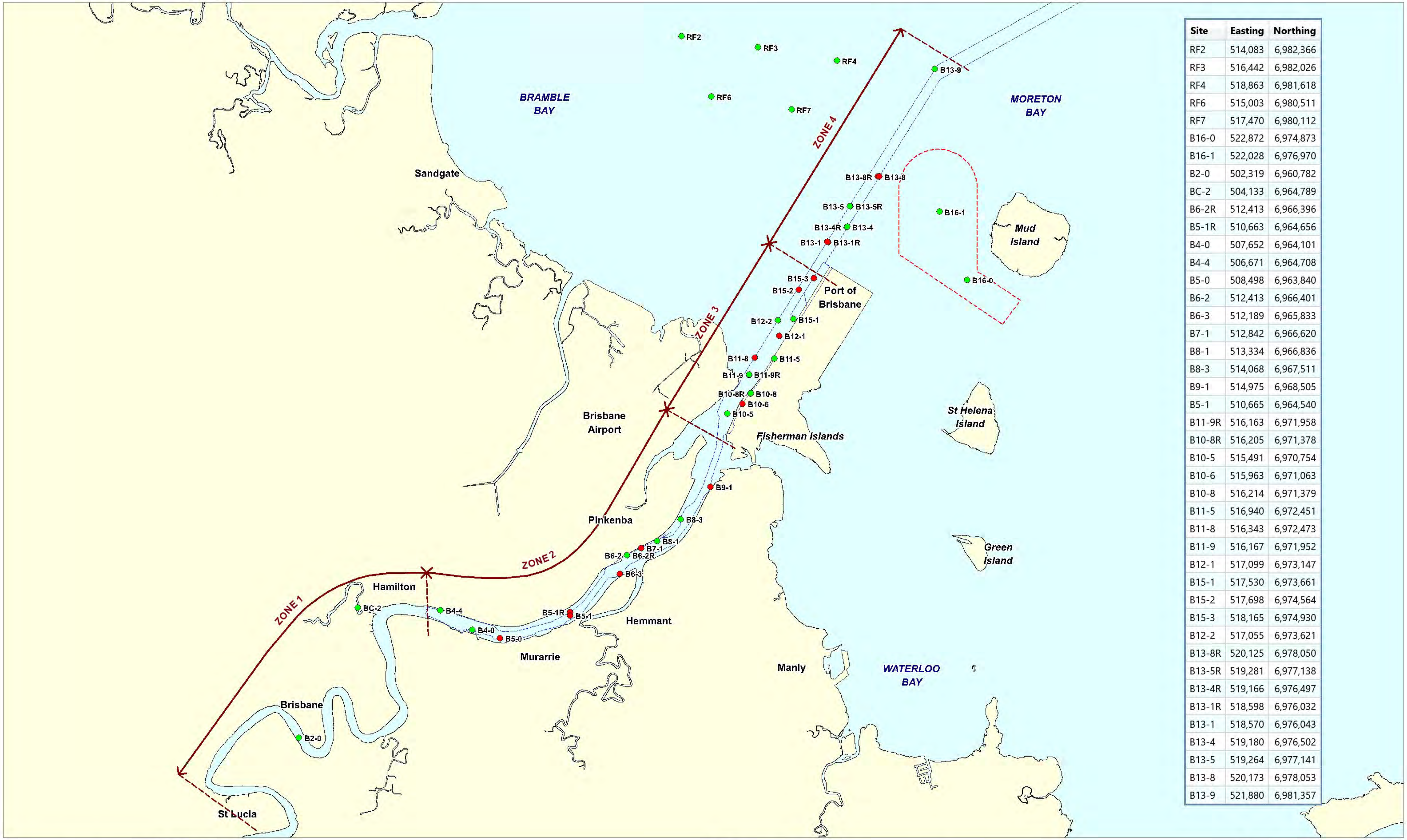
As per the SAP, all samples were analysed for a basic suite with a detailed suite analysed at selected study locations (refer to Figure 2-1 and Section 2.5).

2.3.2 Additional Field QA/QC Samples

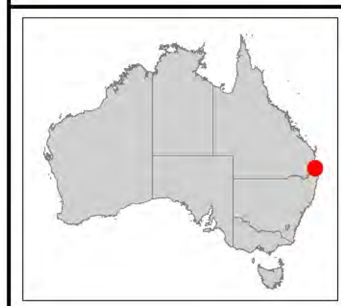
In accordance with NAGD requirements and based on the number of sample locations, the following field and laboratory quality control samples were taken:

- Three field triplicate samples at 10% of locations to determine the small scale (measured in metres) spatial variability of the sediment physical and chemical characteristics, i.e. two additional grab samples at locations 5-1 (Zone 2), 11-9 (Zone 3) and 13-4 (Zone 4);
- Two triplicate split samples (primary sample from 5% of locations thoroughly mixed and split into three sample container sets) to assess laboratory variation, with one of the three samples sent to a second (reference) laboratory for analysis. Split samples were obtained at location 6-2 (Zone 2) and 10-6 (Zone 3); and
- Three trip blank containers (one per sampling day) filled with inert material (e.g. chromatographic sand) to be analysed concurrent with the analysis of volatile organic substances such as BTEX and TPH C6-C9.

All samples were submitted to the primary and secondary laboratories in one batch, so no inter-batch samples were required.



Site	Easting	Northing
RF2	514,083	6,982,366
RF3	516,442	6,982,026
RF4	518,863	6,981,618
RF6	515,003	6,980,511
RF7	517,470	6,980,112
B16-0	522,872	6,974,873
B16-1	522,028	6,976,970
B2-0	502,319	6,960,782
BC-2	504,133	6,964,789
B6-2R	512,413	6,966,396
B5-1R	510,663	6,964,656
B4-0	507,652	6,964,101
B4-4	506,671	6,964,708
B5-0	508,498	6,963,840
B6-2	512,413	6,966,401
B6-3	512,189	6,965,833
B7-1	512,842	6,966,620
B8-1	513,334	6,966,836
B8-3	514,068	6,967,511
B9-1	514,975	6,968,505
B5-1	510,665	6,964,540
B11-9R	516,163	6,971,958
B10-8R	516,205	6,971,378
B10-5	515,491	6,970,754
B10-6	515,963	6,971,063
B10-8	516,214	6,971,379
B11-5	516,940	6,972,451
B11-8	516,343	6,972,473
B11-9	516,167	6,971,952
B12-1	517,099	6,973,147
B15-1	517,530	6,973,661
B15-2	517,698	6,974,564
B15-3	518,165	6,974,930
B12-2	517,055	6,973,621
B13-8R	520,125	6,978,050
B13-5R	519,281	6,977,138
B13-4R	519,166	6,976,497
B13-1R	518,598	6,976,032
B13-1	518,570	6,976,043
B13-4	519,180	6,976,502
B13-5	519,264	6,977,141
B13-8	520,173	6,978,053
B13-9	521,880	6,981,357



LEGEND

- Basic Suite
- Basic Suite and Detailed Suite
- Dredge Area
- Dredge Material Placement Area

Title:

Actual Sediment Sampling Locations

Figure: **2-1**

Rev: **A**

BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

N 0 2.5 5km Approx. Scale

www.bmt.org

Filepath: I:\B20259_I_BRH Port of Brisbane DLR\DRG\ECO_022_131212 Sediment Sampling Locations.wor

2.3.3 Elutriate and Bioavailability Analyses

Phase III testing was undertaken for parameters which have frequently exceeded the NAGD screening levels in the past. Based on the review of historical data in the SAP this included:

- Metals and metalloids;
- Organotins (TBT); and
- Organochlorine Pesticides (DDT, DDD, DDE, chlordane).

Phase III testing for metals/metalloids (and potential other metals/metalloids) was undertaken from the primary samples collected for the sediment quality assessment and based on the initial analysis results. Analysis was performed on the samples with the highest concentrations.

Bioavailability analysis for the organic contaminants (organotins and organochlorine pesticides) required porewater testing as per NAGD. Additional samples were collected for porewater testing at the locations which have historically shown the highest percentage of screening level exceedances. To meet required holding times, elutriate and bioavailability analysis for the organic contaminants was undertaken concurrent with the analysis of the primary samples.

As per the SAP, additional samples for porewater testing were obtained from five locations in Zone 2 and six locations in Zone 3.

2.4 Sample Collection and Handling

2.4.1 Survey Vessel, Sampling Equipment and Personnel

BMT's vessel "Resolution II" was used for sampling the sediments. A handheld GPS was used on the survey vessel for position fixing and navigation to each sampling location. All sediment sampling was undertaken by a team of two qualified marine scientists with experience in the implementation of sediment sampling and analysis programs.

2.4.2 Sampling Procedure

Sediment samples were collected using a stainless steel Van Veen grab sampler (0.14 m^2 grab). Only samples obtained with properly closed grab jaws were processed to ensure that the fine sediment fractions were retained.

In order to overcome issues with potential high variability at sampling locations, a minimum of two grabs were collected at each sampling location and pooled as one sample. An adequate number of grabs was obtained and pooled for each sample location ensuring that sufficient sediment was collected for all analyses.

2.4.3 Survey Vessel and Equipment

The vessel was thoroughly inspected and washed down prior to the beginning of sediment sampling each day. The workspace on the vessel was washed down regularly with ambient seawater to clean all surfaces and minimize the potential for dust contamination of samples. All sample processing was undertaken away from any potential contamination sources such as engine exhausts, fuels, oils, greases, lead weights, zinc anodes, antifouling paint etc.

The grab sampler was thoroughly cleaned with De-con 90 solution prior to use and cleaned and rinsed with seawater between samples to prevent cross contamination between samples.

2.4.4 Sample Collection, Handling and Storage

Photographs of the grab samples were taken and grab samples were logged for its physical characteristics and variations in sediment type and texture (refer Appendix B). The grab samples from each location were carefully homogenized in a clean container prior to the filling of analytical laboratory-supplied clean sampling jars.

Nitrile gloves were worn by all field personnel handling the sediment, and gloves were disposed of after processing of each sample.

Sample bottles were labelled with a waterproof marker pen on the bottle label and lid. Sample bottles for organic analyses were filled with zero headspace to minimise volatilisation. A field trip blank sample container filled with clean chromatographic sand was placed with opened lid near the sample processing site while a sediment sample was completely processed.

All storage containers were chilled on ice immediately following sample collection. The samples were then transferred to BMT office in sealed eskies at the end of each sampling day. Acid Sulfate Soil samples were frozen at the end of each sampling day to minimise potential oxidation of the sediment material.

At the end of the sampling campaign, all samples were submitted to the primary and secondary analytical laboratories. All samples were submitted to the laboratories with Chain of Custody documentation (Appendices C and D).

2.5 Laboratory Analysis

As per the SAP, all samples were analysed for a basic suite with a detailed suite analysed at selected study locations (refer to Figure 2-1 and Appendix A).

2.5.1 Analytical Tests

Primary analysis of sediment samples was conducted by Australian Laboratory Services (ALS). The analysis of Particle Size Distribution was conducted by Microanalysis Australia. Symbio Laboratories was selected as the secondary (reference) laboratory for inter-laboratory quality testing.

A total of 35 locations were analysed for a basic suite of parameters. Of these, 12 locations were also analysed for a detailed list of contaminants. Furthermore, elutriate and bioavailability (porewater and dilute acid extraction) testing was undertaken at selected locations as per the SAP.

Basic List of Parameters:

- Analysis included contaminants of (potential) concern and supplementary parameters:
  - Metals/Metalloids (As, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn, Al, Fe);
  - Organotins (MBT, DBT, TBT);
  - Organochlorine pesticides (including DDT, DDD, DDE, chlordane);
  - Particle Size Distribution (PSD);

  - Moisture content; and
  - Total Organic Carbon (TOC).

Detailed List of Parameters:

- Analysis included 'low risk' parameters that have been detected in the past but generally in concentrations below Limit of Reporting (LOR) or NAGD screening levels:
  - Polycyclic Aromatic Hydrocarbons (PAHs);
  - Total Petroleum Hydrocarbons (TPHs);
  - Polychlorinated Biphenyls (PCBs);
  - Acid Sulfate Soils;
  - Nutrients (TP, TN, NO_x, TKN); and
  - Radionuclides.

Elutriate and Bioavailability Testing:

- Metals/Metalloids;
- Organotins (TBT); and
- Organochlorine pesticides (DDT, DDD, DDE, chlordane).

2.5.2 Laboratory Quality Control

Both laboratories followed laboratory Quality Control (QC) procedures in accordance with requirements outlined in Appendix F of NAGD. This included analysis of laboratory blanks, duplicates, certified surrogate materials and spiked samples.

Validation of all laboratory QC analyses was conducted in accordance with Appendix A of NAGD to confirm suitable data quality for undertaking a rigorous characterisation of the proposed dredge material.

2.5.2.1 Laboratory Blanks

The purpose of this assessment is to monitor potential laboratory contamination of samples due to potential cross-contamination of samples during laboratory preparation, extraction or analysis. Blank sample concentrations should be at or near the LOR of the method used.

2.5.2.2 Laboratory Duplicates

This assessment refers to a randomly selected intra-laboratory split sample, which provides information regarding the method precision and sample heterogeneity. Results are presented as Relative Percent Difference (RPD) values of two sample concentrations for a specific contaminant.

NAGD recommends that duplicates should agree within a typical RPD of the method of ±35 %. This recommended RPD is typically not adopted by analytical laboratories as it does not account for the greater uncertainty for contaminant concentrations close to the method's LOR. NAGD also notes that

RPDs may not always agree within these limits where sediments are very inhomogeneous or vary greatly in grain size.

The primary laboratory AAA uses the following approach to assess duplicate RPD's:

- Result <10 times LOR – no limit to RPD; and
- Result >10 times LOR – RPD between 0% and 50%.

The secondary laboratory ALS follows this approach:

- Result <10 times LOR – no limit to RPD;
- Result between 10 and 20 times LOR – RPD between 0% and 50%; and
- Result >20 times LOR – RPD between 0% and 20%.

Refer to Appendices C and D for the acceptance criteria of subcontracted laboratories.

2.5.2.3 Surrogate and Matrix Spikes

Laboratory Control Samples are either certified reference materials or a blank sample spiked with known concentrations of the analytes of interest. The purpose of this measurement is to monitor method accuracy.

Matrix spikes refer to an intra-laboratory split sample spiked with a representative set of target analytes of known concentration. Matrix spikes are assessed to monitor potential sample matrix effects on analyte recoveries.

Surrogate spikes are used for organic analytes. Surrogates are known additions to samples which mimic the compounds of interested and are not normally expected to be present in the sample.

For both surrogate and matrix spikes, a calculation of the percent recovery of the spiked amount against the returned concentration is performed indicating analytical performance in terms of extraction efficiency.

NAGD states that recovery limits of 75% - 125% are generally acceptable. Analytical laboratories typically adopt specific surrogate and matrix spike recovery limits for the various contaminant compound groups. It is also noted that ideal recovery ranges may be waived in the event of sample matrix interference.

The primary laboratory AAA adopts the following acceptable surrogate and matrix spike recovery limits:

- Trace elements: 70-130%;
- Organic analyses: 50-150%;
- SVOC & speciated phenols: 10-140%; and
- Surrogates: 10-140%.

The secondary laboratory ALS adopts specific recovery limits for individual compounds.

2.6 Data Analysis

2.6.1 Sediment Contaminants

Concentrations of chemicals measured in sediment samples were compared to screening levels listed in Table 2 of NAGD to determine whether the material is suitable for unconfined placement at sea or if further analyses, such as elutriate, bioavailability or toxicity testing, are required.

Specifically, mean concentrations of chemical parameters at the upper 95% confidence level (95% UCL) were compared against NAGD guideline levels. This involved the following steps.

Data pre-treatment

Analytical values below Limit of Reporting (LOR) were set to one-half of the LOR as per NAGD recommendation to facilitate 95% UCL calculation. This was only undertaken where there was greater than 30% detections within the dredge zone. Any replacement technique is a source of bias (Croghan and Egeghy 2003). Only parameters with greater than 30% detections were subject to analysis due to the high probability of bias created by the replacement technique.

Organic contaminant results were normalised to 1% TOC where the measured value is within the range of 0.2-10%. If TOC values were outside of this range, the highest (10%) or lowest (0.2%) value was adopted as appropriate. Organic parameters with concentrations below LORs were not normalised to 1% TOC but were included at half their LOR.

One assumption in the calculation of the 95% UCL is that the samples are statistically independent. Therefore, field triplicate samples and laboratory split samples were averaged for each location in the 95% UCL calculation.

Selection of appropriate 95% UCL Calculation Method

ProUCL Version 4.1.00 was used to calculate the 95% UCL (Singh *et al.* 2010). In accordance with NAGD, for normally distributed data, the arithmetic mean was calculated, and the 95% UCL was calculated using the one-tailed Student's *t* UCL test. For data that followed a log-normal distribution, the geometric mean was calculated and the 95% UCL was calculated using Chebyshev method. For data that did not follow either a normal or log-normal distribution, the 95% UCL was calculated using non-parametric techniques as per NAGD. Should 95% UCL values for all analysed parameters fall below NAGD screening levels, the sediment were considered chemically acceptable for ocean disposal.

In accordance with NAGD, ambient baseline concentrations of chemicals were determined by sampling of sediment at reference areas near the existing disposal site. The 80th percentile value was calculated from reference site data. The mean of the sediment concentrations at the dredge site was then compared with the 80th percentile of ambient baseline levels. Sediment was chemically acceptable for ocean disposal the mean concentration at the dredge site was less than or at the 80th percentile value.

If chemicals were found to be above ambient baseline levels and the screening level, they were considered a Contaminant of Potential Concern and Phase III testing was required.

2.6.2 Elutriate and Bioavailability Testing

Elutriate and bioavailability testing was undertaken as per NAGD for a range of contaminants which have regularly exceeded screening levels in the past.

Elutriate Testing:

The elutriate test is designed to simulate release of contaminants from sediment during dredged material disposal. Testing was carried out using the USEPA's standard seawater elutriate test which involves shaking the sediment samples with four times the volume of seawater at room temperature for 30 minutes. The sample was allowed to settle for one hour and the supernatant was centrifuged or filtered (0.45 µm) within 60 minutes and analysed using analytical methods appropriate for determining ultra-trace levels in seawater.

Results were compared to the respective ANZECC/ARMCANZ (2000) marine water quality trigger value (for 95% protection of species).

Bioavailability Testing:

The Dilute Acid Extraction (DAE) method was used to provide an estimate of the bioavailable fraction of metals/metalloids. The sediment samples were extracted using a weak acid and result compared against the respective NAGD screening levels.

For organic contaminants, analysis of pore water is the recommended bioavailability test as per NAGD. Porewater is assumed to represent the major route of exposure to sediment contaminants by benthic organisms. Porewater results were compared to the respective ANZECC/ARMCANZ (2000) marine water quality trigger value (for 95% protection of species).

Should both elutriate and bioavailability tests result in values less than the respective guideline limits, the material would be considered clean and suitable for ocean disposal.

2.6.3 Acid Sulfate Soils

The results of the chromium-suite acid sulfate analysis were assessed against the Australian framework for Acid Sulfate Soil management in coastal systems (Ahern *et al.* 1998). The risk of acidification was determined by the acid-base accounting approach (Ahern *et al.* 2004). Net acidity was calculated from the results as a measure of the acid producing capacity of the sampled sediment upon complete oxidation.

The calculated net acidity was then compared to the QASSIT action criteria of 0.03% S or 18 mol H^+/tonne to assess the need for acid sulfate soil management if the dredged sediments were to be placed on land. The liming rate indicates the amount of lime that needs to be added to the soil to manage its acid generating capacity.

3 Results

Sediment logs of the sampled sediments are shown in Appendix B. Detailed laboratory results are provided in Appendices C and D for the primary and secondary laboratory, respectively.

3.1 Physical Sediment characteristics

Table 3-1 presents sediment grain particle size distribution (PSD) results for each location.

Zone 2

Results were broadly consistent with previous years. The average sand content was 28% in 2019 and 2020. Most sites had >50% of fine material (silts and clays), except site B9-1 (30%). Gravel was present in small proportions, typically less than 5%.

Zone 3 and 4

The physical properties of sediments in Zones 3 and 4 were spatially variable, but generally dominated by fines fractions (average Zone 3 = 60%, Zone 4 = 65%). These zones had a higher proportion of sand than Zone 2, with an average of 44% and 40% in Zones 3 and 4, respectively. These patterns were consistent with previous survey results.

MIDMPA and Reference/Background

The MIDMPA had a high sand fraction (48-97%), similar to previous years. Moreton Bay reference sites were characterised by a high proportion of fine sediment (76% on average). This was consistent with results from 2019 (85%), 2018 (89%), 2017 (84%), 2016 (90%), 2015 (85%), 2014 (86%) and 2013 (89%).

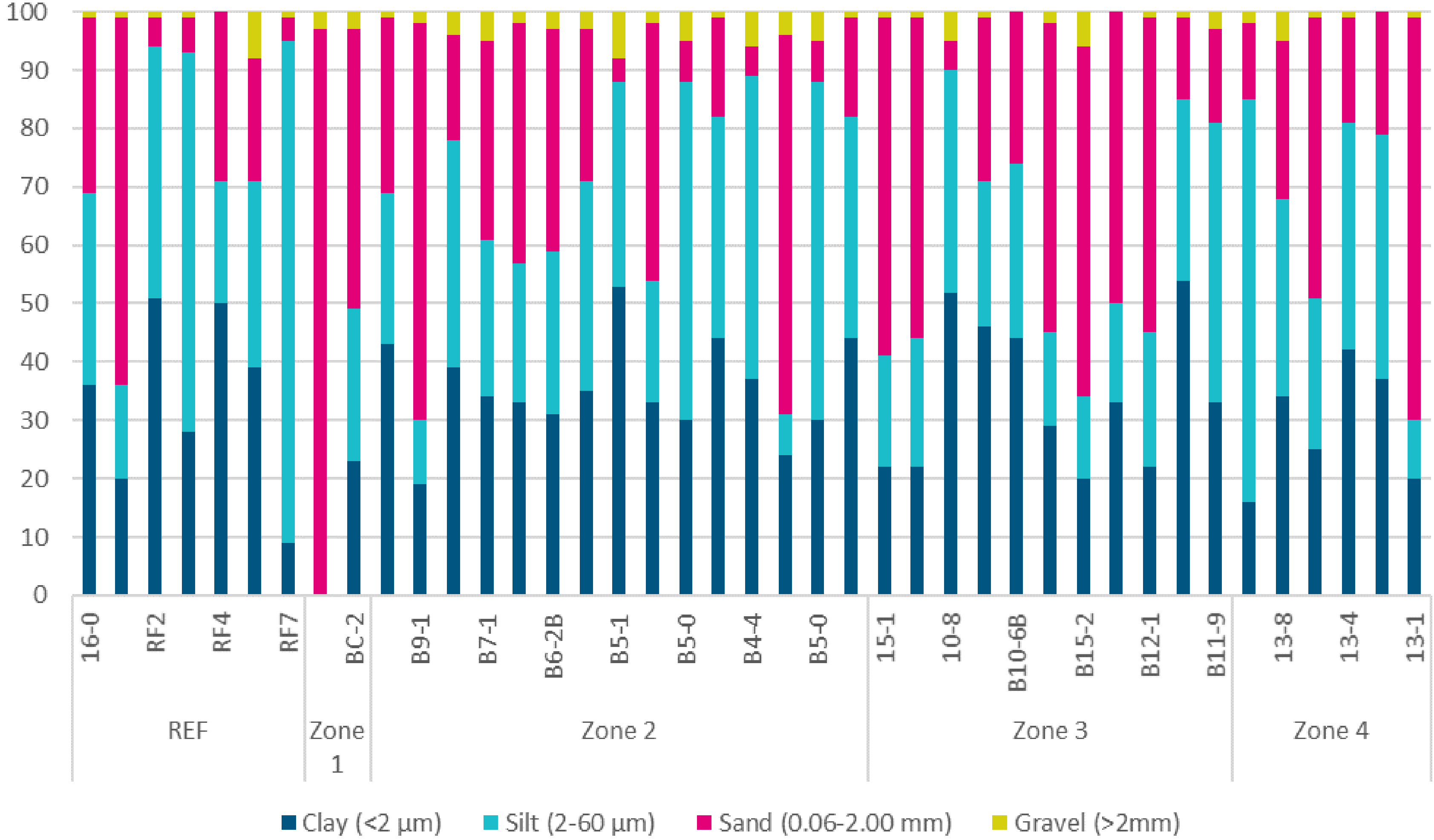


Figure 3-1 Sediment Particle Size Distribution Analysis – 2020

3.2 Analytical Results

3.2.1 Metals and Metalloids

3.2.1.1 Bulk Sediment

Trace Metals/Metalloids Except Nickel

Summary data for metals and metalloids are presented in Table 3-1. Silver and cadmium had concentrations less than the LOR (0.1 mg/kg) in several samples at Zones 2, 3 and 4, consistent with 2016, 2017, 2018 and 2019 survey results. All other metals and metalloids were detected in 100% of samples from Zones 2, 3 and 4.

Concentrations of most metals and metalloids were generally below NAGD screening levels across the study area, except nickel and mercury. While mercury concentrations exceeded the screening level in individual samples, 95% UCL of the mean in all dredge zones was less than the screening level.

Trace metal and metalloid concentrations recorded at reference locations followed similar trends to those at the dredge sites, and were also consistent with trends observed between 2013-2019.

Nickel

The overall 95% UCL of the mean for nickel was 20.0 mg/kg at dredged areas (Zones 2, 3 and 4), which was below the NAGD screening level of 21 mg/kg. There has been a trend of declining nickel concentrations between 2013-2018, which have stabilised in 2019-20 (Figure 3-2).

Within individual dredge zones, the 95% UCL value for nickel exceeded the NAGD screening level at Zone 2 (22.24 mg/kg), but was less than the screening level at Zone 3 (19.66 mg/kg) and Zone 4 (20.01 mg/kg). In accordance with NAGD, nickel concentrations at the dredge site were compared to reference sites. The 95% UCL at all dredge zones was less than that at the reference sites (22.78 mg/kg) (Table 3-1). On this basis, sediments were considered suitable for ocean disposal in accordance with NAGD. While not required under NAGD, Phase 3 testing was conservatively undertaken to assess nickel bioavailability (Section 3.2.1.2).

Table 3-1 Summary statistics and 95% UCLs for combined locations in Zones 2, 3, and 4 – trace metals/metalloids and nutrients. Values highlighted in orange indicate exceedance of NAGD screening level

Parameter	LOR (mg/kg)	# Non-Detects	Screening Level	Statistical Distribution	95% UCL	Min	Max	Mean	Geometric Average
Moisture Content	1	0	n/a	Normal	56.36	50.10	64.30	57.01	48.4
Aluminium	50	0	n/a	Normal	13089	6100.00	17000.00	12149.35	11068.9
Arsenic	1	0	20	Normal	8.1427	4.80	10.10	7.54	7.2
Cadmium	0.1	23	1.5	n/a	NC2	0.10	32.00	0.70	0.2
Chromium	1	0	80	Normal	31.52	16.60	39.50	29.36	27.8
Copper	1	0	65	Normal	28.03	6.40	49.30	24.17	21.0
Iron	50	0	n/a	Normal	32482	19900.00	39900.00	31064.52	28421.4
Lead	1	0	50	Normal	20.05	5.20	37.60	17.43	14.6
Mercury	0.01	0	0.15	Normal	0.0816	0.02	5.00	0.07	0.08
Nickel	1	0	21	Normal	20	11.00	30.50	19.16	18.2
Silver	0.1	15	1	Non-Parametric	0.177	0.10	21.00	0.15	0.1
Zinc	1	0	200	Normal	95.95	28.10	161.00	84.85	80.7
Total Organic Carbon	0.02	0	n/a	Normal	1.113	0.32	5.00	1.00	0.7
Total Kjeldahl Nitrogen	20	0	n/a	Normal	1157	300.00	1600.00	1.00	1559.4
Total Nitrogen	20	0	n/a	Normal	1157	300.00	1600.00	987.14	1559.4
Phosphorus	2	0	n/a	Normal	631.1	312.00	847.00	568.64	571.2

Blue shading = parameter not detected; Yellow shading = UCL95% > screening level; ND = No Data, NC1 = not calculated due to no detections; NC2 = not calculated due to >30% of values being non-detects (applicable only to parameters with screening levels); n/a = no NAGD screening level

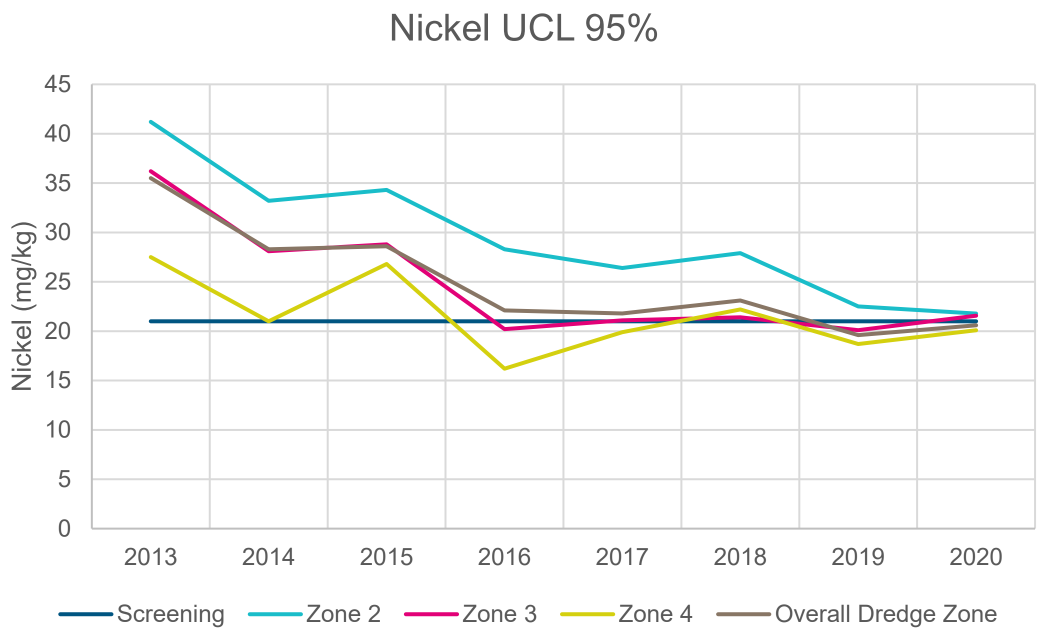


Figure 3-2 UCL 95% Nickel (mg/l) at each dredge zone over time

3.2.1.2 Bioavailability Testing

Samples with the highest recorded nickel and mercury concentrations were conservatively selected for analysis from dredge Zones 2 and 3 and a reference site. A total of nine samples for nickel and mercury were analysed as per NAGD.

The dilute acid extraction (DAE) results indicate:

- All samples had nickel (DAE) concentrations less than the NAGD screening level (Table 3-2), and were therefore not at levels of concern. Nickel concentrations derived from DAE were consistent with levels recorded by BMT from previous years (BMT WBM 2013, 2015a, 2015c, 2016, 2017, 2018 and 2019).
- Mercury was not detected in any DAE samples and was therefore below the NAGD screening level.

The elutriate results were also below the ANZECC/ARMCANZ (2000) marine trigger limit of 7 µg/L (99% species protection) for nickel and 0.00004 mg/L for mercury (Table 3-2).

These results indicate that the bioavailable fraction of nickel and mercury is unlikely to result in adverse ecological impacts. Based on the Phase II and Phase III testing for metals and metalloids, dredge sediments are considered suitable for ocean disposal as per NAGD.

Table 3-2 Nickel and Mercury Bioavailability Elutriate Results

Zone	Sample	Nickel			Mercury		
		Bulk sediment	DAE	Elutriate	Bulk sediment	DAE	Elutriate
		(mg/kg)	(mg/kg)	ug/L	(mg/kg)	(mg/kg)	ug/L
Guideline Value		21*		7**	0.15*		0.0001**
REF	RF7	24.5	9.4	1.8	0.08	<0.10	<0.00004
3	B10-6	24.1	7.7	1	0.07	<0.10	<0.00004
3	B10-6B	30.5	8.6	1	0.05	<0.10	<0.00004
3	B11-9	22.6	6.8	1.4	0.08	<0.10	<0.00004
3	B10-8	22.4	8	1.4	0.06	<0.10	<0.00004
2	B5-1	23.8	9	0.7	0.12	<0.10	<0.00004
2	B5-0	23.2	7.4	1.3	0.13	<0.10	<0.00004
2	B4-0	21.8	7.8	1	0.12	<0.10	<0.00004
2	B4-4	23.2	8.3	2.8	0.13	<0.10	<0.00004

1 - orange shading – sample exceeds screening level; NM = not measured (concentration in bulk sediment less than screening level).
* NAGD Screening Level; ** ANZG 2018 water quality guideline value (99% species protection)

3.2.2 Nutrients and Carbon Content

Total Nitrogen (TN) and Total Kjeldahl Nitrogen (TKN) concentrations across the dredge zones ranged from 300 and 1300 mg/kg, and the 95% UCL concentration was 1157 mg/kg. These values were similar to 2019 (470 and 1440 mg/kg), 2018 (420 and 1600 mg/kg), 2017 (360 and 1810 mg/kg), 2016 (100 and 1650 mg/kg) and 2015 (320 and 1530 mg/kg), and higher than recorded in 2014 (220 to 1320 mg/kg).

Total Phosphorus (TP) concentrations across dredge zones ranged between 312 and 847 (95% UCL = 631.1mg/kg). TP concentrations across dredge zones in 2020 was similar to the values reported in 2019 (293 and 889 mg/kg) and lower than values reported in 2018 (180 and 1800 mg/kg), 2017 (310 to 1600 mg/kg), 2016 (270 to 1500 mg/kg), 2015 (390 to 1200 mg/kg) and 2014 (260 - 1300 mg/kg).

Total organic carbon content ranged between 0.32 and 5.0% across the dredge zones. The TOC 95% UCL for dredge zones was 1.11%, which was similar to the reference sites (1.13%). TOC in 2014 -2019 were slightly lower than recorded in 2020.

3.2.3 Organotins

All samples with the dredge areas had TOC normalised TBT concentrations below the screening level of 9 µgSn/kg (Table 3-3). At the reference locations, organotin concentrations were either below the LOR or detected at very low concentrations.

3.2.4 Total Petroleum Hydrocarbons (TPHs)

Low concentrations of TPHs C10-C14, C15-C28 and C29-C36 were recorded at most locations in the dredge zones. TPH fraction C6-C9 was below the LOR in all samples. The 95% UCL for total TPHs in the dredge was 69.7 (normalised to 1% TOC), which was below the NAGD screening level of 550 mg/kg. These results are consistent with previous surveys undertaken by BMT.

Table 3-3 Summary Statistics and 95% UCLs (µg/kg) for Combined Locations in Zones 2, 3 and 4 - Organic Compounds (Normalised to 1% TOC). Values Highlighted in Orange Indicate Exceedance of NAGD Screening Levels

Parameter	LOR	No. Detects	Screening Level	Distribution	95% UCL	Min	Max	Mean	Geometric Average
Organochlorine Pesticides (OPC)									
Aldrin	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
alpha-BHC	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
beta-BHC	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
gamma-BHC (Lindane)	0.25	0	0.32	NC1	NC1	NC1	NC1	NC1	NC1
delta-BHC	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
cis-Chlordane	0.5	0	0.5	NC1	NC1	NC1	NC1	NC1	NC1
trans-Chlordane	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
p-p'-DDD	0.5	0	2	NC1	NC1	NC1	NC1	NC1	NC1
p-p'-DDE	0.5	0	2.2	NC1	NC1	NC1	NC1	NC1	NC1
p-p'-DDT	0.5	0	1.6	NC1	NC1	NC1	NC1	NC1	NC1
Dieldrin	0.5	0	280	NC1	NC1	NC1	NC1	NC1	NC1
alpha-Endosulfan	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
beta-Endosulfan	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Endosulfan Sulphate	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Endrin	0.5	0	10	NC1	NC1	NC1	NC1	NC1	NC1
Endrin ketone	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Endrin aldehyde	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Heptachlor	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Heptachlor epoxide	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Hexachlorobenzene	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Methoxychlor	0.5	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Organotins compounds									

Parameter	LOR	No. Detects	Screening Level	Distribution	95% UCL	Min	Max	Mean	Geometric Average
Monobutyltin as Sn	1	0	n/a	NC1	NC1	NC1	NC1	NC1	NC1
Dibutyltin as Sn	1	4	n/a	NC2	NC2	1.00	3.00	2.00	1.86
Tributyltin as Sn	0.5	12	9	Log Normal	3.25	0.60	14.80	2.96	1.73
Total Petrol Hydrocarbons (TPH)									
TPH C10 - C14	3	8	n/a	Normal	13.1	4.00	25.00	8.56	6.95
TPH C15 - C28	3	12	n/a	Normal	30.38	4.00	52.00	23.13	17.64
TPH C29 - C36	5	10	n/a	Normal	30.66	12.00	51.00	28.67	26.37
Total TPH	n/a	12	550	Normal	69.7	4.00	107.00	51.20	33.66
Polynuclear Aromatic Hydrocarbons (PAHs)									
Naphthalene	5	1	n/a	NC2	NC2	NC2	NC2	NC2	NC2
2-Methylnaphthalene	5	0	n/a	NC2	NC2	NC2	NC2	NC2	NC2
Acenaphthylene	4	9	n/a	Normal	10.78	6.00	16.00	9.27	8.95
Acenaphthene	4	1	n/a	NC2	NC2	10.00	10.00	10.00	10.00
Fluorene	4	1	n/a	NC2	NC2	5.00	5.00	5.00	5.00
Phenanthrene	4	10	n/a	Normal	24.27	7.00	95.00	19.00	13.30
Anthracene	4	6	n/a	Normal	6.83	5.00	19.00	8.43	7.60
Fluoranthene	4	11	n/a	Normal	88.89	8.00	348.00	56.15	34.15
Pyrene	4	12	n/a	Normal	94.25	4.00	384.00	57.50	32.06
Benz(a)anthracene	4	11	n/a	Normal	48.72	5.00	154.00	30.46	21.12
Chrysene	4	11	n/a	Normal	39.94	4.00	146.00	25.85	16.92
Indeno(1-2-3-cd)pyrene	4	10	n/a	Normal	24.95	10	89	24.8	20.03
Dibenz(a-h)anthracene	4	5	n/a	NC1	NC2	5	24	10.8	9.12
Benzo(g-h-i)perylene	4	11	n/a	Normal	31.67	5	113	28.9	21.9
Coronene	5	8	n/a	Normal	7.029	5.00	21.00	7.67	6.76

Parameter	LOR	No. Detects	Screening Level	Distribution	95% UCL	Min	Max	Mean	Geometric Average
Benzo(e)pyrene	4	10	n/a	Normal	22.41	8.00	88.00	21.00	16.55
Perylene	4	12	n/a	Normal	144.1	6.00	178.00	47.08	29.00
Total PAHs (as above)	4	12	10000	Normal	493.1	4.00	1990.00	460.94	233.42

Blue shading = parameter not detected; Orange shading = UCL95% > screening level, ND = No Data, NC1 = not calculated due to no detections; NC2 = not calculated due to >30% of values being non-detects (applicable only to parameters with screening levels)

3.2.5 Polyaromatic Hydrocarbons (PAHs)

Low level detections of PAHs were recorded at all locations in all dredge zones (Table 3-3). Total PAHs concentrations (corrected to 1% TOC) ranged from 4 to 1990 µg/kg, well below the NAGD screening level of 10,000 µg/kg in all samples. The 95% UCL for total PAHs across all dredge zones was 493.1 µg/kg, which was lower than 2019 (1261 µg/kg), 2018 (638 µg/kg) and 2017 (524 µg/kg).

3.2.6 Organochlorine Pesticides (OCPs)

There were no detections of OCPs within the dredge zones, therefore Phase III test (elutriate and bioavailability) was not undertaken.

3.2.7 Polychlorinated Biphenyls (PCBs)

Concentrations of PCBs were below the laboratory LOR (e.g. 0.50 µg/kg) at all investigated locations. No assessment of PCBs was undertaken at the reference locations.

Therefore, the sediments in the dredge zones are considered suitable for ocean disposal as per the NAGD guidelines with respect to PCBs.

3.2.8 Radionuclides

Gross alpha and gross beta activity ranged between <0.5 (LOR) to 1.09 Bq/g dry weight and <0.5 (LOR) to 0.53 Bq/g dry weight respectively. These values were within the range recorded in previous years and well below the NAGD screening level of 35 Bq/g.

Therefore, the NAGD screening level for the sum of gross alpha and beta (35 Bq/g) was not exceeded in any samples, and on this basis sediments in the dredge zones are considered suitable for ocean disposal as per the NAGD guidelines with respect to radionuclides.

3.2.9 Acid Sulfate Soils

Acid sulfate soil test results are presented in Table 3-4. The pH_{kcl} results ranged from 6.9 to -9.0 (alkaline) and TAA was below LOR, indicating that there was no existing acidity in sediments.

Results of acid neutralising capacity (ANC) ranged from 1.99% at site B5-1 to 8.95% $CaCO_3$ at site B15.2. The mean ANC in the current survey is 4.2% $CaCO_3$ which indicate that sediments have a high capacity to self-neutralise if exposed to oxygen. Based on the net acidity (sulfur units) and net acidity (acidity units) results, all samples were below the action criteria of 0.03% S and 18 moles H+/t which indicating PASS to be absent and liming would not be required to treat soils if placed on land.

Table 3-4 Acid Sulfate Soil Results (Chromium Suite and SPOCAS)

Parameter	Units	QPL	Zone 2							Zone 3						Zone 4	
			B9-1	B7-1	B6-3	B5-1	B5-1B	B5-0	B9-1	B10-6	B10-6B	B15-3	B15-2	B12-1	B11-8	B13-8	B13-1
Actual Acidity																	
pH KCl	pH Unit	0.1	8.9	8.2	8.1	6.9	8.2	7.4	8.7	8.4	8.3	9.0	8.8	8.8	8.3	8.6	8.7
Titratable Actual Acidity	mole H+ / t	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity	% pyrite S	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Potential Acidity																	
Chromium Reducible Sulfur	% S	0.005	0.089	0.240	0.258	0.292	0.222	0.247	0.108	0.375	0.247	0.125	0.252	0.055	0.239	0.183	0.137
acidity - Chromium Reducible Sulfur)	mole H+ / t	10	55	150	161	182	139	154	68	234	154	78	158	34	149	114	85
Acid Neutralising Capacity																	
Acid Neutralising Capacity	% CaCO3	0.01	4.65	5.96	2.82	1.99	3.69	2.32	3.87	3.58	3.76	5.28	8.95	3.37	3.68	5.46	4.92
acidity - Acid Neutralising Capacity)	mole H+ / t	10	930	1190	563	397	737	464	774	716	750	1060	1790	673	736	1090	983
sulfidic - Acid Neutralising Capacity	% pyrite S	0.01	1.49	1.91	0.90	0.64	1.18	0.74	1.24	1.15	1.20	1.69	2.87	1.08	1.18	1.75	1.58
Acid Base Accounting																	
ANC Fineness Factor		0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	% S	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	mole H+ / t	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Liming Rate	kg CaCO3/t	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	% S	0.02	0.09	0.24	0.26	0.29	0.22	0.25	0.11	0.37	0.25	0.12	0.25	0.06	0.24	0.18	0.14
Net Acidity excluding ANC (acidity units)	mole H+ / t	10	55	150	161	182	139	154	68	234	154	78	158	34	149	114	85
Liming Rate excluding ANC	kg CaCO3/t	1	4	11	12	14	10	12	5	18	12	6	12	2	11	8	6

4 Data Validation

4.1 Laboratory QA/QC

Details of the laboratory QA/QC for the primary and secondary laboratories is provided in the following sections. Refer to Section 2.5.2 for a description of laboratory QA/QC procedures.

4.1.1 Limits of Reporting (LORs)

All LORs used by the primary laboratory were below NAGD screening levels.

4.1.2 Sample Holding Times and Storage Conditions

All samples were received by the laboratories in appropriately pre-treated and preserved containers. Samples were chilled with ice whilst in the field and during delivery (ice packs). Most analyses were undertaken by the laboratories within recommended holding times. The exception were organotin compounds and OCPs for Phase 3 tests in samples B15-2 and B12-1 however this was not an issue due to findings from Phase 2 testing. The holding time for NOx in samples B7-1, B5-1, B5-0/B5-0b and B6-3 was exceeded, and the holding times breaches were due to laboratory analysis delays, however.

4.1.3 Laboratory Blanks

Results indicated that the laboratory blank assessment was within the acceptable criteria.

4.1.4 Laboratory Duplicates

Results indicated that the laboratory duplicates were within the acceptable criteria.

4.1.5 Surrogate and Matrix Spikes

The assessment of surrogate and matrix spike recoveries was satisfactory for all samples. The exception was matrix spike recovery for metals, TRH volatiles/BTEX, OPC (water) and organotin (water) due to recovery outside of the data quality objective range.

4.2 Field QA/QC

4.2.1 Field Trip Blank

No volatile Total Petroleum Hydrocarbons (TPH C6-C9) were detected in any trip blank samples, indicating that samples were not contaminated with volatile organic carbons during field sampling and processing of samples.

4.2.2 Field Triplicates and Splits

Analyses of field triplicate and split samples were within the ±50 % NAGD criterion for RPDs for most parameters. Parameters reported outside the threshold are presented in Table 4-1.

The source of variation is not known, noting the greatest variability occurred between the secondary and primary laboratories, most likely due to differences in laboratory procedures. The exceedance of the NAGD criterion for these parameters was not considered problematic given the concentrations were below the screening levels.

Table 4-1 Field triplicate and triplicate split samples exceeding the recommended RSD

Parameter	Primary Sample	Triplicate B	Triplicate C	RSD (%)
B6-2				
Cadmium	0.2	2.2	0.38	119.4
Copper	49.3	26.6	230	109.3
Lead	13.7	33.5	16	51.4
Silver	0.1	0.1	0.31	71.3
Monobutyltin	<1	<1	15.3	143.2
DDE	<0.5	<0.5	1.5	69.3
B10-6				
Monobutyltin	1	1	17.5	146.6
gamma-BHC	0.25	0.25	1	86.6
Fluoranthene	32	21	8	59.1
Pyrene	34	23	10	53.8
Chrysene	16	10	5	53.3
Benzo(a)pyrene TEQ (LOR)	36	26	5.8	68.1
B5-1				
Cadmium	0.3	0.1	0.11	66.3
Silver	0.4	0.1	0.29	57.6
Nitrite + Nitrate as N	0.1	0.2	0.5	78.1
C6 - C9 Fraction	3	3	25	122.9
C10 - C14 Fraction	3	3	10	75.8
C15 - C28 Fraction	23	14	50	64.6
C29 - C36 Fraction	25	16	50	58.1
C6 - C10 Fraction	3	3	25	122.9
>C10 - C16 Fraction	3	3	10	75.8
>C34 - C40 Fraction	15	10	50	87.2
Monobutyltin	<1	<1	10.5	131.6
Dibutyltin	3	<1	6.4	78.8
Tributyltin	0.9	2	18.2	137.7
DDE	<0.5	<0.5	1.7	77.0
Phenanthrene	9	28	34	55.1
Benzo(b+j)fluoranthene	21	36	66	55.9
Benzo(k)fluoranthene	8	21		63.4

Parameter	Primary Sample	Triplicate B	Triplicate C	RSD (%)
Perylene	178	27	61	89.3
Indeno(1.2.3.cd)pyrene	12	26	120	111.5
Benzo(a)pyrene TEQ (zero)	23	57		60.1
Benzo(a)pyrene TEQ (half LOR)	25	57		55.2
B11-9				
Monobutyltin	<1	<1	16.8	145.6
Dibutyltin	<1	<1	5.1	100.0
Tributyltin	0.6	0.5	7.1	138.4
B13-4				
Monobutyltin	<1	<1	13.7	140.1
DDE	<0.5	<0.5	1.4	65.0

4.3 Summary of Data Validation

Results from the present study indicated that the survey was undertaken to a high standard providing scientific confidence that the presented results are valid to allow an assessment of sediment quality against the NAGD guidelines.

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Appendix A Sampling and Analysis Plan

A part of BMT in Energy and Environment

Port of Brisbane Maintenance Dredging - Sediment Sampling and Analysis Plan 2013

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Port of Brisbane Maintenance Dredging - Sediment Sampling and Analysis Plan 2013

Prepared for:	Port of Brisbane Pty Ltd
Prepared by:	BMT WBM Pty Ltd (Member of the BMT group of companies)

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1 Introduction

Port of Brisbane Pty Ltd (PBPL) is required to maintain a minimum depth of clearance below the keel of vessels calling at the port to allow for effective shipping access to the port and ensure ship safety. Channel depths are declared by the Harbour Master (Maritime Safety Queensland) and displayed on various shipping charts. PBPL undertakes an annual maintenance dredging program to ensure these minimum depths are maintained.

PBPL propose to undertake its annual maintenance dredging within the navigational areas of the Brisbane River and Moreton Bay, primarily using the Trailer Suction Hopper Dredge (TSHD) 'Brisbane'. Maintenance dredging works extend from the Hamilton Reach of the Brisbane River to the North West Channel located in northern Moreton Bay.

PBPL aims to ensure that all dredging activities, including extraction and placement of material, are undertaken in accordance with existing legislation and with minimal environmental harm. A key component of achieving this aim is to undertake a contaminant assessment of the material proposed for dredging prior to the commencement of the dredging program.

1.1 Sediment Sampling and Analysis Plan (SAP) Objectives

The aim of this SAP is to provide a set of procedures that will allow a statistically valid evaluation of the physical and chemical sediment properties of the sediments to be dredged. The results of this assessment will assist in determining the likely impacts of unconfined offshore disposal of the dredged sediment.

The assessment of physico-chemical sediment properties will be undertaken on the basis of the approach set out in the National Assessment Guidelines for Dredging (Commonwealth of Australia 2009; henceforth NAGD).

The specific SAP objectives are to:

- Provide a summary of proposed dredging and disposal operations for the project;
- Identify a list of contaminants based on a review of existing data and potential contaminant sources;
- Determine the number of samples required to provide an adequate characterisation of the physical and chemical sediment properties;
- Develop procedures for adequate field collection and handling of sediment samples;
- Outline adequate quality assurance and quality control (QA/QC) procedures for field sampling and laboratory analysis;
- Provide a description of statistical procedures used to determine the contaminant status of the dredged material;
- Describe procedures for validating the analytical data to assess whether the sample collection, handling and laboratory analysis was undertaken to a standard allowing assessment of sediment quality against the NAGD guidelines; and

- Outline the proposed reporting framework for the sediment quality results that will address the requirements of the Determining Authority.

1.2 Proposed Dredging

PBPL's area of responsibility in relation to maintenance and capital dredging within port limits can be broadly divided into two zones on the basis of the water body type, navigable depths and nature of dredged material:

- Moreton Bay zone (enclosed/open coastal waters); and
- Brisbane River zone including the Port of Brisbane (middle/lower estuary).

This SAP only considers assessment of sediments for the Brisbane River zone. The Brisbane River zone extends from Hamilton Reach to the Outer Bar Cutting. Annual maintenance dredging is required to remove sediments accumulated by natural siltation processes within the catchment and sediment loads from residential and commercial developments.

To ensure that declared depths of navigational channels are maintained at all times, PBPL undertakes 'insurance' dredging of up to -0.5 metres below the declared depth.

On average, PBPL dredges about 400,000 m^3 to 450,000 m^3 of material each year. Additional dredging needs to be undertaken following major flood events, i.e. in 2011 and 2013.

The Brisbane River zone is divided into different dredging subareas based on existing contaminant data (Figure 2-1), comprising Zone 2, Zone 3 and Zone 4. It is noted that Zone 1 is not part of the annual dredging and samples from this zone have been used to collect control samples upstream of the actual dredging areas.

The following average dredge volumes apply to the dredge subareas (Table 1-1):

Table 1-1 Approximate Maintenance Dredge Volumes

Dredging Subarea	Extents	Average Dredge Volume (m^3)
Zone 2	Colmslie to Pinkenba	150,000
Zone 3	Within port reaches	250,000
Zone 4	Moreton Bay entrance channel	30,000

The maintenance dredging program is structured to maximise efficiencies and utilisation of PBPL's largest dredger, the trailing suction hopper dredge *TSHD Brisbane*. The *TSHD Brisbane* typically carries out the majority of the ports maintenance dredging over a two month period between January and May (actual period varies depending on other commitments of the *TSHD Brisbane* and siltation patterns). The PBPL may also utilise smaller, more manoeuvrable dredging plant, such as grab dredgers and bed levellers, to maintain more confined areas within the Port Limits.

1.3 Offshore Disposal

The PBPL's policy with regard to dredged material is to maximise its beneficial reuse. In general, most of the material dredged by the PBPL from within Port Limits is used in reclamation works associated with development of the port. The reuse of this dredged material provides several benefits, including:

- Reduced pressure on sea disposal sites;
- The placement of any actual or potential acid sulphate material at depth beneath the water surface; and
- The containment of any contaminated material within a designated boundary, disconnected from the marine system and monitored to ensure the immobility of identified contaminants.

In 2009, the reclamation life of the Future Port Expansion (FPE) area was estimated to be approximately 30 years, based on the current level of port development at that time. Following extreme flood events in both 2011 and 2013 and the subsequent disposal of additional material in the FPE area, the estimated life of the FPE area was reduced by 20 years to 10 years. Given the importance of the FPE as an area to dispose of material unsuitable for ocean disposal, there has been a shift in thinking around the management of the FPE area.

The current proposed management of dredged material is to, where practical, dispose at sea all dredged material deemed suitable for ocean disposal. This proposed management initiative will ensure the long term viability of the FPE area for the disposal of material deemed unsuitable for ocean disposal.

In the past, significant quantities of dredged material from the Brisbane River have been placed offshore at the Mud Island Dredge Material Placement Area (DMPA) (Figure 2-1). In recent years only smaller volumes of dredged material from boat harbours in southern Moreton Bay were placed at the Mud Island DMPA. However, it is proposed that the Mud Island DMPA will be utilised for material found suitable for ocean disposal in future PBPL maintenance dredging campaigns.

2 Review of Existing Information

Prior to each annual maintenance dredging campaign, PBPL undertook assessments of sediment quality at 45 sampling locations within the dredging zones 2 to 4 (Figure 2-1).

Additional samples were obtained from three locations in Zone 1 and Breakfast Creek upstream of the dredging area in order to assess potential sediment quality impacts from the upstream catchment. The sediment quality results for the annual sampling program between 2000 and 2013 are summarised in Section 2.1.

Due to major flooding in the Brisbane River catchment in early January 2011 and late January 2013, emergency dredging was required to maintain declared depths. Twelve to twenty locations were sampled within the port and three to four locations within the Mud Island DMPA for the 2011 and 2013 flood sampling campaigns, respectively. The sediment quality assessments included elutriate and bioavailability analyses for selected trace metals and organic contaminants.

Additionally, a comparison of sediment quality (organochlorine pesticides and dioxins) at 14 sampling locations at the Mud Island DMPA and seven reference sites in Moreton Bay (Sites RF1 to RF7 in Figure 2-1) was undertaken in 2013 to assess if the emergency dredging and disposal activities impacted on sediment and water quality in Moreton Bay. The sediment quality results for the 2011 and 2013 flood sampling are summarised in Section 2.2.

Conclusions based on the review of the annual and flood sampling data are provided in Section 2.3.

2.1 Annual Sediment Quality Data 2000 – 2013

Detailed sediment quality studies have been undertaken within the Port of Brisbane since 1998. This review considers sediment quality data collected between 2000 and 2012. This comprises the studies detailed in Table 2-1.

In addition to the routine monitoring documented in Table 2-1, further sampling was carried in 2011 and 2013 (Worley Parsons 2011b, 2013b, 2013c, 2013d) to assess the effects of floods on sediment quality. Refer to Section 2.2 for a description of these studies.

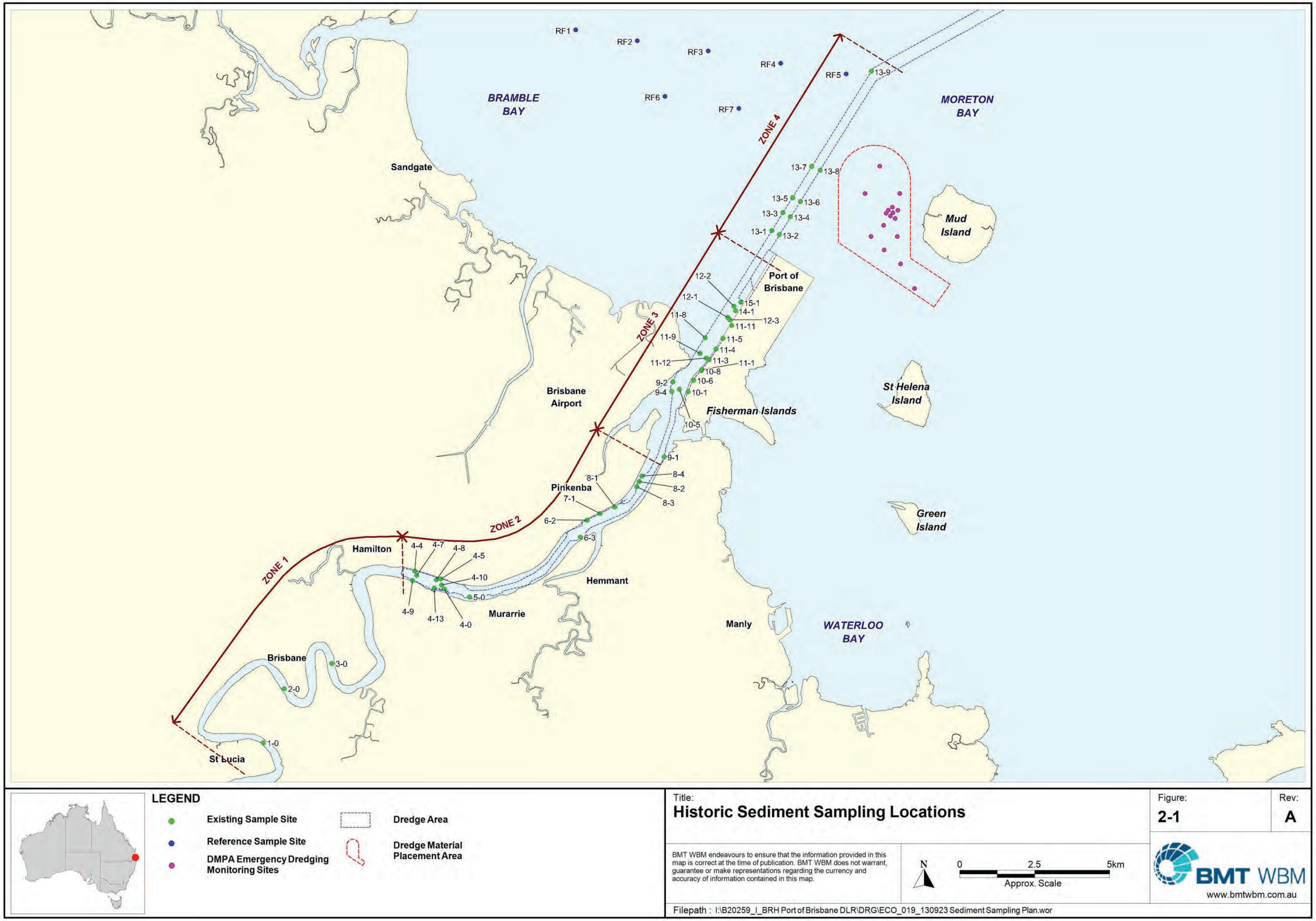
Table 2-1 Previous Routine Annual Sediment Quality Studies

Reference	Sampling Date
Maunsell McIntyre (2001)	November 2000
Butler Partners (2002)	November 2001
Hydrobiology (2003)	November 2002
Hydrobiology (2004)	November 2003
SKM (2005)	November 2004
SKM (2006)	January 2006
SKM (2007)	February 2007
Worley Parsons (2008)	January 2008
Worley Parsons (2009)	February 2009
GHD (2010)	January 2010
Worley Parsons (2011a)	December 2010
Worley Parsons (2012)	December 2011
Worley Parsons (2013a)	December 2012

A wide range of analytical parameters have been measured between 2000 and 2012 as summarised in Table 2-2. Analysis was undertaken at a total of 45 locations within the dredge areas. Additional samples were collected from three control locations upstream of the dredging areas as well as from Breakfast Creek (these locations are not within the dredge areas).

Table 2-2 Summary of Sediment Quality Data 2000 - 2012

Analytical Parameter	Measurement Events
Inorganics	
Metals & Metalloids	2000-2012
Organics	
Organotins	2000-2012
Total Petroleum Hydrocarbons (TPHs)	2000-2012
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	2000-2012
Polycyclic Aromatic Hydrocarbons (PAHs)	2000-2012 (30% of locations)
Organophosphate and Organochlorine Pesticides (OPPs and OCPs)	2000-2012 (40% of locations between 2000 and 2006)
Polychlorinated Biphenyls (PCBs)	2000-2012 (30% of locations)
Radionuclides	2010-2012
Acid Sulfate Soils	2000-2012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WATERLOO BAY
Sandgate
Brisbane Airport
Port of Brisbane
Fisherman Islands
Mud Island
St Helena Island
Green Island
Pinkenba
Hamilton
Hemmant
Murarrie
Manly
Brisbane
St Lucia
ZONE 1
ZONE 2
ZONE 3
ZONE 4
RF1
RF2
RF3
RF4
RF5
RF6
RF7
LEGEND
Existing Sample Site
Reference Sample Site
DMPA Emergency Dredging Monitoring Sites
Dredge Area
Dredge Material Placement Area
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2.1.1 Metals and Metalloids

Testing for metals and metalloids has included analysis of arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc between 2000 and 2012. Antimony and silver were also tested between 2001 and 2004.

The main contaminants of potential concern in terms of metals and metalloids were mercury and nickel. Mercury and nickel concentrations frequently exceeded the NAGD screening level at the 95% Upper Confidence Limit of the mean (95% UCL). Silver exceeded the NAGD screening level at the 95% UCL between 2002 and 2004. All other metals and metalloid 95% UCL concentrations were generally below the 95% UCL between 2000 and 2013.

The temporal and spatial trends observed for trace metals between 2000 and 2012 are detailed in the following sections.

2.1.1.1 Mercury

The NAGD screening level for mercury (0.15 mg/kg) was exceeded on numerous occasions in the Brisbane River dredge zones, particularly in Zone 2. Figure 2-2 shows the number of occasions when the screening level was exceeded between 2000 and 2012 and the number of sites for dredge zones 2 to 4 where exceedances were noted.

For Zone 2, mercury concentrations exceeded the screening level on 61 - 70% of occasions at 25% of locations. At a similar number of sites in Zone 2 exceedances were noted on 20 – 40% of occasions between 2000 and 2012.

Some exceedances of the mercury screening level were noted also for Zone 3 and Zone 4. However, those exceedances occurred only at a limited number of sites whilst no screening level exceedances were noted at 70 – 80% of locations in Zone 3 and Zone 4 between 2000 and 2012.

In Zone 3 most exceedances of the mercury screening level occurred at three sites (9-2, 10-6 and 11-8) occurring on 31 – 69% of occasions. In Zone 4, exceedances were only noted at two sites (13-5 and 13-6) on 8 – 23% of occasions.

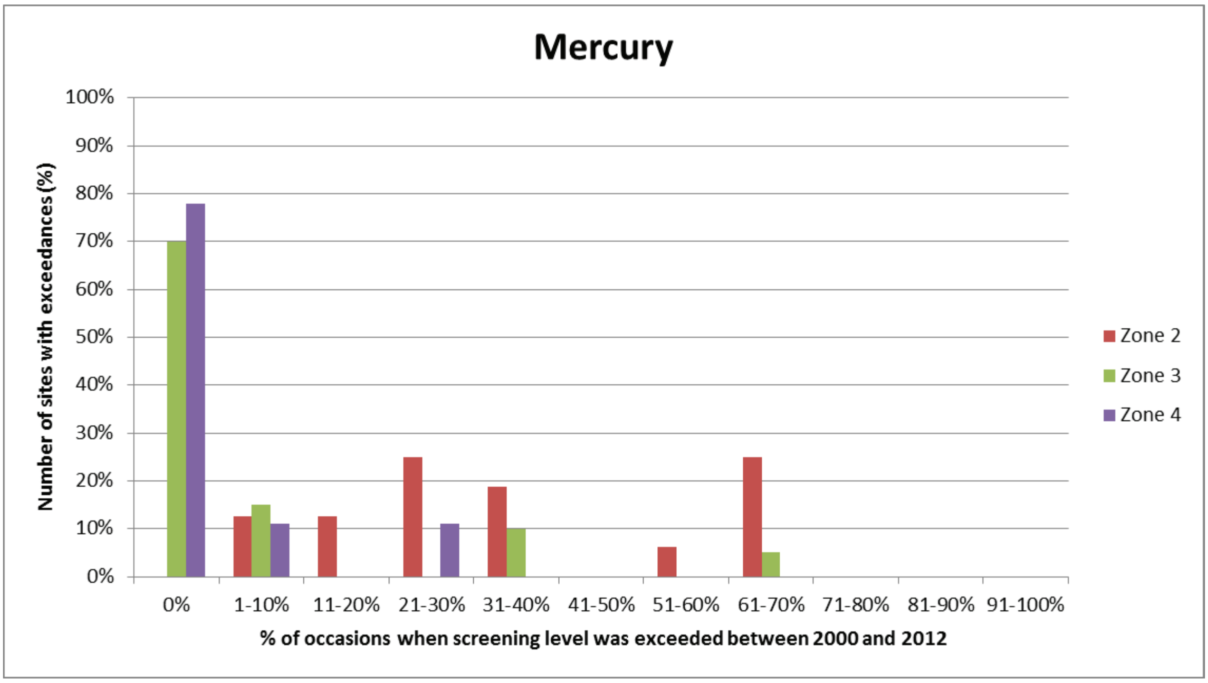

Figure 2-2 Exceedances of the NAGD Screening Level for Mercury between 2000 and 2012 in Dredge Zones 2, 3 and 4

2.1.1.2 Nickel

Exceedances of the nickel screening level (21 mg/kg) were noted for most locations across all dredge zones (Figure 2-3). Exceedances of the screening level on more than 80% of occasions were noted at a cumulative 56% of sites in Zone 2, 20% of sites in Zone 3 and 11% of sites in Zone 4. Average Nickel concentrations were 24.2 mg/kg for Zone 2, 20.1 mg/kg for Zone 3 and 21.4 mg/kg for Zone 4, i.e. close to the nickel screening level of 21 mg/kg.

Given the widespread exceedances of the nickel screening level across all dredge zones and that exceedances were also commonly noted for the upstream control sites, it appears likely that the elevated nickel concentrations are of natural origin. It is recognised that sediments in Australia including South-East Queensland commonly have high natural levels of nickel (NAGD 2009 and Preda & Cox 2002).

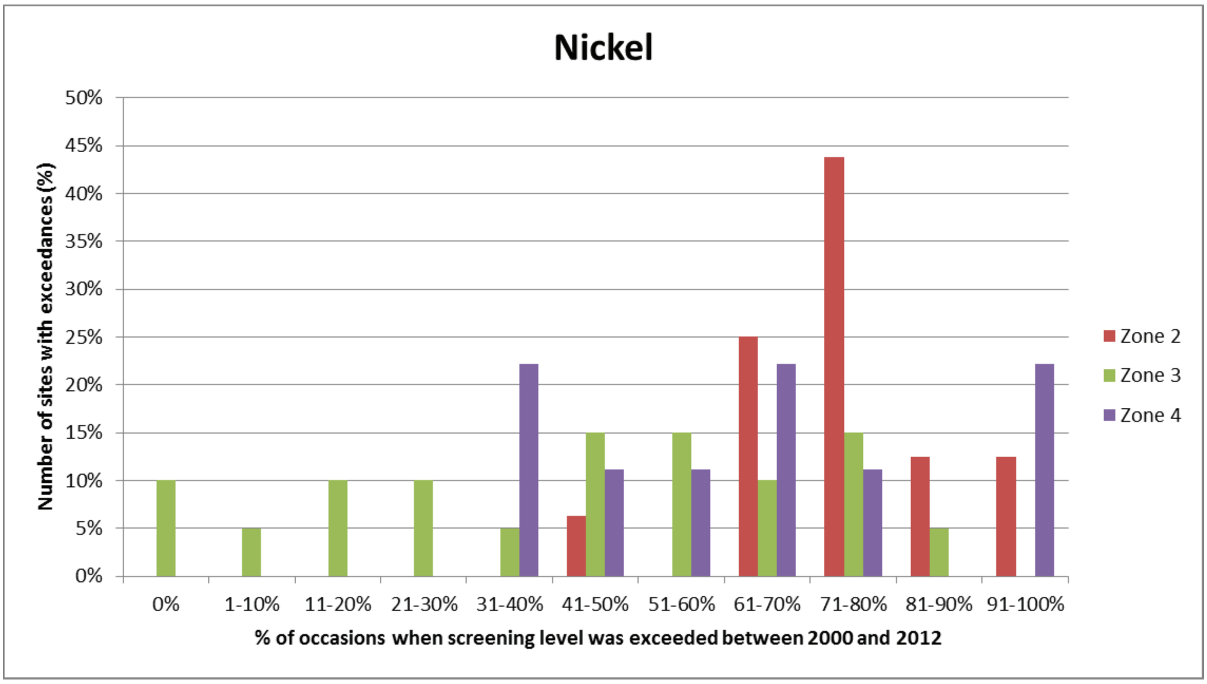

Figure 2-3 Exceedances of the NAGD Screening Level for Nickel between 2000 and 2012 in Dredge Zones 2, 3 and 4

2.1.1.3 Arsenic

Concentrations for arsenic were below the NAGD screening level of 20 mg/kg at all locations and dredge zones between 2000 and 2012.

2.1.1.4 Cadmium

Cadmium concentrations were below the NAGD screening level of 1.5 mg/kg with the exception of one site in Zone 2 (Site 6-2) where the screening level was met or exceeded between 2007 and 2009 with concentrations ranging between 1.5 – 6.3 mg/kg.

However, cadmium concentrations were below screening level at all locations between 2010 and 2012. The 95% UCL for cadmium was below the screening level between 2000 and 2013 for all dredge zones.

Average cadmium concentrations between 2000 and 2012 were 0.30 mg/kg for Zone 2, 0.20 mg/kg for Zone 3 and 0.17 mg/kg for Zone 4, i.e. well below the screening level across all dredge zones.

2.1.1.5 Chromium

Chromium concentrations were mostly below the screening level of 80 mg/kg. The only exceptions were noted at site 9-1 in Zone 3 where the screening level was exceeded in 2002 and 2012 with concentrations ranging between 94 – 100 mg/kg. However, the 95% UCL remained below the screening level. Furthermore, exceedances of the chromium screening level were noted at four sites in Zone 2 in 2000 with concentrations ranging between 88.6 – 101 mg/kg.

2.1.1.6 Copper

Copper concentrations exceeded the NAGD screening level of 65 mg/kg on a few occasions in Zone 2 and Zone 3. No exceedances of the copper screening level were noted for Zone 4 (Figure 2-4).

In Zone 2 exceedances were noted at five out of sixteen locations, with only one to two detections noted at four of these locations between 2000 and 2012. At site 6-2 in Zone 2 exceedances of the screening level occurred on 46% of occasions. However, in 2011 and 2012 copper concentrations were below the screening level at this site.

The only exceedances of the copper screening level in Zone 3 were noted for site 9-1 in 2000 and 2008.

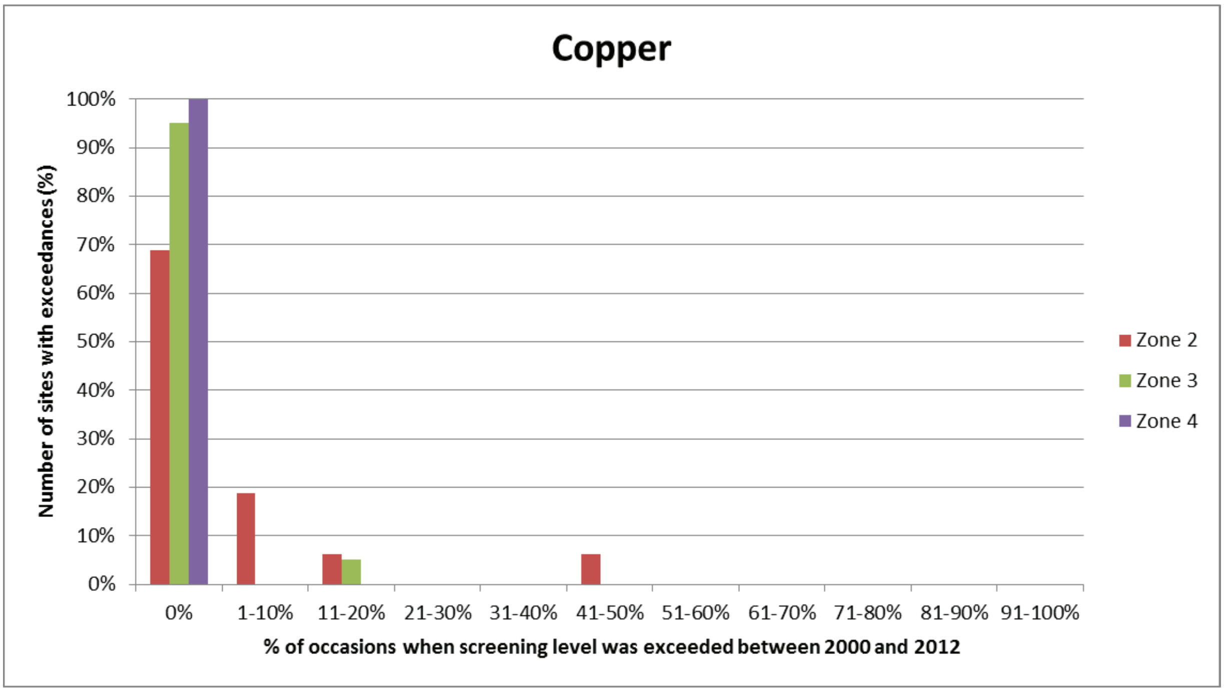

Figure 2-4 Exceedances of the NAGD Screening Level for Copper between 2000 and 2012 in Dredge Zones 2, 3 and 4

2.1.1.7 Lead

Some individual exceedances of the lead screening level (50 mg/kg) were noted, in particular in Zone 2 where exceedances were noted at seven locations (Figure 2-5). Since 2001 there were only single detections of lead above the screening level noted per annual sampling event. The 95% UCL for lead was below the NAGD screening level since 2001.

Exceedances on individual sites were noted on less than 20% of occasions, i.e. only once or twice between 2000 and 2012 in Zone 2. In Zone 3 and Zone 4, the only exceedances of the lead screening level were noted at single sites (9-1 in Zone 3 and 13-4 in Zone 4) and only on one or two occasions between 2000 and 2012.

The last screening level exceedance was noted in 2009 for Zone 2, in 2000 for Zone 3 and in 2010 for Zone 4. The average concentrations of lead between 2000 and 2012 were 26.9 mg/kg for Zone

2, 13.7 mg/kg for Zone 3 and 12.3 mg/kg for Zone 4, i.e. well below the screening level across all dredge zones.

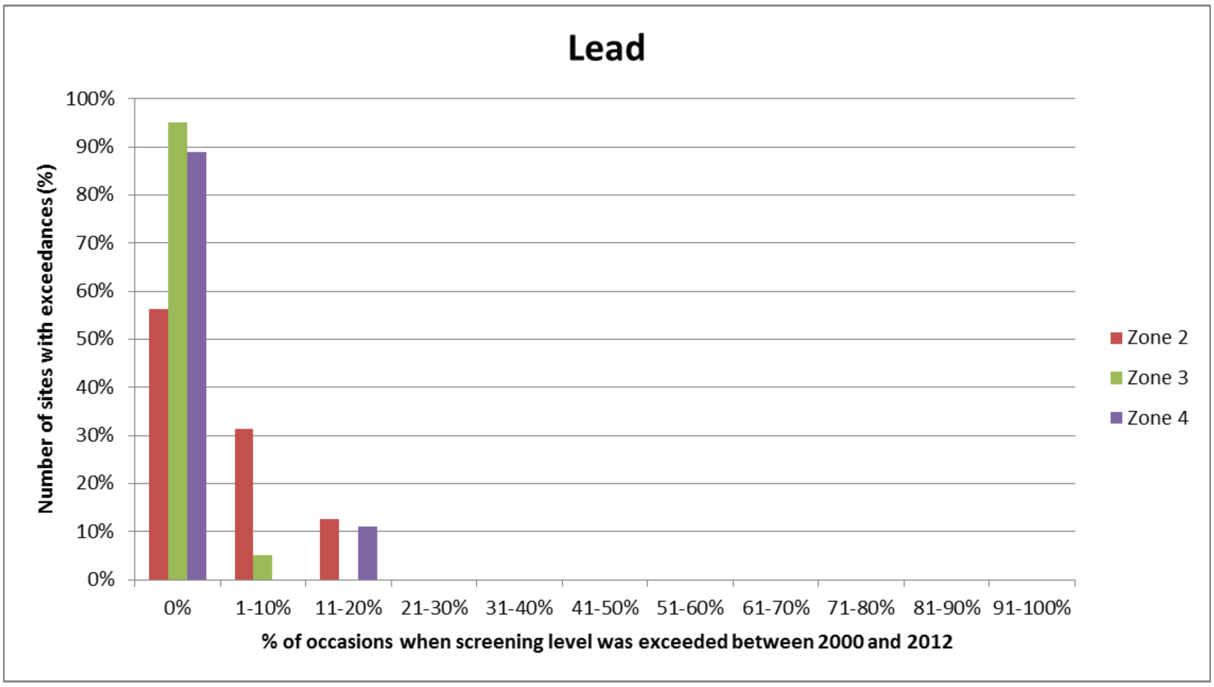

Figure 2-5 Exceedances of the NAGD Screening Level for Lead between 2000 and 2012 in Dredge Zones 2, 3 and 4

2.1.1.8 Zinc

Individual exceedances of the zinc screening level (200 mg/kg) were noted at eight locations in Zone 2. However, most of these exceedances occurred only once or twice (<15% occurrence) between 2000 and 2012 (Figure 2-6). Only at location 6-2 exceedances occurred on more than 30% of occasions (four times between 2000 and 2012). It is noted that the last exceedance of the zinc screening level in Zone 2 occurred in 2010.

In Zone 3 only a single exceedances was noted at location 9-1 in 2000. No exceedances of the zinc screening level were noted in Zone 4.

The average zinc concentration between 2000 and 2012 was 130.3 mg/kg for Zone 2, 74.0 mg/kg for Zone 3 and 57.1 mg/kg for Zone 4, i.e. well below the NAGD screening level across all dredge zones.

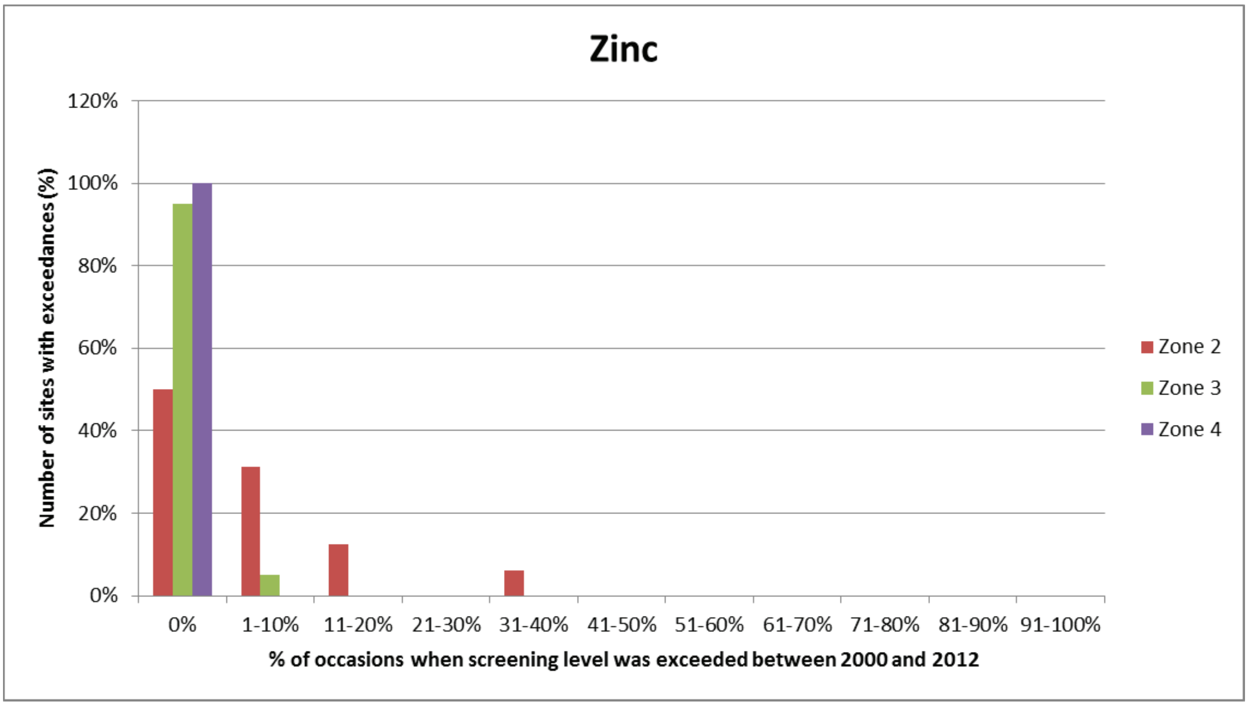

Figure 2-6 Exceedances of the NAGD Screening Level for Zinc between 2000 and 2012 in Dredge Zones 2, 3 and 4

2.1.1.9 Antimony and Silver

In addition to the metals and metalloids outlined above, antimony and silver were tested between 2001 and 2004. While antimony concentrations remained below the Limit of Reporting (LOR) for all sampling events, silver was detected at several locations and concentrations exceeded the screening level at one site in Zone 3 (11-8) between 2002 and 2004.

2.1.2 Organotins

Concentrations of TBT at the 95% UCL frequently exceeded the NAGD screening level (9 µg Sn/kg) between 2000 and 2012, particularly in dredge zones 2 and 3.

Exceedances of the TBT screening level were noted predominantly in Zone 2, including several exceedances of the NAGD high level of 70 µg Sn/kg (Figure 2-7). At sampling site 4-4 in Zone 2, the screening level was exceeded during all sampling events except in 2001, including six exceedances of the NAGD high level. At several other locations in Zone 2, screening level exceedances were noted between 20 to 70% of occasions.

In Zone 3, exceedances of the TBT screening level were typically only noted once or twice between 2000 and 2013, corresponding to 8% and 15% of occasions in Figure 2-7. The only exception was site 9-1, where exceedances of the screening level were noted on 69% of occasions. This included five sampling events where the NAGD high level was exceeded. This corresponds to a generally higher occurrence of metal/metalloid exceedances at this site as outlined in Section 1.1.1. It is noted that site 9-1 is the site located closest to Zone 2.

Only a single exceedance of the TBT screening level was noted at site 13-1 in Zone 4 in 2006.

The average normalised TBT concentration between 2000 and 2012 was 28.8 µg Sn/kg for Zone 2, 21.8 µg Sn/kg for Zone 3 and 0.7 µg Sn/kg for Zone 4. If site 9-1 is excluded from Zone 3, the average concentration is 4.4 µg Sn/kg, i.e. less than the NAGD screening level.

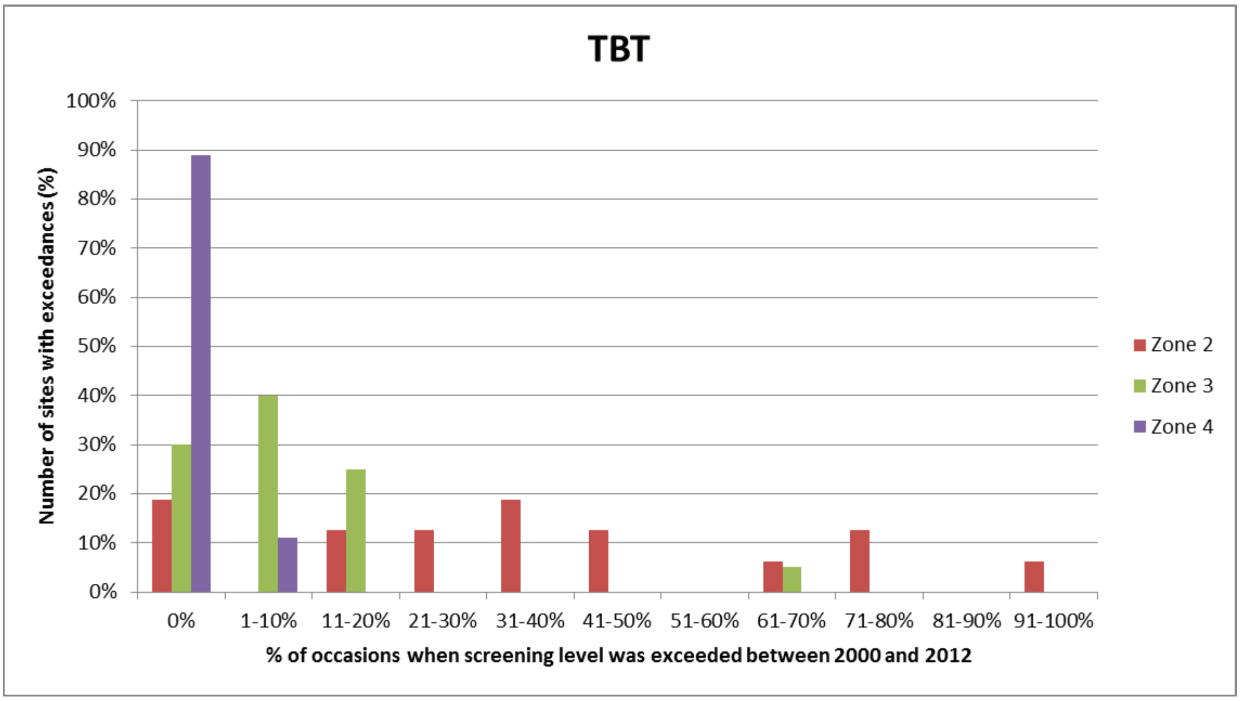

Figure 2-7 Exceedances of the NAGD Screening Level for TBT between 2000 and 2012 in Dredge Zones 2, 3 and 4

2.1.3 Benzene, Toluene, Ethylbenzene and Xylene (BTEX)

BTEX concentrations were below LOR in all samples and all zones between 2000 and 2012.

2.1.4 Total Petroleum Hydrocarbons (TPHs)

While TPHs were detected on several occasions across all dredge zones, the total TPH concentration was below the NAGD screening level of 550 mg/kg at all sampling locations between 2000 and 2012. Most detections of TPHs were noted in Zone 2, with less detections noted for Zone 3 and only some isolated detections recorded in Zone 4.

2.1.5 Polycyclic Aromatic Hydrocarbons (PAHs)

Total PAHs concentrations were mostly below the NAGD screening level of 10,000 µg/kg except for two individual detections above screening level in Zone 2 and Zone 3 in 2001. The 95% UCL for PAHs exceeded the screening level in 2011. However, since 2001, the total PAHs concentrations remained well below the screening level for all dredge zones.

2.1.6 Polychlorinated Biphenyls (PCBs)

Total PCBs concentrations were mostly well below the NAGD screening level of 23 µg/kg or below LOR. The only exceptions were site 10-6 in Zone 3 where detections above the screening level were noted in 2001 and 2012 and site 13-1 in Zone 4, where a detection above screening level was noted in 2011.

2.1.7 Organochlorine Pesticides (OCPs)

The 95% UCL concentrations of the OCPs dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyldichloroethane (DDD) and Dichlordiphenyldichloroethylene (DDE) frequently exceeded the NAGD screening level between 2000 and 2013. In some cases the 95% UCL concentrations of chlordane also exceeded the NAGD screening level.

Total DDT concentrations and its metabolites DDD and DDE exceeded their respective screening levels (1.6, 2 and 2.2 µg/kg for DDT, DDD and DDE, respectively) on numerous occasions across all dredge zones (). This includes some exceedances of the NAGD high levels for DDT (46 µg/kg) and DDD (20 µg/kg), but DDE concentrations did not exceed the NADG high level of 27 µg/kg.

Most of these screening level exceedances for DDT, DDD and DDE were recorded at Zone 2, occasional exceedances of all three parameters were also recorded in Zone 3 and 4 between 2000 and 2012. The DDT breakdown product DDE was generally detected more frequently than DDT and DDD (Figure 2-8).

The presence of DDT and its metabolites across all dredge zones and consistent detections over the last decade demonstrates the long term environmental persistence of DDT and its metabolites.

Furthermore, several exceedances of the chlordane NAGD screening level of 0.5 µg/kg and the NAGD high level of 6 µg/kg were noted between 2000 and 2012.

In 2002, chlordane concentrations exceeded the screening level at all tested sampling locations in Zone 2, 3 and 4. Whilst no screening level exceedances were noted between 2003 and 2007, one to three locations in Zone 2 had concentrations higher than the screening level in 2008, 2009 and 2011 (sites 4-0, 4-4, 4-5, 4-7 and 4-8). One exceedance of the chlordane screening level was also noted in 2011 in Zone 3 (site 11-8).

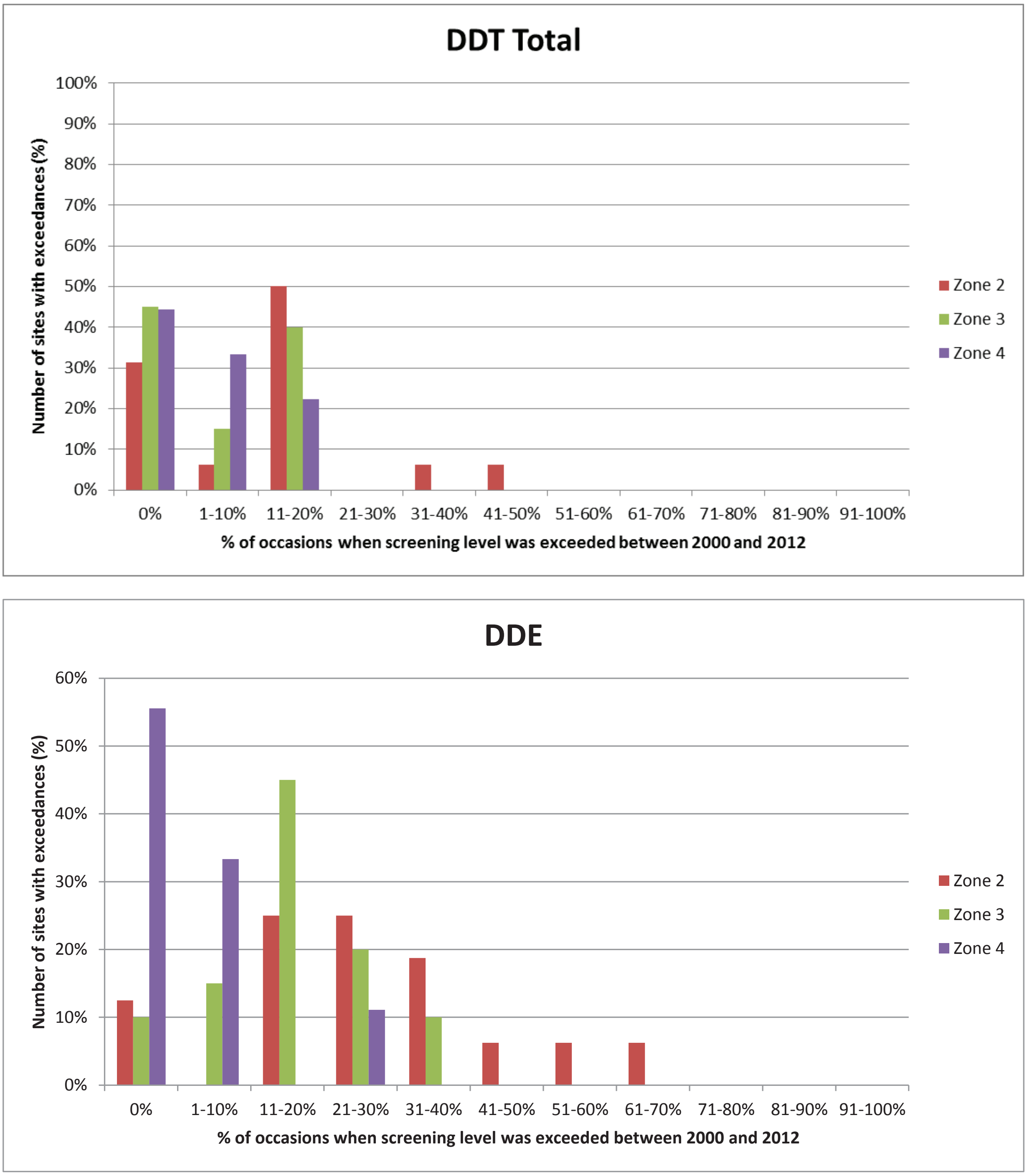

Figure 2-8 Exceedances of the NAGD Screening Level for total DDT (upper plot) and DDE (lower plot) between 2000 and 2012 in Dredge Zones 2, 3 and 4. Similar Trends for DDD.

2.1.9 Organophosphorus Pesticides (OPPs)

Concentrations of OPPs were below LOR for all sampled locations between 2000 and 2012.

2.1.10 Radionuclides

Radionuclides (gross alpha and beta) were analysed at eight sites across all dredge zones between 2010 and 2012.

Concentrations of radionuclides were detected in the January 2010 sampling but in concentrations well below the NAGD screening level of 35 Bq/g (maximum concentration 0.97 Bq/g). Radionuclide concentrations were below the LOR at all sites in all following sampling campaigns.

2.1.11 Acid Sulfate Potential

Acid sulfate soil testing indicates that the sediments in the dredge zone have no actual acidity but are generally considered to be Potential Acid Sulfate Soils (PASS). Assessments of the buffer capacity indicate that the sediments in all dredge zones have sufficient acid neutralizing capacity to buffer any acid potentially generated through onshore disposal.

Acid Sulfate Soil test results were generally consistent between 2000 and 2012.

2.2 Flood Sampling 2011 and 2013

The review of flood sampling sediment quality results included Worley Parsons (2011b, 2013b, 2013c, 2013d).

The 2011 and 2013 sampling campaigns (Worley Parsons 2011b and 2013b) included all parameters as per Table 1 of the NAGD. Additionally, porewater ammonium concentrations were measured and acid sulfate soils assessed in 2011. For both studies elutriate and bioavailability testing for nickel and mercury was undertaken.

Further testing for DDT, DDD, DDE and dioxins/furans was undertaken in 2013 including a comparison of 14 sampling locations at the Mud Island DMPA against seven Moreton Bay reference locations to assess whether the emergency dredging and disposal has affected sediment quality in Moreton Bay (Worley Parsons 2013c and 2013d).

2.2.1 Metals and Metalloids

In 2011, nickel (9 of 15 locations), mercury (3 of 15 locations) and lead (1 location) were the only metals to exceed their respective NAGD screening levels. In 2013, nickel was the only metal to exceed screening levels at 18 of the 24 locations sampled. All other metals/metalloids were below their respective screening levels.

Elutriate and bioavailability testing was undertaken for nickel and mercury in 2011 and 2013. For both sampling events, the elutriate concentrations for mercury were below LOR and nickel elutriate concentrations were well below the ANZECC/AMRCANZ (2000) 95% species protection level of 70 µg/L or below LOR. Furthermore, dilute acid extraction results for mercury and nickel indicated low bioavailability of these metals with concentrations below their respective NAGD screening level in all samples in 2011 and 2013.

These results indicated low likelihood for adverse water quality and sediment quality impacts during dredging and disposal for mercury and nickel.

2.2.1.1 Comparison to Annual Sampling

Consistent with the annual sampling undertaken between 2000 and 2012, nickel and mercury concentrations were the main contaminants of concern within the dredge areas with concentrations similar to the annual sampling events. Lead was detected above the screening level on some occasions during the annual sampling. Similar to the flood sampling, detections were noted only at single locations per annual event and 95% UCL concentrations were below the NAGD screening level.

2.2.2 Organochlorine Pesticides (OCPs)

DDT and its metabolites were detected in 2011 with DDE detected in nine of 15 locations. Whilst normalised DDD and DDE concentrations remained below their respective screening levels, normalised DDT concentrations exceeded the NAGD screening level at two locations. All other OCPs were below LOR at all locations in 2011.

In 2013, DDD was detected in one sample with a concentration exceeding the NAGD screening level. DDE exceeded the NAGD screening level of 2.2 µg/kg in all samples with a 95% UCL of 5.25 µg/kg.

2.2.2.1 Comparison to Annual Sampling

Similar to the annual sampling events, DDT and its metabolites were detected above the NAGD screening level in the flood sampling. Concentrations were similar to those detected in the annual sampling.

2.2.2.2 Comparison to Background Concentrations (2013)

Total DDT concentrations were below the LOR at all locations, including those at Mud Island DMPA and reference locations.

Sampling carried out prior to the 2013 emergency dredged material disposal event detected DDE at all 20 sampling locations within the dredged area, and one of the four locations within the DMPA. DDD was above the LOR in one sample within the dredged area (10µg/kg normalised to % TOC), and was also above the NAGD Screening level of 2 µg/kg.

Further more detailed sampling was carried out to compare contaminant concentrations at 14 locations in the DMPA and seven reference locations, following the 2013 emergency dredged material disposal event. The results of this sampling indicated that:

- DDT was again below the LOR at all locations, including those at Mud Island DMPA and reference locations.
- DDE was detected at all sampling locations with 95% UCL concentrations exceeding the NAGD screening level at both the DMPA and reference locations. This indicates that DDE was widespread throughout the study area.
- A comparison of the 80th percentile DDE of the reference locations was higher than historical levels of DDE in the Brisbane River. This indicates that the Brisbane River flood plume in

January 2013 impacted on the Brisbane River, Bramble Bay and the wider Moreton Bay region and the maintenance dredging operations undertaken by PBPL were not likely to have caused or spread this contamination.

- Additional elutriate and pore water analyses for OCPs indicated that DDD and DDE are likely adsorbed to the clay fraction of the sediment and thus not bioavailable.

2.2.3 Dioxins

Dioxins and furans were detected in the 2011 and 2013 flood sampling events. A toxic effect factor is allocated to each compounds which allows the total toxicity of combined dioxins and furans to be determined using the toxic equivalence (TEQ).

In 2011, the WHO-$TEQ_{(0.5\ LOR)}$ value (concentrations below LOR are assigned a concentration equal to half the LOR) was elevated at one location in Zone 3 with a concentration of 25.36 pg/g. All other sampling locations, including at the DMPA had concentrations between 6.02 and 10.89 pg/g WHO-TEQ.

In 2013, the WHO-TEQ concentrations were generally lower ranging between 0.5 pg/g to 5.3 pg/g.

There are no sediment quality guideline values for comparison that would apply to Australian sediments.

2.2.3.1 Comparison to Background Concentrations (2013)

The WHO-TEQ concentrations at the Mud Island DMPA sites ranged between 4.24 to 4.94 pg/g. The WHO-TEQ concentrations were higher at the reference site in comparison ranging between 7.87 to 7.97 pg/g. Approximately 99% of the sediment concentrations at all sampling locations comprised of 99% dioxins and 1% furans.

Pore water WHO-TEQs ranged between 0.5 and 7.3 pg/g at the DMPA and between 3.1 and 8.0 pg/g at the reference sites. Mean values and 95% UCL concentrations were lower than the 80th percentile of dioxins/furans at the reference area.

A comparison with historical data (Hermanussen et al. 2004; Mueller et al. 2004) shows that dioxins/furans have been historically present within Moreton Bay in elevated concentrations and that their concentrations are not directly related to dredging activities.

2.2.4 Organotins

Organotin concentrations were below the NAGD screening level or below LOR in 2011 and 2013.

2.2.4.1 Comparison to Annual Sampling

The relatively low concentrations of organotins in the flood sampling of 2011 and 2013 appear to be different to the pattern observed in the annual sampling campaigns. However, it should be noted that TBT was only detected at three locations above the NAGD screening for the annual 2010 and 2012 sampling events.

The overall low organotin concentrations across the dredge area after the 2011 and 2013 floods may be due to burial and mixing with sediments from the catchment.

2.2.5 Polychlorinated Biphenyls (PCBs)

PCB concentrations were below LOR at all sampling locations in 2011. In 2013, one location in Zone 3 had a normalised total PCB concentration (38.9 µg/kg) exceeding the NAGD screening level of 23 µg/kg. PCB concentrations were below LOR at all other locations in 2013.

2.2.5.1 Comparison to Annual Sampling

Similar to the annual sampling events, PCBs exceeded the NAGD screening level at only one location or were not detected.

2.2.6 Other Organic Contaminants

Concentrations of BTEX, TPHs, PAHs, OPPs, Phenols, Chlorobenzenes, halogenated compounds and non-organochlorine pesticides were either below LOR or below their respective screening levels in 2011 and 2013.

2.2.6.1 Comparison to Annual Sampling

The pattern observed for BTEX, TPHs, PAHs, OPPs were similar to the those observed in the annual sampling events, i.e. BTEX and OPPs were below their laboratory LORs whereas TPHs and PAHs were typically detected but at concentrations well below the respective NAGD screening levels.

2.2.7 Porewater Ammonia

Sediments at all locations had porewater concentrations below the literature derived guideline level of 11 mg/L (Batley and Simpson 2009). The only exception was one site in Zone 2 where the guideline level was marginally exceeded (16.6 mg/L).

2.2.8 Acid Sulfate Soil

Acid sulfate soils were tested in the 2011 flood sampling. Actual acidity was below the laboratory LOR for all samples, but potential acidity exceeded the QASSIT guideline limit identifying the samples as potential acid sulfate soils (PASS).

The acid neutralising capacity was sufficient in all samples resulting in a net acidity less than the LOR indicating that no liming would be required if the material would be placed on land.

2.2.8.1 Comparison to Annual Sampling

Results for the flood sampling were consistent with the annual maintenance dredge sampling.

2.3 Summary of Annual and Flood Sampling Data

Consistent across the annual and flood sampling events, the main contaminants of concern in the Brisbane River dredge area were the metals nickel and mercury, and DDT metabolites. TBT was also found above screening levels during routine annual monitoring, but was below screening levels in the 2011 and 2013 post-flood sampling episodes. This could suggest that the flood events had dispersed, diluted or buried TBT contaminated material.

Exceedances of the NAGD screening level for mercury, organochlorine pesticides and organotins were most frequently detected upstream of the Port area, i.e. in Zone 2 with a lower occurrence of screening level exceedances in the Port area (Zone 3) and the Entrance Channel area (Zone 4).

The similar spatial patterns of contaminant distribution observed between the regular annual sampling and the flood sampling indicates that catchment runoff from the urbanised and industrialised area upstream of the Port and not the Port of Brisbane is likely the main contributor of contaminants in the dredge area.

Organochlorine pesticides may be present due to broad non-point catchment sources or as legacy material. TBT is mainly originating from local marine industry sources and ships. Mercury may be introduced to the system via sewage treatment plant discharges (including trade waste) or other industrial point sources along the river.

The wide distribution of high nickel concentrations across the entire dredge area and upstream reference locations indicates that nickel is of natural origin (due to local mineralogy) across the broader catchment.

3 Sampling and Analysis

3.1 Sampling Rationale

3.1.1 Number of Sampling Locations

As per NAGD, the number of sample locations for medium sized projects (up to 500,000 m^3) should be divided into distinct sites based on their chemical characteristics. Based on the review of historical data (Section 2) and consistent with previous sampling campaigns, the dredge area was divided into three zones (Table 3-1).

Table 6 of NAGD was used to determine the number of sampling locations for each dredging subarea. Given that current, good quality data were available to support the classification, the number of sampling locations was halved and rounded up as per NAGD. Table 3-1 also shows the required number of sampling locations for Phase III testing (elutriate and bioavailability).

In addition to the required samples to be obtained from the dredge areas, samples will be collected also from upstream and downstream 'reference' areas. This includes two locations from Zone 1 which were sampled in previous sampling campaigns and five locations from Moreton Bay which were sampled as part of additional sediment sampling following the 2011 and 2013 flooding. Furthermore, two samples will be collected from the Mud Island DMPA.

Table 3-1 Number of Sampling Locations as per NAGD

Dredging Subarea	Classification	Dredge Volume (m^3)	# Locations – Phase II	# Locations – Phase III
Zone 2	Probably contaminated	150,000	10	5 + 1 replicate
Zone 3	Probably clean	250,000	11	6 + 2 replicates
Zone 4	Probably clean	30,000	5	3 + 1 replicate
Additional Samples				
Zone 1	Upstream Reference	N/A	2	N/A
Moreton Bay	Downstream Reference	N/A	5	N/A
Mud Island	DMPA	N/A	2	N/A

3.1.2 QA/QC Samples

In accordance with NAGD requirements, the following field and laboratory quality control samples will be obtained:

- Field triplicate samples (two additional grab samples at 10% of sample locations) to determine the small scale variability of the sediment physical and chemical characteristics. Based on a total of 26 primary locations in dredged areas (Zones 2, 3 and 4), field triplicate samples would be required at three locations. Two additional samples would therefore be collected at location 5-1 (Zone 2), 11-9 (Zone 3) and 13-4 (Zone 4).
- Triplicate split samples (primary sample from 5% of locations thoroughly mixed and split into three sample container sets) to assess laboratory variation, with one of the three samples sent to a second (reference) laboratory for analysis. Based on a total of 26 primary locations in dredged areas (Zones 2, 3 and 4), field split samples would be required at two locations. Split samples would be undertaken at location 6-2 (Zone 2) and 10-6 (Zone 3).

- One trip blank container per sampling day filled with inert material (e.g. chromatographic sand) to be analysed concurrent with the analysis of volatile organic substances such as; and
- One inter-batch sample from a previous batch of samples if more than one batch is submitted to the laboratory, to determine the analytical variation between batches. However, it is anticipated that all samples will be submitted in one batch.

Table 3-2 provides a summary of QA/QC samples to be obtained for the three dredging subareas.

Table 3-2 Number of Primary and QA/QC Samples

Dredging Subarea	Primary Samples	Field Triplicate Samples	Triplicate Split Samples	Trip blanks
Zone 2	10	2	2	1 per sampling day
Zone 3	11	2	2	
Zone 4	5	2		

3.1.3 Sampling for Elutriate and Bioavailability Testing

The sediment sampling will include additional sediment samples for Phase III testing (elutriate and bioavailability). Phase III testing will be undertaken for parameters which have frequently exceeded the NAGD screening levels in the past. Based on the review of historical data (Section 2) this will include:

- Metals and metalloids (nickel and mercury);
- Organotins (TBT); and
- Organochlorine Pesticides (DDT, DDD, DDE, chlordane).

Exceedances of NAGD screening levels were predominantly detected in Zone 2 and Zone 3. In accordance with Table 7 of NAGD, five locations would need to be sampled for Zone 2 and six locations for Zone 3 (Table 3-1).

In order to allow elutriate analysis, 20 L of seawater will be collected from the Mud Island DMPA.

Phase III testing for nickel and mercury (and potential other metals/metalloids) can be undertaken from the primary samples collected for the sediment quality assessment. The bioavailability analysis for nickel and mercury will involve dilute acid extraction as per NAGD. Analysis will be performed on the samples with the highest concentrations.

Bioavailability analysis for the organic contaminants (organotins and organochlorine pesticides) will require porewater testing as per NAGD. Additional samples will be collected for porewater testing at the locations which have historically shown the highest percentage of screening level exceedances. The proposed sampling locations for this testing are provided in Section 3.2.1. In order to meet required holding times, elutriate and bioavailability analysis for the organic contaminants will be undertaken concurrent with the analysis of the primary samples.

3.2 Sampling Locations

A map with the proposed sampling locations is provided in Figure 3-1. In order to provide consistency with previous sampling and to facilitate comparisons with historical data, most of the proposed sampling locations were selected from the set of historical sampling locations, and to also focus on areas that are most frequently dredged. Additionally, sampling locations were added to close spatial gaps in sediment quality data. These include sampling locations 5-1 in Zone 2 as well as locations 9-5 and 9-6 in Zone 3 (Figure 3-1).

As outlined in more detail in Section 3.5, samples from all locations will be analysed for a basic suite of parameters. A selection of these sites will also be analysed for a detailed suite in addition to the basic suite including ‘low risk’ parameters that have been detected in the past but were typically below their respective NAGD screening levels.

3.2.1 Sampling Locations for Porewater Testing

Additional sediment samples will be collected at selected locations for pore water testing of organic contaminants as part of the Phase III elutriate and bioavailability assessments (refer to Section 3.1.3).

Exceedances of NAGD screening levels were predominantly detected in Zone 2 and Zone 3. Five additional pore water samples (plus one replicate) and six samples (plus two replicates) will be collected from zones 2 and 3, respectively (see also Table 3-1). Four samples will be collected from Zone 4 however based on the historical data samples will only be analysed if contaminants exceed screening levels during Phase II sampling.

Based on the review of historical data, sample locations with the highest percentage of screening level exceedances between 2000 and 2012 were chosen for the additional pore water testing:

Zone 2: Locations 4-0, 5-0, 6-2, 7-1 and 8-3.

Zone 3: Locations 10-5, 10-6, 10-8, 11-8, 11-9 and 12-1.

Location	Easting	Northing
BC-2	504,134.0	6,964,789.5
4-0	507,652.5	6,964,101.7
4-4	506,672.0	6,964,709.0
5-0	508,498.5	6,963,840.7
5-1	510,665.0	6,964,541.0
6-2	512,413.5	6,966,401.7
6-3	512,189.5	6,965,833.7
7-1	512,842.5	6,966,620.7
8-1	513,334.5	6,966,836.7
8-3	514,068.4	6,967,511.7
9-1	514,975.4	6,968,505.7
10-5	515,491.4	6,970,754.7
10-6	515,963.4	6,971,063.7
10-8	516,214.4	6,971,379.7
11-5	516,940.4	6,972,451.7
11-8	516,343.4	6,972,473.7
11-9	516,167.4	6,971,952.7
12-1	517,099.4	6,973,147.7
12-2	517,055.6	6,973,620.8
15-1	517,530.4	6,973,661.7
15-2	517,699.1	6,974,565.4
15-3	518,165.2	6,974,930.6
13-1	518,570.4	6,976,043.7
13-4	519,180.4	6,976,502.7
13-5	519,264.4	6,977,141.7
13-8	520,173.4	6,978,053.7
13-9	521,880.4	6,981,356.6
16-0	522,872.0	6,974,873.0
16-1	522,028.0	6,976,971.0
RF2	514,084.0	6,982,366.0
RF3	516,443.0	6,982,027.0
RF4	518,864.0	6,981,619.0
RF6	515,003.0	6,980,511.0
RF7	517,470.0	6,980,112.0

LEGEND

- Basic Suite
- Basic Suite and Detailed Suite
- Dredge Area
- Dredge Material Placement Area

Title:
Proposed Sampling Locations

Figure: **3-1**

Rev: **A**

BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

N

0 2.5 5km
Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B20259_I_BRH Port of Brisbane DLR\DRG\ECO_020_130924 Proposed Sediment Sampling Plan.wor

3.3 Sample Collection Methodology

3.3.1 Survey Vessel and Positioning

A suitable sampling vessel will be used to undertake sediment sampling. Navigation to the sampling locations will be undertaken using a differentially corrected global positioning system (GPS) with an accuracy of approximately ±1 m.

3.3.2 Sediment Grab Sampling

NAGD Appendix D states that:

'*grab samplers may be used, i.e., for maintenance dredging surveys in frequently dredged areas with substantial shipping traffic. Here, because the sediments are mixed continually, samples taken with a grab sampler can be representative as long as the grab is designed to retain the entire sample.*'

It is also noted that the one metre long sediment cores obtained in all previous sampling campaigns were always composited to single samples. Furthermore, highest contamination levels are typically expected in the top sediment layer, which would be sampled using a grab sampler. It is therefore proposed that a grab sampler will be used to obtain representative sediment samples.

All sediment sampling will be undertaken by experienced personnel. A Van Veen grab sampler (0.14 m^2 gape) will be used to collect surface sediments from all sample locations. Only samples obtained with properly closed grab jaws will be processed to ensure that the fine sediment fractions are retained.

The grab sampler will be thoroughly cleaned with De-con 90 solution prior to use and cleaned and rinsed with seawater to prevent cross contamination between samples.

In order to overcome issues with potential high variability at sampling locations, a minimum of two grabs will be collected at each sampling location and pooled as one sample. An adequate number of grabs will be obtained and pooled for each sample location to ensure that sufficient sediment is collected for all analyses.

3.3.3 Sample Handling

3.3.3.1 Sample Processing

Sample management procedures on the sampling vessel will include the careful processing of sediment samples following the recovery of the sediment grab sample from the seabed.

Photographs of the grab samples will be taken and field personnel will log each sample for its physical characteristics and variations in sediment type and texture. The grab samples from each location will be carefully homogenized in a clean container prior to the filling of analytical laboratory-supplied clean sampling jars.

Sample bottles will be labelled with a waterproof marker pen on the bottle label and lid. Sample bottles for organic analyses will be filled with zero headspace to prevent volatilisation. QA/QC samples will be blind-labelled to ensure that the laboratories cannot relate the QA sample back to the primary sample.

3.3.3.2 Sample Log

All sediment samples will be geotechnically logged upon collection on a standardised pro-forma. The following information will be recorded:

- Project name and number;
- The name of the sample collector;
- Date and Time of sampling;
- Type of grab sampler used;
- Field sample number;
- Northing and Easting of sample location (from onboard DGPS);
- Sediment colour;
- Sediment odour;
- Field texture (fine sand, silt, clay, sand, clayey sand);
- Tidal predictions and water depth at sample location (derived from onboard depth sounder);
- Weather and sea state conditions at the time of sampling; and
- General comments pertaining to the sample (e.g. presence of organic matter or benthic organisms, etc.

3.3.3.3 Sample Processing QA/QC

All sample handling and processing will be performed to minimise contamination and sample mix-ups. All sample equipment will be cleaned prior to sample collection using a scrub with decontamination solution followed by a rinse with seawater.

The workspace on the vessel will be washed down regularly with ambient seawater to clean all surfaces and minimize the potential for dust contamination of samples. All sample processing will be undertaken away from any potential contamination sources such as engine exhausts, fuels, oils, greases, lead weights, zinc anodes, antifouling paint etc.

Nitrile gloves will be worn by all field personnel handling the sediment, and gloves will be disposed of after processing of each sample.

Utmost care will be maintained in ensuring that cross-contamination between samples is not possible. Samples collected from each location will be placed into appropriately cleaned and preserved containers (labelled prior to filling) provided by the analytical laboratories.

Following sample processing and filling of sample containers, all samples will be immediately chilled on ice following sample collection. All acid sulfate soil samples will be transferred to a freezer at the end of each sampling day to minimise potential oxidation of the samples.

3.3.3.4 Sample Submission and Chain of Custody

All samples will be traced using Chain of Custody (COC) documentation submitted to the laboratory. This will ensure that sample possession and processing can be traced from sample collection to reporting of results.

The COC record may include, but is not limited to, the following information:

- Project name and number;
- Name(s) of sampler(s);
- Sample type, identification number and location;
- Date of collection;
- Number and types of containers;
- Required analyses;
- Preservatives (if any) and storage conditions; and
- Signatures documenting change of sample custody.

At the conclusion of the sampling program the sediment samples will be submitted to the analytical laboratories for processing and analysis in a single batch within prescribed holding times.

3.4 Health & Safety and Contingency Plan

3.4.1 Health and Safety

The vessel skipper will keep in close contact with Brisbane VTS/Harbour Control during sampling. Grab sampling can be completed at each location in around 20 minutes with logging and processing undertaken in locations out of the path of large vessels (as necessary and dependent upon shipping movements).

A single anchor may be used to anchor the vessel. The anchor would be placed upstream and upwind of the vessel. A marker buoy may be placed on the anchor if required.

The sampling vessel will display appropriate flags (R over Y) for the work being carried out at all times. Interactions with other vessel traffic will be minimised by being mindful of approaching vessels.

3.4.2 Adverse Weather

The planning of field sampling will involve regular checking of available weather forecast services for the study area. There are no unusual hazards in operating the grab sampler in wet weather.

In case of adverse weather conditions that would make sampling unacceptable due to strong winds and high waves, the sampling team and vessel operator would remain on stand-by until weather conditions improve to allow rigorous and safe collection of sediment samples.

3.4.3 Equipment Failure

The grab sampler and lifting arrangement is sufficiently robust and no failure of the equipment is expected to occur during the sampling. Prior to sampling, all equipment will be thoroughly checked and repaired if necessary.

In the unlikely event of equipment failure during sampling, repairs to any equipment would be undertaken as soon as possible to minimise delays as far as practical.

3.5 Contaminants List

3.5.1 Rationale for Selection of Sampling Parameters

In accordance with NAGD, the contaminants to be investigated should include:

- Toxic substances known, from previous investigations, to occur in dredge area sediments at levels greater than one-tenth of the screening levels; or
- Based on the historical review, substances potentially present at such levels in the sediments to be dredged.

Based on the review of existing sediment quality data (Section 2), samples will be analysed as follows:

Basic List of Parameters:

- Analysis undertaken at all sampling locations;
- Analysis includes contaminants of (potential) concern and supplementary parameters:
  - Metals/Metalloids (As, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn, Al, Fe);
  - Organotins (MBT, DBT, TBT);
  - Organochlorine Pesticides (including DDT, DDD, DDE, chlordane);
  - Particle size distribution;
  - Moisture content; and
  - Total Organic Carbon.

Detailed List of Parameters:

- Analysis undertaken at 30% of sampling locations and new sampling locations (i.e. 5-1, 9-5 and 9-6).
- Analysis includes 'low risk' parameters that have been detected in the past but generally in concentrations below LOR or NAGD screening levels:
  - Polycyclic Aromatic Hydrocarbons (PAHs);
  - Total Petroleum Hydrocarbons (TPHs);
  - Polychlorinated Biphenyls (PCBs);
  - Acid Sulfate Soils;
  - Nutrients (TP, TN, NOx, TKN); and

   - Radionuclides.

Elutriate and Bioavailability Testing:

- Metals/Metalloids (Hg and Ni);
- Organotins (TBT); and
- Organochlorine Pesticides (DDT, DDD, DDE, chlordane).

3.6 Laboratory Analysis

3.6.1 Analytical Laboratories

Primary analysis of the sediment samples will be conducted by Advanced Analytical Australia Pty Ltd (AAA). Australian Laboratory Services (ALS) will be used as the secondary (reference) laboratory for inter-laboratory quality testing.

Both analytical laboratories are fully accredited by the National Association of Testing Authorities (NATA). AAA will subcontract some of the analyses to specialised NATA accredited laboratories, i.e. Sydney Analytical Laboratories (ammonia, Total Organic Carbon) and Microanalysis (Particle Size Distribution).

3.6.2 Analytical Tests

The primary laboratory Advanced Analytical Australia will perform all analyses in accordance with NAGD and will meet or provide better practical quantitation limits (PQL) than the target PQL's (Table 3-3).

Table 3-3 Analytical Parameters and Practical Quantitation Limits

Parameter	Target Practical Quantitation Limit (required)	Practical Quantitation Limit (Advanced Analytical Australia)
Moisture Content	0.1%	0.1%
Particle Size (sieve and sedigraph)	Size distribution (sieve + hydrometer or equivalent) and rates of settlement after 50% and 90% of settlement in seawater if possible.	10 to 0.001mm Settling velocities in m/s for all particle size fractions
Total Organic Carbon	0.1%	0.01%
Total Petroleum Hydrocarbons	100 mg/kg	10-50 mg/kg
Polychlorinated Biphenyls	5 µg/kg	5 µg/kg
PAHs (naphthalene, acenaphthalene, acenapthene, fluorene, phenanthene, anthracene, total fluoranthene, benzo [a]anthracene, benzo [a] pyrene, chrysene, dibenz[a,h] anthracene, pyrene, 2-methylnapthalene)	Individual - 5 µg/kg; Sum of PAHs - 100 µg/kg	Individual - 5 µg/kg; Sum of PAHs - 100 µg/kg

Parameter	Target Practical Quantitation Limit (required)	Practical Quantitation Limit (Advanced Analytical Australia)
Trace Metals and Metalloids (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc)	0.1 – 100 mg/kg, Hg- 0.01 mg/kg	0.1 – 5 mg/kg, Hg – 0.01 mg/kg
Organotins (MBT, DBT, TBT)	1 µg Sn/kg	0.5 µg Sn/kg
OCP Pesticides	1 µg/kg	OCP-1 µg/kg
Total Nitrogen Total Kjeldahl Nitrogen Nitrate & Nitrite as N Total Phosphorus	N/A N/A 0.1 mg/kg N/A	20 mg/kg 20 mg/kg 0.1 mg/kg 1 mg/kg
Acid Sulfate Soils	N/A	2 mole H^+/tonne
Radionuclides	N/A	35 Bq/g

3.6.3 Sample Containers

Based on the proposed analyses, the following sample containers would be required per sample:

- 2 x 250 mL glass jar – organic/inorganic chemical analysis;
- 1 x 125 mL glass jar – nutrient analyses;
- 1 x medium plastic clipseal bag (50-100 g) – particle size distribution; and
- 1 x small clipseal bag (200 g) – acid sulfate soil.

3.6.4 Quality Control – Laboratory Analysis

Both laboratories will follow laboratory QC procedures in accordance with requirements outlined in Appendix F of NAGD. This includes analysis of laboratory blanks, duplicates, certified reference materials and spiked samples.

3.6.4.1 Laboratory Blanks

The purpose of this assessment is to monitor a potential laboratory contamination of samples due to potential cross-contamination of samples during laboratory preparation, extraction or analysis. Blank sample concentrations should be at or near the detection limit of the method used.

3.6.4.2 Laboratory Duplicates

This assessment refers to a randomly selected intra-laboratory split sample, which provides information regarding the method precision and sample heterogeneity. Results are presented as Relative Percent Difference (RPD) values of two sample concentrations for a specific contaminant.

NAGD recommends that duplicates should agree within a typical RPD of the method of ±35 %. This recommended RPD is typically not adopted by analytical laboratories as it does not account for the greater uncertainty for contaminant concentrations close to the method's detection limit.

The primary laboratory AAA uses the following approach to assess duplicate RPD's:

- Result <10 times LOR – no limit to RPD; and
- Result >10 times LOR – RPD between 0% and 50%.

The secondary laboratory ALS adopts specific RPDs for individual compounds.

3.6.4.3 Surrogate and Matrix Spikes

Laboratory Control Samples are either certified reference materials or a blank sample spiked with known concentrations of the analytes of interest. The purpose of this measurement is to monitor method accuracy.

Matrix spikes refer to an intra-laboratory split sample spiked with a representative set of target analytes of known concentration. Matrix spikes are assessed to monitor potential sample matrix effects on analyte recoveries.

Surrogate spikes are used for organic analytes. Surrogates are known additions to samples which mimic the compounds of interest and are not normally expected to be present in the sample.

For both surrogate and matrix spikes, a calculation of the percent recovery of the spiked amount against the returned concentration is performed indicating analytical performance in terms of extraction efficiency.

NAGD states that recovery limits of 75% - 125% are generally acceptable. Analytical laboratories typically adopt specific surrogate and matrix spike recovery limits for the various contaminant compound groups. It is also noted that ideal recovery ranges may be waived in the event of sample matrix interference.

The primary laboratory AAA adopts the following acceptable surrogate and matrix spike recovery limits:

- Trace elements: 70-130%;
- Organic analyses: 50-150%;
- SVOC & speciated phenols: 10-140%; and
- Surrogates: 10-140%.

The secondary laboratory ALS adopts specific recovery limits for individual compounds.

3.7 Data Analysis

3.7.1 Sediment Contaminants

Concentrations of chemicals measured in sediment samples at each dredging sub-area (or reference area) will be compared to screening levels listed in Table 2 of NAGD. This will provide a basis for determining whether dredged material is suitable for unconfined placement at sea or if further analyses, such as elutriate, bioavailability or toxicity testing, are required.

For each dredging sub-area, the mean concentrations of chemical parameters at the upper 95% confidence level (95% UCL) will be calculated and compared against NAGD guideline levels. This involves the following steps.

Data pre-treatment

Analytical values below detection limit will be set to one-half of the laboratory Limit of Reporting (LOR) as per NAGD recommendation to facilitate 95% UCL calculation. Organic contaminant results will be normalised to 1% Total Organic Carbon (TOC) where the measured value is within the range of 0.2-10%. If TOC values are outside of this range, the highest (10%) or lowest (0.2%) value will be adopted as appropriate. Organic parameters with concentrations below detection limits will not be normalised to 1% TOC but included at half their LOR.

One assumption in the calculation of the 95% UCL is that the samples are statistically independent. Therefore, field triplicate samples and laboratory split samples will not be included in the 95% UCL calculation.

Outliers

Outliers will be treated in accordance with the procedure in NAGD. In summary this will involve:

(a) Outliers (for all parameters) will be identified as any data points greater than two standard deviations.

(b) For TBT, where outliers are detected, the stored portion of the sample will be analysed in triplicate.

(c) If the original result is not confirmed through the re-analysis, it will be discarded in favour of the mean of the three triplicate samples.

NAGD does not provided guidance on treatment of outliers for other parameters. Outliers for other parameters will be noted in the report but included in calculation of the 95% UCL.

Selection of appropriate 95% UCL Calculation Method

The methodology for calculating the 95% UCL follows the approach recommended in Appendix A of NAGD. A Shapiro-Wilk test will be used to determine whether data followed a normal distribution. The ProUCL (Version 4.1.00) software package will be used for these calculations (Singh et al. 2010).

Calculation of 95% UCL and Comparison to Screening Levels

ProUCL Version 4.1.00 will be used to calculate the 95% UCL. For normally distributed data, the arithmetic mean and standard deviation will be calculated, and the 95% UCL calculated using the one-tailed Student's *t* UCL test. For data that follows a log-normal (or other) distribution, the geomean will be calculated, and the 95% UCL analysed using non-parametric Jack-Knife analysis as per NAGD recommendation.

In cases where an insufficient number of discrete values in the dataset would not allow calculation of the 95% UCL (e.g. most values below LOR), the maximum recorded value of the dataset will be conservatively used instead for comparison against NAGD trigger levels.

Should 95% UCL values for all analysed parameters fall below NAGD screening levels, the sediment would be considered clean and suitable for unconfined disposal at sea.

3.7.2 Baseline Concentrations

NAGD states that ambient baseline concentrations can be determined by sampling of sediment at reference areas in the vicinity of an existing disposal site. Similar to the approach followed in Worley Parsons (2013c, d), the data collected from the five reference locations in Moreton Bay would be used to derive ambient baseline concentrations if required (RF2, 3, 4, 6 and 7 in Figure 3-1).

3.8 Elutriate and Bioavailability Testing

As outlined on Section 3.1.3, elutriate and bioavailability testing will be undertaken as per NAGD for a range of contaminants which have regularly exceeded screening levels in the past.

Elutriate Testing:

The elutriate test is designed to simulate release of contaminants from sediment during dredged material disposal. Testing will be carried out using the USEPA's standard seawater elutriate test which involves shaking the sediment samples with four times the volume of seawater at room temperature for 30 minutes. The sample will be allowed to settle for one hour and the supernatant centrifuged or filtered (0.45 µm) within sixty minutes, and analysed using analytical methods appropriate for determining ultra-trace levels in seawater.

Results will be compared to the respective ANZECC/ARMCANZ (2000) marine water quality trigger value (for 95% or 99% protection of species, as appropriate).

Bioavailability Testing:

The Dilute Acid Extraction (DAE) method will be used to provide an estimate of the bioavailable fraction of the contaminant of concern in case of metal/metalloid analysis. The sediment samples will be extracted using a weak acid and the results compared against the respective NAGD screening levels.

Porewater analysis would be undertaken for organic contaminants such as TBT. Porewater is assumed to represent the major route of exposure to sediment contaminants by benthic organisms and is the recommended bioavailability test for organic contaminants as per NAGD. Porewater results would be compared to the respective ANZECC/ARMCANZ (2000) marine water quality trigger value (for 95% protection of species).

Should both elutriate and bioavailability tests result in values less than the respective guideline limits, the material would be considered clean and suitable for ocean disposal.

3.8.1 Acid Sulfate Soils

The results of the chromium-suite acid sulfate analysis will be assessed against the Australian framework for Acid Sulfate Soil management in coastal systems (Ahern et al. 1998). The risk of acidification will be determined by the acid-base accounting approach (Ahern et al. 2004). Net acidity will be calculated from the results as a measure of the acid producing capacity of the sampled sediment upon complete oxidation.

The calculated net acidity will then be compared to the QASSIT action criteria of 0.03% S or 18 mol H+/tonne to assess the need for acid sulfate soil management if the dredged sediments were to be placed on land.

The liming rate will indicate the amount of lime that needs to be added to the soil to manage its acid generating capacity.

3.9 Data Validation

All laboratory analyses will be validated in accordance with Appendix A of NAGD to confirm suitable data quality for undertaking a rigorous characterisation of the proposed dredge material.

Data Validation will involve assessment of the following:

- Sample holding times and storage conditions;
- Laboratory blanks, duplicates and surrogate/matrix spikes; and
- Field triplicates samples, triplicate sample splits and trip blank.

The proposed data quality objectives for data validation are outlined in Table 3-4.

Table 3-4 Data Quality Objectives for Data Validation

Parameter	Data Quality Objective
Holding Time	Samples received within specified holding time (NAGD Appendix H)
Field Triplicate Samples	Relative Standard Deviation <50%
Triplicate Split Samples, including inter-laboratory samples	Relative Standard Deviation <50%
Laboratory Blanks	At or near the Limit of Reporting (LOR)
Laboratory Duplicate Samples	Relative Percent Difference (RPD) <35% or as per laboratory requirements
Laboratory Matrix Spikes	Recovery as per laboratory requirements
Surrogate Spikes	Recovery as per laboratory requirements

3.10 Reporting

The reporting of sediment quality results will be undertaken in a SAP Implementation Report in accordance with NAGD including the following components:

- Summary of the SAP, or SAP appended to the report;
- Outline of potential problems encountered and deviations from the SAP, including justification;
- Description of the sampling carried out, along with the actual sampling locations, sample numbers (including replicates and QA samples), completed COC forms, field logs and description of sediments;
- Comparison of the 95% UCL of mean chemical concentrations of sediments in the dredge subareas;
- Assessment of QA/QC procedures for both field and laboratory data;

- Data validation including comparison to data quality objectives;
- Appendices including all laboratory and field data; and
- Conclusions as to the acceptability or otherwise of the dredge material for unconfined ocean disposal and recommendations as to further work required.

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Worley Parsons (2013d) Emergency Dredging Sediment Sampling – Round 2 Dioxin Results. Report prepared for Port of Brisbane Pty Ltd.

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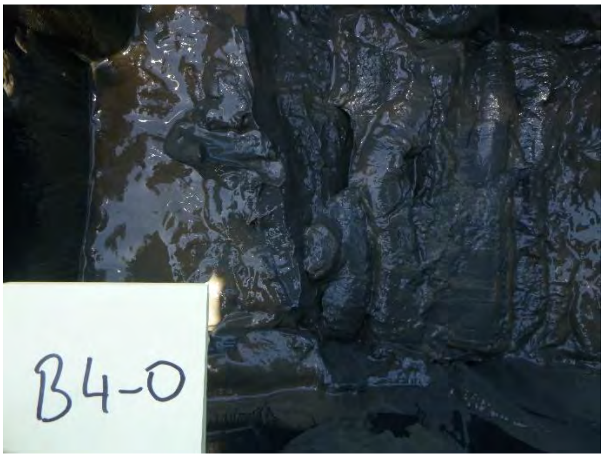
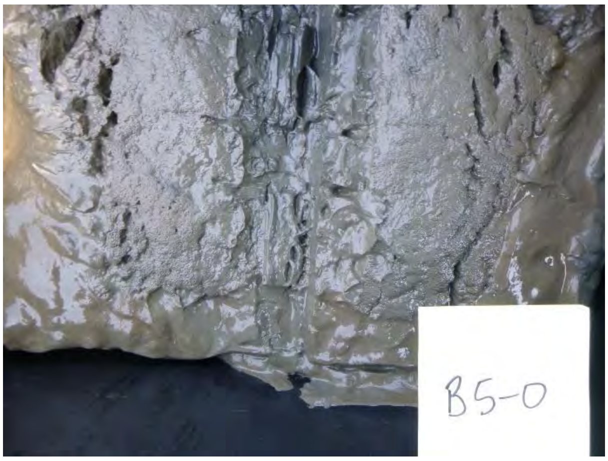
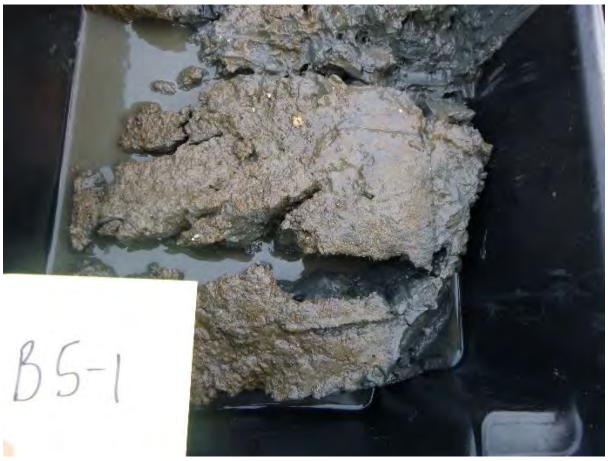
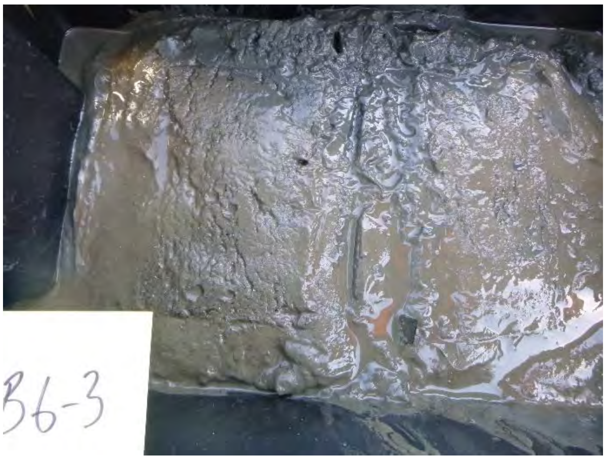
Appendix B Sediment Photos

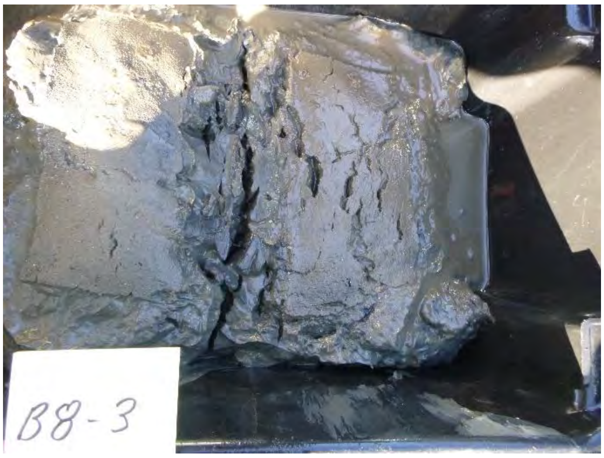






Sediment Photos



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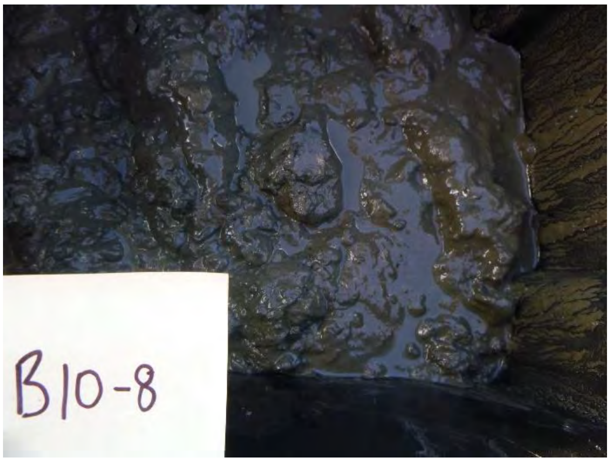
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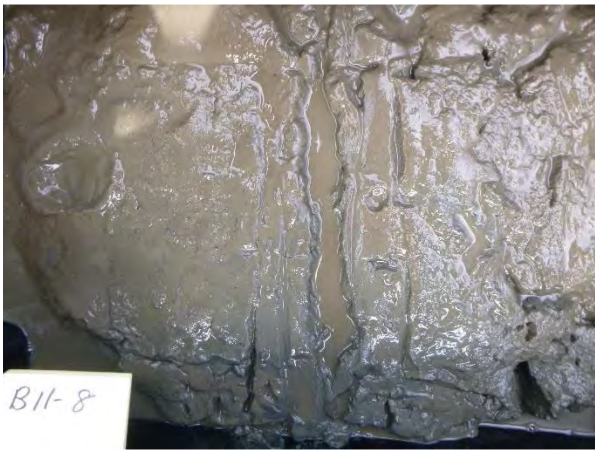
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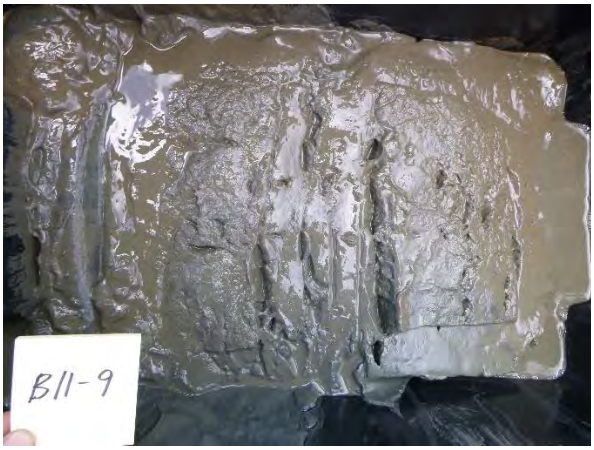
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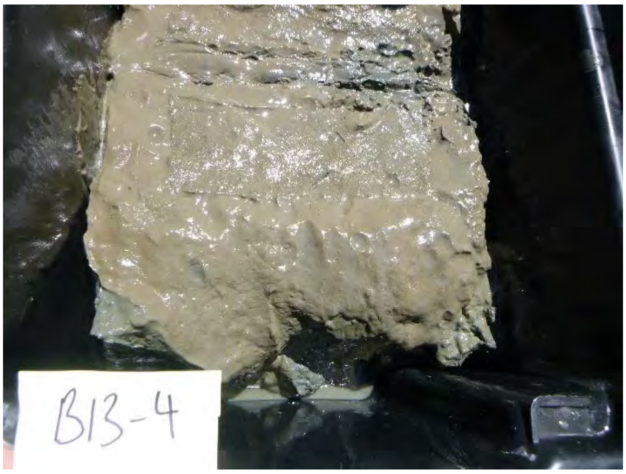
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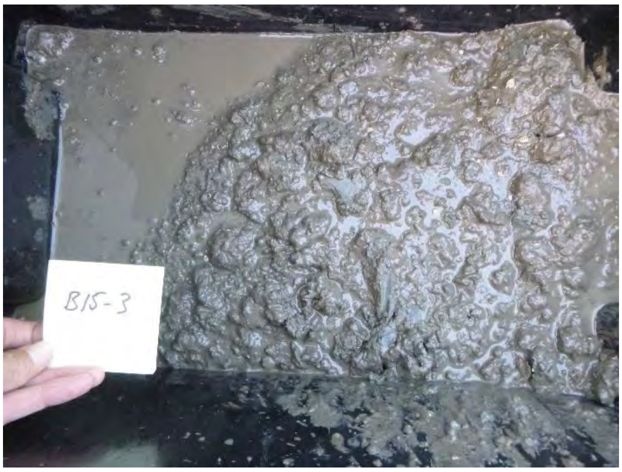
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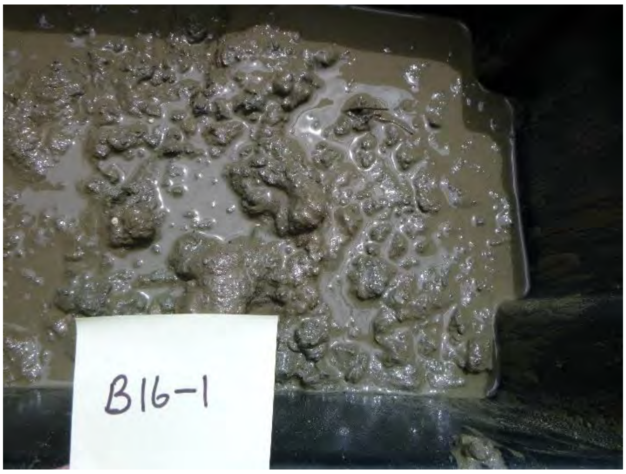
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RF2


RF3


RF4


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RF7

Appendix C Sediment Quality Results – Primary Laboratory

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2026300**	Page	: 1 of 24
Client	: **BMT COMMERCIAL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DARREN RICHARDSON	Contact	: Andrew Epps
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 3552 8639
Project	: Port of Brisbane SAP	Date Samples Received	: 07-Oct-2020 18:16
Order number	: ----	Date Analysis Commenced	: 08-Oct-2020
C-O-C number	: ----	Issue Date	: 20-Oct-2020 13:44
Sampler	: BRAD HILES		
Site	: ----		
Quote number	: BN/016/19		
No. of samples received	: 18		
No. of samples analysed	: 17		

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 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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Diana Mesa	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 fell outside the scope of AS1289.3.6.3. Results should be scrutinised accordingly.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP080-SD: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP131A: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP132B-SD and EP131B : LOR is raised due to high amount of moistures is present.
- **Ultra-trace OC/OP Pesticides, PCBs and PAH analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite):Retained Acidity not required because pH KCl greater than or equal to 4.5
- EP090 Organotins: Sample 'RF6' shows poor matrix spike recovery for MBT due to matrix interference.
- ASS: EA029 (SPOCAS): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime ($CaCO_3$) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime ($CaCO_3$) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	RF2	RF6	RF3	RF7	RF4
			Client sampling date / time	07-Oct-2020 08:50	07-Oct-2020 08:50	07-Oct-2020 09:12	07-Oct-2020 09:35	07-Oct-2020 10:03
Compound	CAS Number	LOR	Unit	EB2026300-001	EB2026300-002	EB2026300-003	EB2026300-004	EB2026300-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	62.2	55.6	64.3	61.8	59.0
EA150: Particle Sizing								
+75µm	----	1	%	5	28	5	4	28
+150µm	----	1	%	4	21	4	3	22
+300µm	----	1	%	3	17	4	3	11
+425µm	----	1	%	3	15	3	3	5
+600µm	----	1	%	2	13	3	2	3
+1180µm	----	1	%	1	11	2	2	<1
+2.36mm	----	1	%	<1	7	<1	1	<1
+4.75mm	----	1	%	<1	2	<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	%	51	39	28	9	50
Silt (2-60 µm)	----	1	%	43	32	65	86	21
Sand (0.06-2.00 mm)	----	1	%	5	21	6	4	29
Gravel (>2mm)	----	1	%	1	8	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	2.42	2.58	2.39	2.24	2.28
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	17800	12800	17000	16200	13300
Iron	7439-89-6	50	mg/kg	40200	29400	38700	36800	31300
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	8.11	7.90	10.0	7.60	8.09
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	43.7	32.5	39.7	37.9	32.6
Copper	7440-50-8	1.0	mg/kg	20.4	14.6	19.6	21.8	14.8
Lead	7439-92-1	1.0	mg/kg	21.4	17.0	19.5	18.9	15.0
Nickel	7440-02-0	1.0	mg/kg	23.4	17.7	22.9	24.5	18.5
Silver	7440-22-4	0.1	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	1.0	mg/kg	92.5	65.0	84.9	83.2	66.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	RF2	RF6	RF3	RF7	RF4
			Client sampling date / time	07-Oct-2020 08:50	07-Oct-2020 08:50	07-Oct-2020 09:12	07-Oct-2020 09:35	07-Oct-2020 10:03
Compound	CAS Number	LOR	Unit	EB2026300-001	EB2026300-002	EB2026300-003	EB2026300-004	EB2026300-005
				Result	Result	Result	Result	Result
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	**0.09**	**0.06**	**0.09**	**0.08**	**0.06**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**1.00**	**0.93**	**1.07**	**1.21**	**0.86**
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	<1	<1
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	<1	<1	<1
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	RF2	RF6	RF3	RF7	RF4
			Client sampling date / time	07-Oct-2020 08:50	07-Oct-2020 08:50	07-Oct-2020 09:12	07-Oct-2020 09:35	07-Oct-2020 10:03
Compound	CAS Number	LOR	Unit	EB2026300-001	EB2026300-002	EB2026300-003	EB2026300-004	EB2026300-005
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	**86.6**	**90.7**	**97.2**	**92.1**	**108**
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	**52.4**	**79.3**	**73.9**	**60.6**	**59.5**
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	**41.4**	**61.6**	**82.6**	**47.6**	**72.0**

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	B13-9	16-1	16-0	13-8	13-5
Client sampling date / time				07-Oct-2020 10:28	07-Oct-2020 10:56	07-Oct-2020 11:16	07-Oct-2020 12:06	07-Oct-2020 12:56
				EB2026300-006	EB2026300-007	EB2026300-008	EB2026300-009	EB2026300-010
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	----	----	8.6	----
pH OX (23B)	----	0.1	pH Unit	----	----	----	8.0	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	----	<2	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	----	----	<2	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	----	----	<2	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	----	----	<0.020	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	----	----	<0.020	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	----	----	<0.020	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	----	----	0.140	----
Peroxide Sulfur (23De)	----	0.020	% S	----	----	----	0.404	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	----	----	0.265	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	----	----	165	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	----	----	0.340	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	----	----	1.93	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	----	----	1.59	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	----	----	795	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	----	----	1.27	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	----	----	0.163	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	----	----	0.360	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	----	----	0.197	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	----	----	162	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	----	----	0.260	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% $CaCO_3$	----	----	----	4.04	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	----	808	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	----	----	----	1.29	----

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	B13-9	16-1	16-0	13-8	13-5
Client sampling date / time				07-Oct-2020 10:28	07-Oct-2020 10:56	07-Oct-2020 11:16	07-Oct-2020 12:06	07-Oct-2020 12:56
				EB2026300-006	EB2026300-007	EB2026300-008	EB2026300-009	EB2026300-010
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	----	1.5	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	----	<0.02	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	----	<10	----
Liming Rate	----	1	kg CaCO3/t	----	----	----	<1	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	----	0.26	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	----	165	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	----	12	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	----	8.6	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	----	<2	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	----	<0.02	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	----	0.183	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	----	114	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	----	----	5.46	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	----	----	1090	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	----	----	1.75	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	----	1.5	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	----	<0.02	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	----	<10	----
Liming Rate	----	1	kg CaCO3/t	----	----	----	<1	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	----	0.18	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	----	114	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	----	8	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	64.8	41.4	53.5	----	53.5
Moisture Content	----	1.0	%	----	----	----	52.8	----
EA150: Particle Sizing								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B13-9	16-1	16-0	13-8	13-5
			Client sampling date / time	07-Oct-2020 10:28	07-Oct-2020 10:56	07-Oct-2020 11:16	07-Oct-2020 12:06	07-Oct-2020 12:56
Compound	CAS Number	LOR	Unit	EB2026300-006	EB2026300-007	EB2026300-008	EB2026300-009	EB2026300-010
				Result	Result	Result	Result	Result
EA150: Particle Sizing - Continued								
+75µm	----	1	%	14	63	29	31	44
+150µm	----	1	%	13	52	22	26	25
+300µm	----	1	%	6	25	13	11	4
+425µm	----	1	%	4	11	8	9	2
+600µm	----	1	%	4	5	4	8	1
+1180µm	----	1	%	3	2	2	6	1
+2.36mm	----	1	%	2	<1	<1	5	<1
+4.75mm	----	1	%	<1	<1	<1	2	<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	%	16	20	36	34	25
Silt (2-60 µm)	----	1	%	69	16	33	34	26
Sand (0.06-2.00 mm)	----	1	%	13	63	30	27	48
Gravel (>2mm)	----	1	%	2	1	1	5	1
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.65	2.50	2.45	2.21	2.34
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	15900	7790	11800	12300	10100
Iron	7439-89-6	50	mg/kg	38000	23100	29000	30300	26800
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	9.81	5.94	7.09	8.27	7.86
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	36.5	21.4	28.9	31.8	26.4
Copper	7440-50-8	1.0	mg/kg	16.0	10.4	22.6	17.6	13.8
Lead	7439-92-1	1.0	mg/kg	15.0	8.8	14.9	16.0	13.6
Nickel	7440-02-0	1.0	mg/kg	19.7	12.7	18.5	17.3	15.6
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Zinc	7440-66-6	1.0	mg/kg	67.7	44.7	75.0	73.4	60.0
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	0.05	0.04	0.06	0.07	0.06

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B13-9	16-1	16-0	13-8	13-5
			Client sampling date / time	07-Oct-2020 10:28	07-Oct-2020 10:56	07-Oct-2020 11:16	07-Oct-2020 12:06	07-Oct-2020 12:56
Compound	CAS Number	LOR	Unit	EB2026300-006	EB2026300-007	EB2026300-008	EB2026300-009	EB2026300-010
				Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	----	0.2	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	----	880	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	----	----	----	880	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	----	----	456	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.06	0.51	1.14	0.88	0.84
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	----	<3	----
C10 - C14 Fraction	----	3	mg/kg	----	----	----	4	----
C15 - C28 Fraction	----	3	mg/kg	----	----	----	22	----
C29 - C36 Fraction	----	5	mg/kg	----	----	----	25	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	----	51	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	----	----	----	<3	----
>C10 - C16 Fraction	----	3	mg/kg	----	----	----	4	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	----	----	----	<3.0	----
>C16 - C34 Fraction	----	3	mg/kg	----	----	----	41	----
>C34 - C40 Fraction	----	5	mg/kg	----	----	----	12	----
^ >C10 - C40 Fraction (sum)	----	3	mg/kg	----	----	----	57	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.2	mg/kg	----	----	----	<0.2	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	----	<0.2	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	----	<0.2	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	----	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	----	----	----	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	<0.2	----
Naphthalene	91-20-3	0.2	mg/kg	----	----	----	<0.2	----
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B13-9	16-1	16-0	13-8	13-5
			Client sampling date / time	07-Oct-2020 10:28	07-Oct-2020 10:56	07-Oct-2020 11:16	07-Oct-2020 12:06	07-Oct-2020 12:56
Compound	CAS Number	LOR	Unit	EB2026300-006	EB2026300-007	EB2026300-008	EB2026300-009	EB2026300-010
				Result	Result	Result	Result	Result
EP090: Organotin Compounds - Continued								
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	<1	<1	<1
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	**1.2**	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B13-9	16-1	16-0	13-8	13-5
			Client sampling date / time	07-Oct-2020 10:28	07-Oct-2020 10:56	07-Oct-2020 11:16	07-Oct-2020 12:06	07-Oct-2020 12:56
Compound	CAS Number	LOR	Unit	EB2026300-006	EB2026300-007	EB2026300-008	EB2026300-009	EB2026300-010
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	----	<6.2	----
Aroclor 1016	12674-11-2	5.0	µg/kg	----	----	----	<6.2	----
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	----	<6.2	----
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	----	<6.2	----
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	----	<6.2	----
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	----	<6.2	----
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	----	<6.2	----
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	----	<6.2	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	----	----	<5	----
2-Methylnaphthalene	91-57-6	5	µg/kg	----	----	----	<5	----
Acenaphthylene	208-96-8	4	µg/kg	----	----	----	**9**	----
Acenaphthene	83-32-9	4	µg/kg	----	----	----	<5	----
Fluorene	86-73-7	4	µg/kg	----	----	----	<5	----
Phenanthrene	85-01-8	4	µg/kg	----	----	----	**17**	----
Anthracene	120-12-7	4	µg/kg	----	----	----	**5**	----
Fluoranthene	206-44-0	4	µg/kg	----	----	----	**42**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B13-9	16-1	16-0	13-8	13-5
			Client sampling date / time	07-Oct-2020 10:28	07-Oct-2020 10:56	07-Oct-2020 11:16	07-Oct-2020 12:06	07-Oct-2020 12:56
Compound	CAS Number	LOR	Unit	EB2026300-006	EB2026300-007	EB2026300-008	EB2026300-009	EB2026300-010
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Pyrene	129-00-0	4	µg/kg	----	----	----	40	----
Benz(a)anthracene	56-55-3	4	µg/kg	----	----	----	25	----
Chrysene	218-01-9	4	µg/kg	----	----	----	20	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	----	----	----	31	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	----	----	16	----
Benzo(e)pyrene	192-97-2	4	µg/kg	----	----	----	16	----
Benzo(a)pyrene	50-32-8	4	µg/kg	----	----	----	29	----
Perylene	198-55-0	4	µg/kg	----	----	----	13	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	----	----	----	24	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	----	----	----	5	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	----	----	----	18	----
Coronene	191-07-1	5	µg/kg	----	----	----	5	----
^ Sum of PAHs	----	4	µg/kg	----	----	----	315	----
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	----	----	----	43	----
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	----	----	----	43	----
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	----	----	----	43	----
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	76.5	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	66.5	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	77.6	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	96.8	106	92.0	96.1	95.7
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	84.4	41.4	62.5	83.7	87.8
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	56.5	52.8	81.9	48.9	63.6
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	----	----	----	66.4	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	----	----	----	90.0	----
Anthracene-d10	1719-06-8	10	%	----	----	----	87.6	----
4-Terphenyl-d14	1718-51-0	10	%	----	----	----	104	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	13-4	13-4B	13-1	15-1	11-5
			Client sampling date / time	07-Oct-2020 13:10	07-Oct-2020 13:40	07-Oct-2020 14:30	07-Oct-2020 15:09	07-Oct-2020 15:39
Compound	CAS Number	LOR	Unit	EB2026300-011	EB2026300-012	EB2026300-014	EB2026300-015	EB2026300-016
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	----	8.7	----	----
pH OX (23B)	----	0.1	pH Unit	----	----	8.3	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	<2	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	----	<2	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	----	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	----	<0.020	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	----	<0.020	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	----	<0.020	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	----	0.098	----	----
Peroxide Sulfur (23De)	----	0.020	% S	----	----	0.273	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	----	0.175	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	----	109	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	----	0.271	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	----	1.63	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	----	1.36	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	----	677	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	----	1.08	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	----	0.133	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	----	0.255	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	----	0.121	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	----	100	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	----	0.160	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	----	----	3.60	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	720	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	----	----	1.15	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	13-4	13-4B	13-1	15-1	11-5
			Client sampling date / time	07-Oct-2020 13:10	07-Oct-2020 13:40	07-Oct-2020 14:30	07-Oct-2020 15:09	07-Oct-2020 15:39
Compound	CAS Number	LOR	Unit	EB2026300-011	EB2026300-012	EB2026300-014	EB2026300-015	EB2026300-016
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	1.5	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	<10	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	0.17	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	109	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	8	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	8.7	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	<0.02	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	0.137	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	85	----	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	----	4.92	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	----	983	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	----	1.58	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	1.5	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	<10	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	0.14	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	85	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	6	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	56.8	61.7	----	35.2	43.4
Moisture Content	----	1.0	%	----	----	50.1	----	----
EA150: Particle Sizing								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	13-4	13-4B	13-1	15-1	11-5
			Client sampling date / time	07-Oct-2020 13:10	07-Oct-2020 13:40	07-Oct-2020 14:30	07-Oct-2020 15:09	07-Oct-2020 15:39
Compound	CAS Number	LOR	Unit	EB2026300-011	EB2026300-012	EB2026300-014	EB2026300-015	EB2026300-016
				Result	Result	Result	Result	Result
EA150: Particle Sizing - Continued								
+75µm	----	1	%	17	19	68	57	54
+150µm	----	1	%	8	11	59	32	44
+300µm	----	1	%	4	6	14	9	19
+425µm	----	1	%	3	4	7	4	6
+600µm	----	1	%	3	3	4	2	3
+1180µm	----	1	%	1	2	2	<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	%	42	37	20	22	22
Silt (2-60 µm)	----	1	%	39	42	10	19	22
Sand (0.06-2.00 mm)	----	1	%	18	21	69	58	55
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	2.51	2.39	2.67	2.55	2.54
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	13500	15000	11500	6960	10100
Iron	7439-89-6	50	mg/kg	33600	35900	28100	19900	25000
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	8.58	9.01	8.23	5.71	6.14
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	33.5	35.9	29.7	19.2	26.8
Copper	7440-50-8	1.0	mg/kg	19.2	20.1	17.4	9.1	17.2
Lead	7439-92-1	1.0	mg/kg	17.7	17.8	15.9	6.6	12.4
Nickel	7440-02-0	1.0	mg/kg	20.7	21.0	15.8	12.1	16.6
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Zinc	7440-66-6	1.0	mg/kg	76.2	81.6	82.8	41.3	74.3
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	0.08	0.07	0.08	0.03	0.06

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	13-4	13-4B	13-1	15-1	11-5
			Client sampling date / time	07-Oct-2020 13:10	07-Oct-2020 13:40	07-Oct-2020 14:30	07-Oct-2020 15:09	07-Oct-2020 15:39
Compound	CAS Number	LOR	Unit	EB2026300-011	EB2026300-012	EB2026300-014	EB2026300-015	EB2026300-016
				Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	**0.2**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	**780**	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ **Total Nitrogen as N**	----	20	mg/kg	----	----	**780**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	----	**481**	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**1.11**	**1.11**	**0.64**	**0.62**	**0.65**
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	----	----	**7**	----	----
C15 - C28 Fraction	----	3	mg/kg	----	----	**52**	----	----
C29 - C36 Fraction	----	5	mg/kg	----	----	**48**	----	----
^ **C10 - C36 Fraction (sum)**	----	3	mg/kg	----	----	**107**	----	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	----	----	<3	----	----
>C10 - C16 Fraction	----	3	mg/kg	----	----	**8**	----	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	----	----	<3.0	----	----
>C16 - C34 Fraction	----	3	mg/kg	----	----	**89**	----	----
>C34 - C40 Fraction	----	5	mg/kg	----	----	**26**	----	----
^ **>C10 - C40 Fraction (sum)**	----	3	mg/kg	----	----	**123**	----	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	----	----
Toluene	108-88-3	0.2	mg/kg	----	----	<0.2	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	<0.2	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	<0.2	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	<0.2	----	----
^ **Total Xylenes**	----	0.5	mg/kg	----	----	<0.5	----	----
^ **Sum of BTEX**	----	0.2	mg/kg	----	----	<0.2	----	----
Naphthalene	91-20-3	0.2	mg/kg	----	----	<0.2	----	----
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	13-4	13-4B	13-1	15-1	11-5
			Client sampling date / time	07-Oct-2020 13:10	07-Oct-2020 13:40	07-Oct-2020 14:30	07-Oct-2020 15:09	07-Oct-2020 15:39
Compound	CAS Number	LOR	Unit	EB2026300-011	EB2026300-012	EB2026300-014	EB2026300-015	EB2026300-016
				Result	Result	Result	Result	Result
EP090: Organotin Compounds - Continued								
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	<1	<1	<1
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	13-4	13-4B	13-1	15-1	11-5
			Client sampling date / time	07-Oct-2020 13:10	07-Oct-2020 13:40	07-Oct-2020 14:30	07-Oct-2020 15:09	07-Oct-2020 15:39
Compound	CAS Number	LOR	Unit	EB2026300-011	EB2026300-012	EB2026300-014	EB2026300-015	EB2026300-016
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	<6.2	----	----
Aroclor 1016	12674-11-2	5.0	µg/kg	----	----	<6.2	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	<6.2	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	<6.2	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	<6.2	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	<6.2	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	<6.2	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	<6.2	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	----	**8**	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	----	----	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	----	----	**10**	----	----
Acenaphthene	83-32-9	4	µg/kg	----	----	<5	----	----
Fluorene	86-73-7	4	µg/kg	----	----	<5	----	----
Phenanthrene	85-01-8	4	µg/kg	----	----	**12**	----	----
Anthracene	120-12-7	4	µg/kg	----	----	**8**	----	----
Fluoranthene	206-44-0	4	µg/kg	----	----	**32**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	13-4	13-4B	13-1	15-1	11-5
			Client sampling date / time	07-Oct-2020 13:10	07-Oct-2020 13:40	07-Oct-2020 14:30	07-Oct-2020 15:09	07-Oct-2020 15:39
Compound	CAS Number	LOR	Unit	EB2026300-011	EB2026300-012	EB2026300-014	EB2026300-015	EB2026300-016
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Pyrene	129-00-0	4	µg/kg	----	----	47	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	----	----	20	----	----
Chrysene	218-01-9	4	µg/kg	----	----	15	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	----	----	28	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	----	10	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	----	----	14	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	----	----	24	----	----
Perylene	198-55-0	4	µg/kg	----	----	63	----	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	----	----	21	----	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	----	----	<5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	----	----	16	----	----
Coronene	191-07-1	5	µg/kg	----	----	5	----	----
^ Sum of PAHs	----	4	µg/kg	----	----	333	----	----
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	----	----	32	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	----	----	34	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	----	----	36	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	81.2	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	69.1	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	83.6	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	80.7	93.0	64.6	70.7	105
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	70.2	53.3	95.7	70.9	79.5
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	83.1	72.9	61.9	54.2	52.1
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	----	----	69.5	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	----	----	92.8	----	----
Anthracene-d10	1719-06-8	10	%	----	----	102	----	----
4-Terphenyl-d14	1718-51-0	10	%	----	----	121	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	10-8	Trip Blank	----	----	----
			Client sampling date / time	07-Oct-2020 16:00	07-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2026300-017	EB2026300-019	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	55.0	<0.1	----	----	----
EA150: Particle Sizing								
+75µm	----	1	%	9	----	----	----	----
+150µm	----	1	%	8	----	----	----	----
+300µm	----	1	%	7	----	----	----	----
+425µm	----	1	%	6	----	----	----	----
+600µm	----	1	%	6	----	----	----	----
+1180µm	----	1	%	5	----	----	----	----
+2.36mm	----	1	%	4	----	----	----	----
+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	%	38	----	----	----	----
Sand (0.06-2.00 mm)	----	1	%	5	----	----	----	----
Gravel (>2mm)	----	1	%	5	----	----	----	----
Cobbles (>6cm)	----	1	%	<1	----	----	----	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.28	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	16300	----	----	----	----
Iron	7439-89-6	50	mg/kg	37300	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	9.73	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	----	----
Chromium	7440-47-3	1.0	mg/kg	35.5	----	----	----	----
Copper	7440-50-8	1.0	mg/kg	26.1	----	----	----	----
Lead	7439-92-1	1.0	mg/kg	14.4	----	----	----	----
Nickel	7440-02-0	1.0	mg/kg	22.4	----	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	----	----	----	----
Zinc	7440-66-6	1.0	mg/kg	81.6	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	10-8	Trip Blank	----	----	----
			Client sampling date / time	07-Oct-2020 16:00	07-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2026300-017	EB2026300-019	--------	--------	--------
				Result	Result	----	----	----
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	**0.06**	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.87**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg	----	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg	----	<1	----	----	----
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	----	----	----	----
Dibutyltin	1002-53-5	1	µgSn/kg	<1	----	----	----	----
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	----	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	----	----
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	----	----	----	----
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	----	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	----	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	----	----	----	----
Ethion	563-12-2	10	µg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	10-8	Trip Blank	----	----	----
			Client sampling date / time	07-Oct-2020 16:00	07-Oct-2020 00:00	----	----	----
				EB2026300-017	EB2026300-019	--------	--------	--------
				Result	Result	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	----	----	----	----
Malathion	121-75-5	10	µg/kg	<10	----	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	----	----
Parathion	56-38-2	10	µg/kg	<10	----	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	----	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	----	----
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	----	----	----	----
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	----	----	----	----
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	----	----	----	----

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

			Client sample ID	10-8	Trip Blank	----	----	----
			Client sampling date / time	07-Oct-2020 16:00	07-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2026300-017	EB2026300-019	--------	--------	--------
				Result	Result	----	----	----
EP131A: Organochlorine Pesticides - Continued								
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	96.6	----	----	----
Toluene-D8	2037-26-5	0.2	%	----	83.0	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	94.2	----	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	70.5	----	----	----	----
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	56.4	----	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	55.5	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
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
EP080-SD: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
EP090S: Organotin Surrogate			
Tripropyltin	----	35	130
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	14	102
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	119
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	106
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2026442**	Page	: 1 of 27
Client	: **BMT COMMERCIAL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DARREN RICHARDSON	Contact	: Andrew Epps
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 3552 8639
Project	: Port of Brisbane SAP	Date Samples Received	: 08-Oct-2020 14:50
Order number	: ----	Date Analysis Commenced	: 09-Oct-2020
C-O-C number	: ----	Issue Date	: 06-Nov-2020 12:01
Sampler	: BRAD HILES		
Site	: ----		
Quote number	: BN/016/19		
No. of samples received	: 16		
No. of samples analysed	: 15		

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 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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD
Diana Mesa	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Minh Wills	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Morgan Lennox	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP080-SD: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP131A: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP132B-SD and EP131B : LOR is raised due to high amount of moistures is present.
- **Ultra Trace Organics analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite):Retained Acidity not required because pH KCl greater than or equal to 4.5
- EK067G (Total Phosphorus as P): Sample EB2026442_003 (B10-6B) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EP090 Organotins: Sample 'B10-6' shows poor matrix spike recovery for MBT due to matrix interference.
- EG020-SD (Total Metals Sediments by ICP-MS): Sample B10-6 (EB2026442-002) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EP090S Organotins: The TBT LOR for sample 'B12-1' has been raised due to low sample volume.
- ASS: EA029 (SPOCAS): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.
- EN68: This analysis in accordance with National Ocean Disposal Guidelines, Commonwealth of Australia, 2002 - (modified). Results reported are those determined on a 1:4 sediment/seawater elutriate without blank correction.

Analytical Results

Sub-Matrix: **ELUTRIATE** (Matrix: **WATER**)			Client sample ID	**B15-2**	**B12-1**	**Elutriate Blank**	**----**	**----**
			Client sampling date / time	08-Oct-2020 09:10	08-Oct-2020 10:00	08-Oct-2020 10:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2026442-005**	**EB2026442-007**	**EB2026442-016**	**--------**	**--------**
				Result	Result	Result	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	<2	<2	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**74.9**	**60.5**	**84.2**	----	----

Analytical Results

Sub-Matrix: PORE WATER (Matrix: WATER)			Client sample ID	B12-1 Pore water	----	----	----	----
			Client sampling date / time	08-Oct-2020 10:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2026442-015	--------	--------	--------	--------
				Result	----	----	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<4	----	----	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**35.8**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-1	B10-6	B10-6B	B15-3	B15-2
			Client sampling date / time	08-Oct-2020 07:20	08-Oct-2020 07:50	08-Oct-2020 07:55	08-Oct-2020 08:55	08-Oct-2020 09:10
Compound	CAS Number	LOR	Unit	EB2026442-001	EB2026442-002	EB2026442-003	EB2026442-004	EB2026442-005
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	8.4	8.3	9.0	8.8
pH OX (23B)	----	0.1	pH Unit	----	7.3	7.6	8.3	7.9
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	<0.020	<0.020	<0.020	<0.020
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	<0.020	<0.020	<0.020	<0.020
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	<0.020	<0.020	<0.020	<0.020
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	0.177	0.184	0.080	0.116
Peroxide Sulfur (23De)	----	0.020	% S	----	0.600	0.524	0.246	0.436
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	0.423	0.340	0.166	0.320
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	264	212	103	200
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	0.354	0.392	0.237	0.259
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	0.913	1.00	1.76	3.49
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	0.559	0.608	1.52	3.23
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	279	303	759	1610
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	0.447	0.486	1.22	2.58
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	0.230	0.270	0.103	0.145
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	0.380	0.435	0.254	0.266
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	0.150	0.165	0.152	0.120
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	124	136	125	99
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	0.198	0.218	0.200	0.159
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	----	1.37	1.76	3.97	7.67
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	274	353	794	1530
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	----	0.438	0.565	1.27	2.45

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-1	B10-6	B10-6B	B15-3	B15-2
			Client sampling date / time	08-Oct-2020 07:20	08-Oct-2020 07:50	08-Oct-2020 07:55	08-Oct-2020 08:55	08-Oct-2020 09:10
Compound	CAS Number	LOR	Unit	EB2026442-001	EB2026442-002	EB2026442-003	EB2026442-004	EB2026442-005
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	----	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.42	0.34	0.16	0.32
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	264	212	103	200
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	20	16	8	15
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	8.4	8.3	9.0	8.8
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	0.375	0.247	0.125	0.252
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	234	154	78	158
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	3.58	3.76	5.28	8.95
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	716	750	1060	1790
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	1.15	1.20	1.69	2.87
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	----	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.37	0.25	0.12	0.25
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	234	154	78	158
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	18	12	6	12
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	58.0	56.9	56.3	33.5	38.3
EA150: Particle Sizing								
+75µm	----	1	%	31	28	25	54	65

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-1	B10-6	B10-6B	B15-3	B15-2
			Client sampling date / time	08-Oct-2020 07:20	08-Oct-2020 07:50	08-Oct-2020 07:55	08-Oct-2020 08:55	08-Oct-2020 09:10
Compound	CAS Number	LOR	Unit	EB2026442-001	EB2026442-002	EB2026442-003	EB2026442-004	EB2026442-005
				Result	Result	Result	Result	Result
EA150: Particle Sizing - Continued								
+150µm	----	1	%	18	17	16	46	52
+300µm	----	1	%	7	6	7	19	33
+425µm	----	1	%	5	4	4	8	18
+600µm	----	1	%	4	3	2	4	12
+1180µm	----	1	%	3	2	<1	3	8
+2.36mm	----	1	%	<1	<1	<1	2	5
+4.75mm	----	1	%	<1	<1	<1	1	3
+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	%	43	46	44	29	20
Silt (2-60 µm)	----	1	%	26	25	30	16	14
Sand (0.06-2.00 mm)	----	1	%	30	28	26	53	60
Gravel (>2mm)	----	1	%	1	1	<1	2	6
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.73	2.68	2.72	2.66	2.61
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	12500	13500	15300	8120	7270
Iron	7439-89-6	50	mg/kg	33200	35300	38200	23800	22100
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	7.84	7.44	5.85	5.79	6.01
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	30.0	30.9	32.3	16.6	18.6
Copper	7440-50-8	1.0	mg/kg	28.6	28.9	25.6	6.4	13.3
Lead	7439-92-1	1.0	mg/kg	16.7	14.2	13.8	5.2	11.5
Nickel	7440-02-0	1.0	mg/kg	20.1	24.1	30.5	11.0	14.9
Silver	7440-22-4	0.1	mg/kg	0.1	0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	1.0	mg/kg	94.0	83.1	80.0	28.1	52.5
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	0.08	0.07	0.05	0.02	0.05
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-1	B10-6	B10-6B	B15-3	B15-2
			Client sampling date / time	08-Oct-2020 07:20	08-Oct-2020 07:50	08-Oct-2020 07:55	08-Oct-2020 08:55	08-Oct-2020 09:10
Compound	CAS Number	LOR	Unit	EB2026442-001	EB2026442-002	EB2026442-003	EB2026442-004	EB2026442-005
				Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser - Continued								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	0.2	<0.1	0.3	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	1110	1180	300	690
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	----	1110	1180	300	690
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	603	732	312	389
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Seawater Sampling Date	----	-	-	----	----	----	----	29/10/2020
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.35	1.11	1.13	0.32	0.83
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	<3	<3	<3	<3
C10 - C14 Fraction	----	3	mg/kg	----	25	6	<3	8
C15 - C28 Fraction	----	3	mg/kg	----	33	30	4	45
C29 - C36 Fraction	----	5	mg/kg	----	32	32	<5	51
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	90	68	4	104
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	----	<3	<3	<3	<3
>C10 - C16 Fraction	----	3	mg/kg	----	26	6	<3	11
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	----	<3.0	<3.0	<3.0	<3.0
>C16 - C34 Fraction	----	3	mg/kg	----	55	53	6	81
>C34 - C40 Fraction	----	5	mg/kg	----	19	18	<5	25
^ >C10 - C40 Fraction (sum)	----	3	mg/kg	----	100	77	6	117
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	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
Naphthalene	91-20-3	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-1	B10-6	B10-6B	B15-3	B15-2
			Client sampling date / time	08-Oct-2020 07:20	08-Oct-2020 07:50	08-Oct-2020 07:55	08-Oct-2020 08:55	08-Oct-2020 09:10
Compound	CAS Number	LOR	Unit	EB2026442-001	EB2026442-002	EB2026442-003	EB2026442-004	EB2026442-005
				Result	Result	Result	Result	Result
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	<1	<1
Dibutyltin	1002-53-5	1	µgSn/kg	**1**	<1	<1	<1	**2**
Tributyltin	56573-85-4	0.5	µgSn/kg	**2.1**	<0.5	<0.5	<0.5	**4.8**
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-1	B10-6	B10-6B	B15-3	B15-2
			Client sampling date / time	08-Oct-2020 07:20	08-Oct-2020 07:50	08-Oct-2020 07:55	08-Oct-2020 08:55	08-Oct-2020 09:10
Compound	CAS Number	LOR	Unit	EB2026442-001	EB2026442-002	EB2026442-003	EB2026442-004	EB2026442-005
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	<6.2	<6.2	<5.0	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	----	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	----	**9**	**7**	<4	**9**
Acenaphthene	83-32-9	4	µg/kg	----	<5	<5	<4	<4
Fluorene	86-73-7	4	µg/kg	----	<5	<5	<4	<4
Phenanthrene	85-01-8	4	µg/kg	----	**13**	**7**	<4	**8**
Anthracene	120-12-7	4	µg/kg	----	**5**	<5	<4	<4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-1	B10-6	B10-6B	B15-3	B15-2
			Client sampling date / time	08-Oct-2020 07:20	08-Oct-2020 07:50	08-Oct-2020 07:55	08-Oct-2020 08:55	08-Oct-2020 09:10
Compound	CAS Number	LOR	Unit	EB2026442-001	EB2026442-002	EB2026442-003	EB2026442-004	EB2026442-005
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluoranthene	206-44-0	4	µg/kg	----	32	21	<4	27
Pyrene	129-00-0	4	µg/kg	----	34	23	4	30
Benz(a)anthracene	56-55-3	4	µg/kg	----	21	13	<4	19
Chrysene	218-01-9	4	µg/kg	----	16	10	<4	15
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	----	28	18	<4	32
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	10	7	<4	13
Benzo(e)pyrene	192-97-2	4	µg/kg	----	14	9	<4	16
Benzo(a)pyrene	50-32-8	4	µg/kg	----	24	17	<4	30
Perylene	198-55-0	4	µg/kg	----	21	15	<4	16
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	----	20	18	<4	23
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	----	<5	<5	<4	11
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	----	16	12	<4	23
Coronene	191-07-1	5	µg/kg	----	5	<5	<5	5
^ Sum of PAHs	----	4	µg/kg	----	268	177	4	277
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	----	32	22	<4	50
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	----	34	24	5	50
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	----	36	26	10	50
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	91.8	81.2	96.2	99.1
Toluene-D8	2037-26-5	0.2	%	----	76.4	72.3	81.2	84.1
4-Bromofluorobenzene	460-00-4	0.2	%	----	94.3	92.3	97.7	101
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	106	61.6	83.6	121	105
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	44.2	43.0	43.0	64.8	67.6
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	52.6	45.2	50.5	73.2	46.4
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	----	45.4	46.2	69.9	44.1
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	----	85.0	82.2	87.1	86.4
Anthracene-d10	1719-06-8	10	%	----	96.5	88.5	85.9	94.2
4-Terphenyl-d14	1718-51-0	10	%	----	116	110	110	108

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B12-2	B12-1	B11-8	B11-9	B11-9B
			Client sampling date / time	08-Oct-2020 09:25	08-Oct-2020 10:00	08-Oct-2020 10:15	08-Oct-2020 11:03	08-Oct-2020 11:24
Compound	CAS Number	LOR	Unit	EB2026442-006	EB2026442-007	EB2026442-008	EB2026442-009	EB2026442-010
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	8.8	8.3	----	----
pH OX (23B)	----	0.1	pH Unit	----	8.3	7.4	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	<2	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	<2	<2	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	<2	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	<0.020	<0.020	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	<0.020	<0.020	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	<0.020	<0.020	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	0.070	0.199	----	----
Peroxide Sulfur (23De)	----	0.020	% S	----	0.126	0.492	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	0.057	0.293	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	36	182	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	0.250	0.440	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	1.03	0.877	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	0.776	0.437	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	387	218	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	0.621	0.350	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	0.118	0.310	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	0.174	0.482	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	0.056	0.173	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	46	142	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	0.074	0.228	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	----	2.58	1.69	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	516	338	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	----	0.827	0.542	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B12-2	B12-1	B11-8	B11-9	B11-9B
			Client sampling date / time	08-Oct-2020 09:25	08-Oct-2020 10:00	08-Oct-2020 10:15	08-Oct-2020 11:03	08-Oct-2020 11:24
Compound	CAS Number	LOR	Unit	EB2026442-006	EB2026442-007	EB2026442-008	EB2026442-009	EB2026442-010
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	1.5	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	<10	----	----
Liming Rate	----	1	kg CaCO3/t	----	<1	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.06	0.29	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	36	182	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	3	14	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	8.8	8.3	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	<0.02	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	0.055	0.239	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	34	149	----	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	3.37	3.68	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	673	736	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	1.08	1.18	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	1.5	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	<10	----	----
Liming Rate	----	1	kg CaCO3/t	----	<1	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.06	0.24	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	34	149	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	2	11	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	45.7	33.1	63.2	61.5	58.2
EA150: Particle Sizing								
+75µm	----	1	%	49	52	14	16	16

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	B12-2	B12-1	B11-8	B11-9	B11-9B
Client sampling date / time				08-Oct-2020 09:25	08-Oct-2020 10:00	08-Oct-2020 10:15	08-Oct-2020 11:03	08-Oct-2020 11:24
				EB2026442-006	EB2026442-007	EB2026442-008	EB2026442-009	EB2026442-010
				Result	Result	Result	Result	Result
EA150: Particle Sizing - Continued								
+150µm	----	1	%	29	30	8	9	8
+300µm	----	1	%	12	17	5	6	5
+425µm	----	1	%	5	10	4	5	5
+600µm	----	1	%	2	4	3	5	4
+1180µm	----	1	%	<1	2	2	4	4
+2.36mm	----	1	%	<1	<1	<1	2	2
+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	%	33	22	54	33	42
Silt (2-60 µm)	----	1	%	17	23	31	48	41
Sand (0.06-2.00 mm)	----	1	%	50	54	14	16	14
Gravel (>2mm)	----	1	%	<1	1	1	3	3
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.63	2.62	2.60	2.58	2.67
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	8910	6100	12900	14700	11900
Iron	7439-89-6	50	mg/kg	24600	21100	33700	38400	31800
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	6.28	5.53	9.26	10.1	9.08
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	22.0	16.9	30.2	33.8	28.1
Copper	7440-50-8	1.0	mg/kg	12.7	10.5	24.9	27.8	22.5
Lead	7439-92-1	1.0	mg/kg	9.5	7.6	15.8	18.6	15.1
Nickel	7440-02-0	1.0	mg/kg	14.5	12.5	20.2	22.6	19.0
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.1	0.1	<0.1
Zinc	7440-66-6	1.0	mg/kg	50.2	37.9	81.2	94.4	78.5
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	0.04	0.03	0.08	0.08	0.06
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B12-2	B12-1	B11-8	B11-9	B11-9B
			Client sampling date / time	08-Oct-2020 09:25	08-Oct-2020 10:00	08-Oct-2020 10:15	08-Oct-2020 11:03	08-Oct-2020 11:24
Compound	CAS Number	LOR	Unit	EB2026442-006	EB2026442-007	EB2026442-008	EB2026442-009	EB2026442-010
				Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser - Continued								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	0.4	0.1	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	690	1480	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	----	690	1480	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	426	744	----	----
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Seawater Sampling Date	----	-	-	----	29/10/2020	----	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.68	0.36	1.19	1.12	0.81
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	<3	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	----	4	14	----	----
C15 - C28 Fraction	----	3	mg/kg	----	13	39	----	----
C29 - C36 Fraction	----	5	mg/kg	----	12	38	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	29	91	----	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	----	<3	<3	----	----
>C10 - C16 Fraction	----	3	mg/kg	----	4	10	----	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	----	<3.0	<3.0	----	----
>C16 - C34 Fraction	----	3	mg/kg	----	22	66	----	----
>C34 - C40 Fraction	----	5	mg/kg	----	6	22	----	----
^ >C10 - C40 Fraction (sum)	----	3	mg/kg	----	32	98	----	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	----	----
Toluene	108-88-3	0.2	mg/kg	----	<0.2	<0.2	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	<0.2	<0.2	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	<0.2	<0.2	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	<0.2	<0.2	----	----
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	<0.2	----	----
Naphthalene	91-20-3	0.2	mg/kg	----	<0.2	<0.2	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B12-2	B12-1	B11-8	B11-9	B11-9B
			Client sampling date / time	08-Oct-2020 09:25	08-Oct-2020 10:00	08-Oct-2020 10:15	08-Oct-2020 11:03	08-Oct-2020 11:24
Compound	CAS Number	LOR	Unit	EB2026442-006	EB2026442-007	EB2026442-008	EB2026442-009	EB2026442-010
				Result	Result	Result	Result	Result
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	<1	<1
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	<1	<1	<1
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	**14.8**	<0.5	**0.6**	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B12-2	B12-1	B11-8	B11-9	B11-9B
			Client sampling date / time	08-Oct-2020 09:25	08-Oct-2020 10:00	08-Oct-2020 10:15	08-Oct-2020 11:03	08-Oct-2020 11:24
Compound	CAS Number	LOR	Unit	EB2026442-006	EB2026442-007	EB2026442-008	EB2026442-009	EB2026442-010
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	<5.0	<6.2	----	----
Aroclor 1016	12674-11-2	5.0	µg/kg	----	<5.0	<6.2	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	----	<5.0	<6.2	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	----	<5.0	<6.2	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	----	<5.0	<6.2	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	----	<5.0	<6.2	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	----	<5.0	<6.2	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	----	<5.0	<6.2	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	<5	<5	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	----	<5	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	----	<4	<5	----	----
Acenaphthene	83-32-9	4	µg/kg	----	<4	<5	----	----
Fluorene	86-73-7	4	µg/kg	----	<4	<5	----	----
Phenanthrene	85-01-8	4	µg/kg	----	<4	**9**	----	----
Anthracene	120-12-7	4	µg/kg	----	<4	<5	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B12-2	B12-1	B11-8	B11-9	B11-9B
			Client sampling date / time	08-Oct-2020 09:25	08-Oct-2020 10:00	08-Oct-2020 10:15	08-Oct-2020 11:03	08-Oct-2020 11:24
Compound	CAS Number	LOR	Unit	EB2026442-006	EB2026442-007	EB2026442-008	EB2026442-009	EB2026442-010
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluoranthene	206-44-0	4	µg/kg	----	8	18	----	----
Pyrene	129-00-0	4	µg/kg	----	8	21	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	----	5	12	----	----
Chrysene	218-01-9	4	µg/kg	----	4	10	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	----	7	14	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	<4	8	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	----	<4	8	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	----	6	14	----	----
Perylene	198-55-0	4	µg/kg	----	6	13	----	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	----	5	14	----	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	----	<4	<5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	----	<4	10	----	----
Coronene	191-07-1	5	µg/kg	----	<5	<5	----	----
^ Sum of PAHs	----	4	µg/kg	----	49	151	----	----
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	----	7	19	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	----	10	21	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	----	12	23	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	96.6	91.6	----	----
Toluene-D8	2037-26-5	0.2	%	----	81.2	80.2	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	97.8	94.3	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	93.3	96.0	78.6	73.9	92.5
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	74.3	53.2	48.1	79.6	54.4
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	68.9	40.6	54.8	45.1	86.5
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	----	65.9	51.1	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	----	82.1	78.0	----	----
Anthracene-d10	1719-06-8	10	%	----	88.2	83.5	----	----
4-Terphenyl-d14	1718-51-0	10	%	----	102	97.2	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
			Client sampling date / time	08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
Compound	CAS Number	LOR	Unit	EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	8.9	----	----	----	----
pH OX (23B)	----	0.1	pH Unit	8.3	----	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	<0.020	----	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	<0.020	----	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	<0.020	----	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	0.089	----	----	----	----
Peroxide Sulfur (23De)	----	0.020	% S	0.203	----	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	0.114	----	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	71	----	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	0.233	----	----	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	1.60	----	----	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	1.37	----	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	683	----	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	1.09	----	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	0.124	----	----	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	0.226	----	----	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	0.102	----	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	84	----	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	0.135	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	3.76	----	----	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	752	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
Client sampling date / time				08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
				EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	1.20	----	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.11	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	71	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	5	----	----	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	8.9	----	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.089	----	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	55	----	----	----	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	4.65	----	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	930	----	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	1.49	----	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.09	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	55	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	4	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	41.6	53.8	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
			Client sampling date / time	08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
Compound	CAS Number	LOR	Unit	EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EA150: Particle Sizing								
+75µm	----	1	%	68	45	----	----	----
+150µm	----	1	%	64	35	----	----	----
+300µm	----	1	%	50	12	----	----	----
+425µm	----	1	%	25	5	----	----	----
+600µm	----	1	%	8	3	----	----	----
+1180µm	----	1	%	3	1	----	----	----
+2.36mm	----	1	%	2	<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	%	19	34	----	----	----
Silt (2-60 µm)	----	1	%	11	20	----	----	----
Sand (0.06-2.00 mm)	----	1	%	68	45	----	----	----
Gravel (>2mm)	----	1	%	2	1	----	----	----
Cobbles (>6cm)	----	1	%	<1	<1	----	----	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.62	2.67	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	8170	9900	----	----	----
Iron	7439-89-6	50	mg/kg	24600	27500	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	4.80	6.70	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	----	----	----
Chromium	7440-47-3	1.0	mg/kg	21.8	23.9	----	----	----
Copper	7440-50-8	1.0	mg/kg	17.0	20.7	----	----	----
Lead	7439-92-1	1.0	mg/kg	16.1	12.7	----	----	----
Nickel	7440-02-0	1.0	mg/kg	18.7	17.7	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	----	----	----
Zinc	7440-66-6	1.0	mg/kg	52.3	68.0	----	----	----
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	0.04	0.06	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
			Client sampling date / time	08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
Compound	CAS Number	LOR	Unit	EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	780	----	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	780	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	465	----	----	----	----
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Seawater Sampling Date	----	-	-	----	----	----	----	29/10/2020
EN82: Porewater Extraction								
Volume	----	1	mL	----	----	----	120	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.44	0.85	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	<10	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	<10	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg	----	----	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	<0.2	----	----
^ Total Xylenes	----	0.5	mg/kg	----	----	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg	----	----	<1	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	----	----	----
C10 - C14 Fraction	----	3	mg/kg	4	----	----	----	----
C15 - C28 Fraction	----	3	mg/kg	17	----	----	----	----
C29 - C36 Fraction	----	5	mg/kg	18	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Client sample ID				B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
Client sampling date / time				08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
Compound	CAS Number	LOR	Unit	EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	3	mg/kg	**39**	----	----	----	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	----	----	----	----
>C10 - C16 Fraction	----	3	mg/kg	**4**	----	----	----	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	----	----	----	----
>C16 - C34 Fraction	----	3	mg/kg	**30**	----	----	----	----
>C34 - C40 Fraction	----	5	mg/kg	**10**	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	3	mg/kg	**44**	----	----	----	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	----	----	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	----	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
Naphthalene	91-20-3	0.2	mg/kg	<0.2	----	----	----	----
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	----	----	----
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	----	----	----
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	<10	----	----	----
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	----	----	----
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	<10	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	<10	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	<10	----	----	----
Ethion	563-12-2	10	µg/kg	<10	<10	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
			Client sampling date / time	08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
Compound	CAS Number	LOR	Unit	EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	<10	----	----	----
Malathion	121-75-5	10	µg/kg	<10	<10	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	----	----	----
Parathion	56-38-2	10	µg/kg	<10	<10	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	<10	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	----	----	----
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	<0.50	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	----	----	----
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	----	----	----
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
			Client sampling date / time	08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
Compound	CAS Number	LOR	Unit	EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	----	----	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	----	----	----	----
Acenaphthylene	208-96-8	4	µg/kg	**12**	----	----	----	----
Acenaphthene	83-32-9	4	µg/kg	**10**	----	----	----	----
Fluorene	86-73-7	4	µg/kg	**5**	----	----	----	----
Phenanthrene	85-01-8	4	µg/kg	**95**	----	----	----	----
Anthracene	120-12-7	4	µg/kg	**19**	----	----	----	----
Fluoranthene	206-44-0	4	µg/kg	**348**	----	----	----	----
Pyrene	129-00-0	4	µg/kg	**384**	----	----	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	**154**	----	----	----	----
Chrysene	218-01-9	4	µg/kg	**146**	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	**157**	----	----	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	**97**	----	----	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	**88**	----	----	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	**174**	----	----	----	----
Perylene	198-55-0	4	µg/kg	**51**	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	**113**	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	**24**	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	**89**	----	----	----	----
Coronene	191-07-1	5	µg/kg	**21**	----	----	----	----
^ Sum of PAHs	----	4	µg/kg	**1990**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B9-1	B10-5	Trip Blank	B12-1 Pore water	Elutriate Blank
			Client sampling date / time	08-Oct-2020 12:13	08-Oct-2020 12:45	08-Oct-2020 00:00	08-Oct-2020 10:00	08-Oct-2020 10:00
Compound	CAS Number	LOR	Unit	EB2026442-011	EB2026442-012	EB2026442-013	EB2026442-015	EB2026442-016
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	250	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	250	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	250	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	113	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	97.5	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	116	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	95.7	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	80.1	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	94.4	----	----	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	91.9	91.3	----	----	----
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	66.5	53.2	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	54.8	66.8	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	46.2	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	75.1	----	----	----	----
Anthracene-d10	1719-06-8	10	%	82.7	----	----	----	----
4-Terphenyl-d14	1718-51-0	10	%	85.4	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	Recovery Limits (%) Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116

Sub-Matrix: **PORE WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
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
EP080-SD: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
EP090S: Organotin Surrogate			
Tripropyltin	----	35	130
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	14	102
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	119
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	106
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

CERTIFICATE OF ANALYSIS

Work Order	: **EB2026597**	Page	: 1 of 26
Client	: **BMT COMMERCIAL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DARREN RICHARDSON	Contact	: Andrew Epps
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 3552 8639
Project	: Port of Brisbane SAP	Date Samples Received	: 09-Oct-2020 15:45
Order number	: ----	Date Analysis Commenced	: 12-Oct-2020
C-O-C number	: ----	Issue Date	: 06-Nov-2020 11:59
Sampler	: BRAD HILES		
Site	: ----		
Quote number	: BN/016/19		
No. of samples received	: 18		
No. of samples analysed	: 17		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Diana Mesa	Senior Organic Chemist	Brisbane Inorganics, Stafford, QLD
Diana Mesa	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EP080-SD (TRH Volatiles/BTEX in Sediments): High LCS recovery deemed acceptable as all associated analyte results are less than LOR.
- EA150H: Soil particle density results fell outside the scope of AS1289.3.6.3. Results should be scrutinised accordingly.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP080-SD: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP131A: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- **Ultratrace Pesticides analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite):Retained Acidity not required because pH KCl greater than or equal to 4.5
- EP090S Organotins: Samples 'B5-0' and 'B4-0' show poor surrogate recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- EP090 Organotins: Sample 'B7-1' shows poor matrix spike recovery for MBT due to matrix interference.
- EP080 (TRH Volatiles/BTEX): Sample B6-3 (EB2026597-005) shows poor matrix spike recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- ASS: EA029 (SPOCAS): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.
- EN68: This analysis in accordance with National Ocean Disposal Guidelines, Commonwealth of Australia, 2002 - (modified). Results reported are those determined on a 1:4 sediment/seawater elutriate without blank correction.

Analytical Results

Sub-Matrix: **ELUTRIATE** (Matrix: **WATER**)			Client sample ID	**B5-1B**	**B5-0**	**B4-0**	**B4-4**	**Elutriate Blank**
			Client sampling date / time	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54	09-Oct-2020 00:00
Compound	CAS Number	LOR	Unit	**EB2026597-007**	**EB2026597-008**	**EB2026597-009**	**EB2026597-010**	**EB2026597-018**
				Result	Result	Result	Result	Result
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	<2	<2	<2	<2
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**69.6**	**60.8**	**60.4**	**56.7**	**77.6**

Analytical Results

Sub-Matrix: **PORE WATER** (Matrix: **WATER**)			Client sample ID	**B5-0 Pore Water**	**B4-0 Pore Water**	----	----	----
			Client sampling date / time	09-Oct-2020 10:59	09-Oct-2020 11:26	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2026597-016**	**EB2026597-017**	--------	--------	--------
				Result	Result	----	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	<2	----	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**8.69**	**19.0**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

			Client sample ID	B8-3	B7-1	B6-2	B6-2B	B6-3
			Client sampling date / time	09-Oct-2020 07:10	09-Oct-2020 07:54	09-Oct-2020 08:40	09-Oct-2020 08:40	09-Oct-2020 09:24
Compound	CAS Number	LOR	Unit	EB2026597-001	EB2026597-002	EB2026597-003	EB2026597-004	EB2026597-005
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	8.2	----	----	8.1
pH OX (23B)	----	0.1	pH Unit	----	7.8	----	----	7.0
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	----	----	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	<2	----	----	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	<2	----	----	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	<0.020	----	----	<0.020
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	<0.020	----	----	<0.020
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	<0.020	----	----	<0.020
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	0.188	----	----	0.177
Peroxide Sulfur (23De)	----	0.020	% S	----	0.486	----	----	0.519
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	0.298	----	----	0.341
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	186	----	----	213
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	0.391	----	----	0.399
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	2.00	----	----	0.839
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	1.61	----	----	0.440
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	804	----	----	220
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	1.29	----	----	0.352
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	0.223	----	----	0.238
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	0.341	----	----	0.356
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	0.118	----	----	0.117
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	97	----	----	97
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	0.156	----	----	0.155
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	----	4.33	----	----	1.30
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	865	----	----	259
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	----	1.38	----	----	0.415

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-3	B7-1	B6-2	B6-2B	B6-3
			Client sampling date / time	09-Oct-2020 07:10	09-Oct-2020 07:54	09-Oct-2020 08:40	09-Oct-2020 08:40	09-Oct-2020 09:24
Compound	CAS Number	LOR	Unit	EB2026597-001	EB2026597-002	EB2026597-003	EB2026597-004	EB2026597-005
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	----	----	1.5
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	----	----	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	----	----	<10
Liming Rate	----	1	kg CaCO3/t	----	<1	----	----	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.30	----	----	0.34
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	186	----	----	213
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	14	----	----	16
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	8.2	----	----	8.1
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	----	----	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	----	----	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	0.240	----	----	0.258
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	150	----	----	161
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	5.96	----	----	2.82
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	1190	----	----	563
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	1.91	----	----	0.90
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	----	----	1.5
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	----	----	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	----	----	<10
Liming Rate	----	1	kg CaCO3/t	----	<1	----	----	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.24	----	----	0.26
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	150	----	----	161
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	11	----	----	12
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	57.4	----	46.9	49.7	----
Moisture Content	----	1.0	%	----	62.1	----	----	56.0
EA150: Particle Sizing								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-3	B7-1	B6-2	B6-2B	B6-3
			Client sampling date / time	09-Oct-2020 07:10	09-Oct-2020 07:54	09-Oct-2020 08:40	09-Oct-2020 08:40	09-Oct-2020 09:24
Compound	CAS Number	LOR	Unit	EB2026597-001	EB2026597-002	EB2026597-003	EB2026597-004	EB2026597-005
				Result	Result	Result	Result	Result
EA150: Particle Sizing - Continued								
+75µm	----	1	%	20	37	41	39	28
+150µm	----	1	%	14	30	38	36	21
+300µm	----	1	%	9	18	17	17	12
+425µm	----	1	%	8	14	10	10	8
+600µm	----	1	%	7	12	6	8	7
+1180µm	----	1	%	6	8	4	4	4
+2.36mm	----	1	%	3	4	2	3	2
+4.75mm	----	1	%	2	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	%	39	34	33	31	35
Silt (2-60 µm)	----	1	%	39	27	24	28	36
Sand (0.06-2.00 mm)	----	1	%	18	34	41	38	26
Gravel (>2mm)	----	1	%	4	5	2	3	3
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.41	2.30	2.33	2.35	2.45
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	13800	14100	10100	11000	12200
Iron	7439-89-6	50	mg/kg	34600	34700	24100	25800	31200
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	8.52	8.10	5.02	5.68	7.57
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.2	2.2	<0.1
Chromium	7440-47-3	1.0	mg/kg	34.2	33.8	23.9	25.0	29.9
Copper	7440-50-8	1.0	mg/kg	28.3	32.1	49.3	26.6	28.9
Lead	7439-92-1	1.0	mg/kg	18.9	20.0	13.7	33.5	19.8
Nickel	7440-02-0	1.0	mg/kg	20.7	20.8	16.3	17.9	20.6
Silver	7440-22-4	0.1	mg/kg	0.2	0.1	<0.1	0.1	0.1
Zinc	7440-66-6	1.0	mg/kg	97.3	109	81.2	103	101
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	0.09	0.09	0.06	0.06	0.08

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-3	B7-1	B6-2	B6-2B	B6-3
			Client sampling date / time	09-Oct-2020 07:10	09-Oct-2020 07:54	09-Oct-2020 08:40	09-Oct-2020 08:40	09-Oct-2020 09:24
Compound	CAS Number	LOR	Unit	EB2026597-001	EB2026597-002	EB2026597-003	EB2026597-004	EB2026597-005
				Result	Result	Result	Result	Result
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	----	**1200**	----	----	**1100**
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	----	**1200**	----	----	**1100**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	**591**	----	----	**630**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**1.41**	**1.39**	**1.02**	**1.13**	**1.38**
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	<3	----	----	<3
C10 - C14 Fraction	----	3	mg/kg	----	**5**	----	----	<3
C15 - C28 Fraction	----	3	mg/kg	----	**24**	----	----	**4**
C29 - C36 Fraction	----	5	mg/kg	----	**22**	----	----	<5
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	**51**	----	----	**4**
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	----	<3	----	----	<3
>C10 - C16 Fraction	----	3	mg/kg	----	**6**	----	----	<3
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	----	<3.0	----	----	<3.0
>C16 - C34 Fraction	----	3	mg/kg	----	**39**	----	----	**7**
>C34 - C40 Fraction	----	5	mg/kg	----	**12**	----	----	<5
^ >C10 - C40 Fraction (sum)	----	3	mg/kg	----	**57**	----	----	**7**
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	----	<0.2
Toluene	108-88-3	0.2	mg/kg	----	<0.2	----	----	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	<0.2	----	----	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	<0.2	----	----	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	<0.2	----	----	<0.2
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	----	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	----	----	<0.2
Naphthalene	91-20-3	0.2	mg/kg	----	<0.2	----	----	<0.2
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-3	B7-1	B6-2	B6-2B	B6-3
			Client sampling date / time	09-Oct-2020 07:10	09-Oct-2020 07:54	09-Oct-2020 08:40	09-Oct-2020 08:40	09-Oct-2020 09:24
Compound	CAS Number	LOR	Unit	EB2026597-001	EB2026597-002	EB2026597-003	EB2026597-004	EB2026597-005
				Result	Result	Result	Result	Result
EP090: Organotin Compounds - Continued								
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	<1	<1	<1
Tributyltin	56573-85-4	0.5	µgSn/kg	**0.6**	**0.9**	**0.6**	<0.5	**1.2**
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-3	B7-1	B6-2	B6-2B	B6-3
			Client sampling date / time	09-Oct-2020 07:10	09-Oct-2020 07:54	09-Oct-2020 08:40	09-Oct-2020 08:40	09-Oct-2020 09:24
Compound	CAS Number	LOR	Unit	EB2026597-001	EB2026597-002	EB2026597-003	EB2026597-004	EB2026597-005
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	<6.2	----	----	<6.2
Aroclor 1016	12674-11-2	5.0	µg/kg	----	<6.2	----	----	<6.2
Aroclor 1221	11104-28-2	5.0	µg/kg	----	<6.2	----	----	<6.2
Aroclor 1232	11141-16-5	5.0	µg/kg	----	<6.2	----	----	<6.2
Aroclor 1242	53469-21-9	5.0	µg/kg	----	<6.2	----	----	<6.2
Aroclor 1248	12672-29-6	5.0	µg/kg	----	<6.2	----	----	<6.2
Aroclor 1254	11097-69-1	5.0	µg/kg	----	<6.2	----	----	<6.2
Aroclor 1260	11096-82-5	5.0	µg/kg	----	<6.2	----	----	<6.2
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	<5	----	----	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	----	<5	----	----	<5
Acenaphthylene	208-96-8	4	µg/kg	----	**8**	----	----	**16**
Acenaphthene	83-32-9	4	µg/kg	----	<5	----	----	<5
Fluorene	86-73-7	4	µg/kg	----	<5	----	----	<5
Phenanthrene	85-01-8	4	µg/kg	----	**12**	----	----	**8**
Anthracene	120-12-7	4	µg/kg	----	**8**	----	----	<5
Fluoranthene	206-44-0	4	µg/kg	----	**67**	----	----	**31**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B8-3	B7-1	B6-2	B6-2B	B6-3
			Client sampling date / time	09-Oct-2020 07:10	09-Oct-2020 07:54	09-Oct-2020 08:40	09-Oct-2020 08:40	09-Oct-2020 09:24
Compound	CAS Number	LOR	Unit	EB2026597-001	EB2026597-002	EB2026597-003	EB2026597-004	EB2026597-005
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Pyrene	129-00-0	4	µg/kg	----	69	----	----	34
Benz(a)anthracene	56-55-3	4	µg/kg	----	45	----	----	18
Chrysene	218-01-9	4	µg/kg	----	33	----	----	14
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	----	51	----	----	37
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	15	----	----	14
Benzo(e)pyrene	192-97-2	4	µg/kg	----	24	----	----	18
Benzo(a)pyrene	50-32-8	4	µg/kg	----	46	----	----	34
Perylene	198-55-0	4	µg/kg	----	28	----	----	150
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	----	32	----	----	29
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	----	6	----	----	8
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	----	25	----	----	23
Coronene	191-07-1	5	µg/kg	----	7	----	----	8
^ Sum of PAHs	----	4	µg/kg	----	476	----	----	442
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	----	66	----	----	52
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	----	66	----	----	52
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	----	66	----	----	52
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	61.0	----	----	80.1
Toluene-D8	2037-26-5	0.2	%	----	59.6	----	----	60.2
4-Bromofluorobenzene	460-00-4	0.2	%	----	73.3	----	----	72.5
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	78.4	102	83.9	88.0	78.6
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	86.4	65.9	68.4	59.1	63.1
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	39.4	56.8	45.1	63.2	73.1
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	----	46.2	----	----	64.1
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	----	77.0	----	----	90.5
Anthracene-d10	1719-06-8	10	%	----	85.5	----	----	119
4-Terphenyl-d14	1718-51-0	10	%	----	97.3	----	----	92.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-1	B5-1B	B5-0	B4-0	B4-4
			Client sampling date / time	09-Oct-2020 09:40	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54
Compound	CAS Number	LOR	Unit	EB2026597-006	EB2026597-007	EB2026597-008	EB2026597-009	EB2026597-010
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	6.9	8.2	7.4	----	----
pH OX (23B)	----	0.1	pH Unit	5.3	7.8	6.6	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	20	<2	<2	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	20	<2	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	<0.020	<0.020	<0.020	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	0.032	<0.020	<0.020	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	0.032	<0.020	<0.020	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	0.248	0.156	0.184	----	----
Peroxide Sulfur (23De)	----	0.020	% S	0.616	0.464	0.480	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	0.368	0.308	0.295	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	229	192	184	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	0.386	0.350	0.437	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	0.426	1.20	0.494	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	0.039	0.852	0.058	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	20	425	29	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	0.031	0.682	0.046	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	0.271	0.190	0.240	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	0.365	0.286	0.358	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	0.093	0.096	0.117	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	77	79	96	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	0.123	0.127	0.155	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	----	2.24	0.855	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	447	171	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	----	0.716	0.274	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-1	B5-1B	B5-0	B4-0	B4-4
			Client sampling date / time	09-Oct-2020 09:40	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54
Compound	CAS Number	LOR	Unit	EB2026597-006	EB2026597-007	EB2026597-008	EB2026597-009	EB2026597-010
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	----	----
Net Acidity (sulfur units)	----	0.02	% S	0.14	<0.02	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	90	<10	<10	----	----
Liming Rate	----	1	kg CaCO3/t	7	<1	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.37	0.31	0.30	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	229	192	184	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	17	14	14	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	6.9	8.2	7.4	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.292	0.222	0.247	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	182	139	154	----	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	1.99	3.69	2.32	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	397	737	464	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	0.64	1.18	0.74	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	----	----
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.29	0.22	0.25	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	182	139	154	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	14	10	12	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	----	----	----	66.4	65.1
Moisture Content	----	1.0	%	60.6	53.2	64.3	----	----
EA150: Particle Sizing								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-1	B5-1B	B5-0	B4-0	B4-4
			Client sampling date / time	09-Oct-2020 09:40	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54
Compound	CAS Number	LOR	Unit	EB2026597-006	EB2026597-007	EB2026597-008	EB2026597-009	EB2026597-010
				Result	Result	Result	Result	Result
EA150: Particle Sizing - Continued								
+75µm	----	1	%	11	44	10	15	10
+150µm	----	1	%	10	26	7	9	8
+300µm	----	1	%	10	12	7	3	8
+425µm	----	1	%	9	8	6	2	8
+600µm	----	1	%	9	6	6	2	7
+1180µm	----	1	%	9	4	6	<1	7
+2.36mm	----	1	%	7	2	5	<1	6
+4.75mm	----	1	%	4	<1	2	<1	4
+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	%	53	33	30	44	37
Silt (2-60 µm)	----	1	%	35	21	58	38	52
Sand (0.06-2.00 mm)	----	1	%	4	44	7	17	5
Gravel (>2mm)	----	1	%	8	2	5	1	6
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.33	2.63	2.40	2.41	2.49
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	17000	10900	15400	15400	15800
Iron	7439-89-6	50	mg/kg	39900	31500	37800	36100	38100
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	7.67	6.36	9.18	8.39	9.25
Cadmium	7440-43-9	0.1	mg/kg	0.3	<0.1	<0.1	<0.1	0.1
Chromium	7440-47-3	1.0	mg/kg	39.5	30.2	38.0	37.3	38.1
Copper	7440-50-8	1.0	mg/kg	33.9	26.3	42.0	40.8	45.8
Lead	7439-92-1	1.0	mg/kg	37.6	18.6	29.1	31.6	31.2
Nickel	7440-02-0	1.0	mg/kg	23.8	18.6	23.2	21.8	23.2
Silver	7440-22-4	0.1	mg/kg	0.4	0.1	0.2	0.2	0.2
Zinc	7440-66-6	1.0	mg/kg	126	99.8	154	161	159
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	0.12	0.08	0.13	0.12	0.13

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-1	B5-1B	B5-0	B4-0	B4-4
			Client sampling date / time	09-Oct-2020 09:40	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54
Compound	CAS Number	LOR	Unit	EB2026597-006	EB2026597-007	EB2026597-008	EB2026597-009	EB2026597-010
				Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	0.2	0.2	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	1030	1000	1600	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	1030	1000	1600	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	659	626	847	----	----
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Seawater Sampling Date	----	-	-	----	29/10/2020	29/10/2020	29/10/2020	29/10/2020
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.41	1.11	1.52	1.58	1.16
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	----	----
C15 - C28 Fraction	----	3	mg/kg	23	14	4	----	----
C29 - C36 Fraction	----	5	mg/kg	25	16	5	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	48	30	9	----	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	----	----
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	----	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	----	----
>C16 - C34 Fraction	----	3	mg/kg	41	25	8	----	----
>C34 - C40 Fraction	----	5	mg/kg	15	10	<5	----	----
^ >C10 - C40 Fraction (sum)	----	3	mg/kg	56	35	8	----	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-1	B5-1B	B5-0	B4-0	B4-4
			Client sampling date / time	09-Oct-2020 09:40	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54
Compound	CAS Number	LOR	Unit	EB2026597-006	EB2026597-007	EB2026597-008	EB2026597-009	EB2026597-010
				Result	Result	Result	Result	Result
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	<1	<1
Dibutyltin	1002-53-5	1	µgSn/kg	**3**	<1	<1	**2**	**1**
Tributyltin	56573-85-4	0.5	µgSn/kg	**0.9**	**2.0**	**2.6**	**6.2**	**2.5**
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-1	B5-1B	B5-0	B4-0	B4-4
			Client sampling date / time	09-Oct-2020 09:40	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54
Compound	CAS Number	LOR	Unit	EB2026597-006	EB2026597-007	EB2026597-008	EB2026597-009	EB2026597-010
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
Aroclor 1016	12674-11-2	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<6.2	<6.2	<6.2	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	**6**	**9**	**7**	----	----
Acenaphthene	83-32-9	4	µg/kg	<5	<5	<5	----	----
Fluorene	86-73-7	4	µg/kg	<5	<5	<5	----	----
Phenanthrene	85-01-8	4	µg/kg	**9**	**28**	**10**	----	----
Anthracene	120-12-7	4	µg/kg	<5	**8**	**6**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-1	B5-1B	B5-0	B4-0	B4-4
			Client sampling date / time	09-Oct-2020 09:40	09-Oct-2020 10:12	09-Oct-2020 10:59	09-Oct-2020 11:26	09-Oct-2020 11:54
Compound	CAS Number	LOR	Unit	EB2026597-006	EB2026597-007	EB2026597-008	EB2026597-009	EB2026597-010
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Fluoranthene	206-44-0	4	µg/kg	21	52	31	----	----
Pyrene	129-00-0	4	µg/kg	27	51	33	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	15	30	19	----	----
Chrysene	218-01-9	4	µg/kg	12	25	16	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	21	36	28	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	8	21	10	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	11	20	14	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	17	37	24	----	----
Perylene	198-55-0	4	µg/kg	178	27	31	----	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	16	34	21	----	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<5	8	<5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	12	26	16	----	----
Coronene	191-07-1	5	µg/kg	<5	8	5	----	----
^ Sum of PAHs	----	4	µg/kg	353	420	271	----	----
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	23	57	32	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	25	57	34	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	27	57	36	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	66.7	69.1	64.2	----	----
Toluene-D8	2037-26-5	0.2	%	64.9	65.4	62.6	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	77.2	78.7	74.2	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	99.0	100	84.6	108	97.8
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	70.7	80.4	56.7	58.4	54.6
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	42.8	46.0	53.9	64.2	43.4
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	68.0	66.8	73.8	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	71.6	89.7	70.4	----	----
Anthracene-d10	1719-06-8	10	%	76.8	87.2	80.5	----	----
4-Terphenyl-d14	1718-51-0	10	%	78.2	99.9	80.5	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**B2-0**	**BC-2**	**B9-1**	**Trip blank**	**B5-0 Pore Water**
			Client sampling date / time	09-Oct-2020 12:34	09-Oct-2020 13:12	08-Oct-2020 00:00	09-Oct-2020 00:00	09-Oct-2020 10:59
Compound	*CAS Number*	*LOR*	*Unit*	**EB2026597-011**	**EB2026597-012**	**EB2026597-013**	**EB2026597-014**	**EB2026597-016**
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	----	**8.7**	----	----
pH OX (23B)	----	0.1	pH Unit	----	----	**8.1**	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	<2	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	----	<2	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	----	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	----	<0.020	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	----	<0.020	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	----	<0.020	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	----	**0.099**	----	----
Peroxide Sulfur (23De)	----	0.020	% S	----	----	**0.221**	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	----	**0.123**	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	----	**76**	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	----	**0.264**	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	----	**1.30**	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	----	**1.03**	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	----	**516**	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	----	**0.828**	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	----	**0.141**	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	----	**0.228**	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	----	**0.087**	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	----	**71**	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	----	**0.114**	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% $CaCO_3$	----	----	**3.11**	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	**621**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B2-0	BC-2	B9-1	Trip blank	B5-0 Pore Water
			Client sampling date / time	09-Oct-2020 12:34	09-Oct-2020 13:12	08-Oct-2020 00:00	09-Oct-2020 00:00	09-Oct-2020 10:59
Compound	CAS Number	LOR	Unit	EB2026597-011	EB2026597-012	EB2026597-013	EB2026597-014	EB2026597-016
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	----	----	**0.995**	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	<10	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	**0.12**	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	**76**	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	**6**	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	**8.7**	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	<2	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	<0.02	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	**0.108**	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	**68**	----	----
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	----	**3.87**	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	----	**774**	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	----	**1.24**	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	<10	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	**0.11**	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	**68**	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	**5**	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**21.5**	**45.5**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	B2-0	BC-2	B9-1	Trip blank	B5-0 Pore Water
Client sampling date / time				09-Oct-2020 12:34	09-Oct-2020 13:12	08-Oct-2020 00:00	09-Oct-2020 00:00	09-Oct-2020 10:59
				EB2026597-011	EB2026597-012	EB2026597-013	EB2026597-014	EB2026597-016
				Result	Result	Result	Result	Result
EA150: Particle Sizing								
+75µm	----	1	%	99	48	68	----	----
+150µm	----	1	%	98	46	65	----	----
+300µm	----	1	%	97	28	51	----	----
+425µm	----	1	%	84	11	27	----	----
+600µm	----	1	%	47	7	10	----	----
+1180µm	----	1	%	7	4	5	----	----
+2.36mm	----	1	%	<1	2	4	----	----
+4.75mm	----	1	%	<1	2	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	%	<1	23	24	----	----
Silt (2-60 µm)	----	1	%	<1	26	7	----	----
Sand (0.06-2.00 mm)	----	1	%	97	48	65	----	----
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	2.74	2.49	2.64	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	1820	8330	----	----	----
Iron	7439-89-6	50	mg/kg	7120	19700	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1.00	mg/kg	1.16	5.26	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	----	----	----
Chromium	7440-47-3	1.0	mg/kg	6.2	19.2	----	----	----
Copper	7440-50-8	1.0	mg/kg	2.4	29.4	----	----	----
Lead	7439-92-1	1.0	mg/kg	2.4	28.8	----	----	----
Nickel	7440-02-0	1.0	mg/kg	5.8	12.7	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	----	----	----
Zinc	7440-66-6	1.0	mg/kg	15.2	120	----	----	----
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Mercury	7439-97-6	0.01	mg/kg	<0.01	0.07	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B2-0	BC-2	B9-1	Trip blank	B5-0 Pore Water
			Client sampling date / time	09-Oct-2020 12:34	09-Oct-2020 13:12	08-Oct-2020 00:00	09-Oct-2020 00:00	09-Oct-2020 10:59
Compound	CAS Number	LOR	Unit	EB2026597-011	EB2026597-012	EB2026597-013	EB2026597-014	EB2026597-016
				Result	Result	Result	Result	Result
EN82: Porewater Extraction								
Volume	----	1	mL	----	----	----	----	**370**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.06**	**2.23**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	<10	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	----	----	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	<1	----
EP090: Organotin Compounds								
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	----	----	----
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	----	----	----
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	**1.2**	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	<10	----	----	----
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	----	----	----
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	<10	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	<10	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	<10	----	----	----
Ethion	563-12-2	10	µg/kg	<10	<10	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B2-0	BC-2	B9-1	Trip blank	B5-0 Pore Water
			Client sampling date / time	09-Oct-2020 12:34	09-Oct-2020 13:12	08-Oct-2020 00:00	09-Oct-2020 00:00	09-Oct-2020 10:59
Compound	CAS Number	LOR	Unit	EB2026597-011	EB2026597-012	EB2026597-013	EB2026597-014	EB2026597-016
				Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	<10	----	----	----
Malathion	121-75-5	10	µg/kg	<10	<10	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	----	----	----
Parathion	56-38-2	10	µg/kg	<10	<10	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	<10	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	----	----	----
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.50	µg/kg	<0.50	<0.50	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	----	----	----
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	----	----	----
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B2-0	BC-2	B9-1	Trip blank	B5-0 Pore Water
			Client sampling date / time	09-Oct-2020 12:34	09-Oct-2020 13:12	08-Oct-2020 00:00	09-Oct-2020 00:00	09-Oct-2020 10:59
Compound	CAS Number	LOR	Unit	EB2026597-011	EB2026597-012	EB2026597-013	EB2026597-014	EB2026597-016
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued								
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	80.0	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	80.4	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	91.4	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.5	%	88.1	80.9	----	----	----
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	45.4	49.1	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	63.3	63.9	----	----	----

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

			Client sample ID	B4-0 Pore Water	Elutriate Blank	----	----	----
			Client sampling date / time	09-Oct-2020 11:26	09-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2026597-017	EB2026597-018	--------	--------	--------
				Result	Result	----	----	----
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Seawater Sampling Date	----	-	-	----	29/10/2020	----	----	----
EN82: Porewater Extraction								
Volume	----	1	mL	370	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116

Sub-Matrix: **PORE WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
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
EP080-SD: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
EP090S: Organotin Surrogate			
Tripropyltin	----	35	130
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	14	102
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	119
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	106
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

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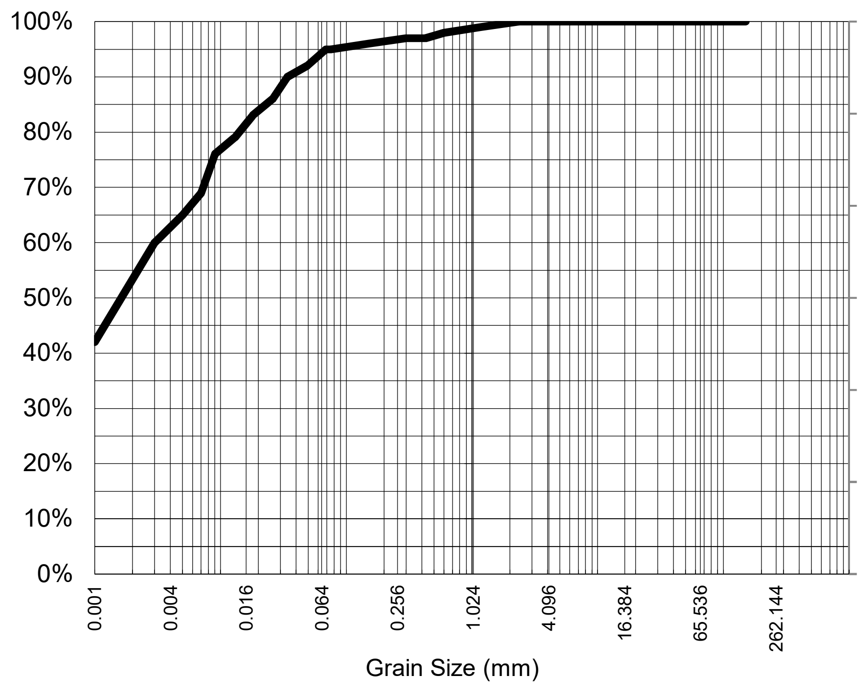
Brisbane QLD

CLIENT:	DARRENRICHARDSON	**DATE REPORTED:**	20-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-001 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	RF2

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	98%
0.425	97%
0.300	97%
0.150	96%
0.075	95%
Particle Size (microns)	
49	92%
34	90%
26	86%
18	83%
13	79%
9	76%
7	69%
5	65%
1	42%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.42 (2.45)*

NATA Accreditation: 825 Site: Brisbane
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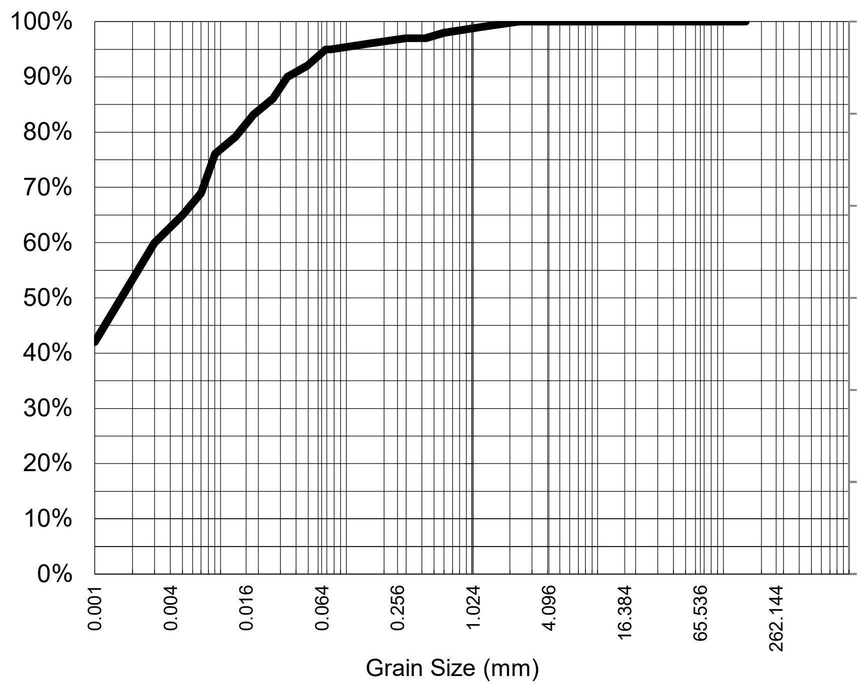
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-001DUP / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	RF2

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	98%
0.425	97%
0.300	97%
0.150	96%
0.075	95%
Particle Size (microns)	
49	92%
34	90%
26	86%
18	83%
13	79%
9	76%
7	69%
5	65%
1	42%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.42 (2.45)*

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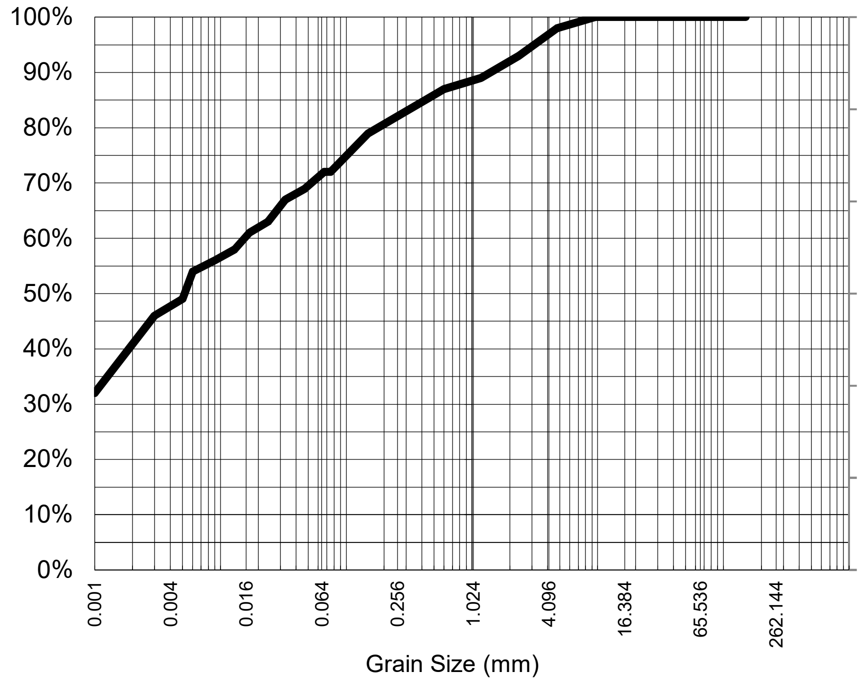
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-002 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	RF6

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	98%
2.36	93%
1.18	89%
0.600	87%
0.425	85%
0.300	83%
0.150	79%
0.075	72%
Particle Size (microns)	
47	69%
33	67%
24	63%
17	61%
13	58%
9	56%
6	54%
5	49%
1	32%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.006

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.58

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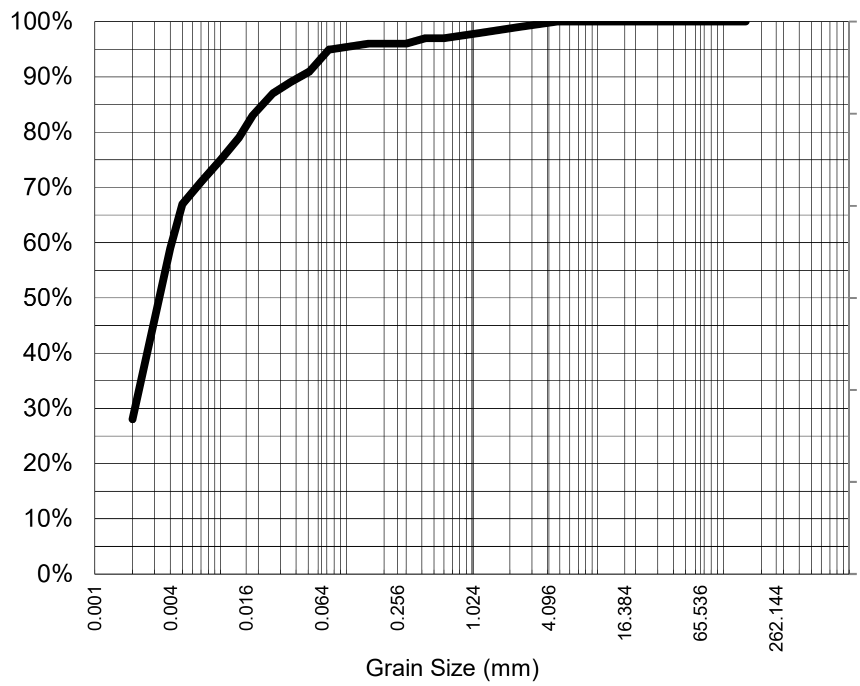
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-003 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	RF3

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	97%
0.425	97%
0.300	96%
0.150	96%
0.075	95%
Particle Size (microns)	
51	91%
36	89%
26	87%
18	83%
14	79%
10	75%
7	71%
5	67%
2	28%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.39 (2.45)*

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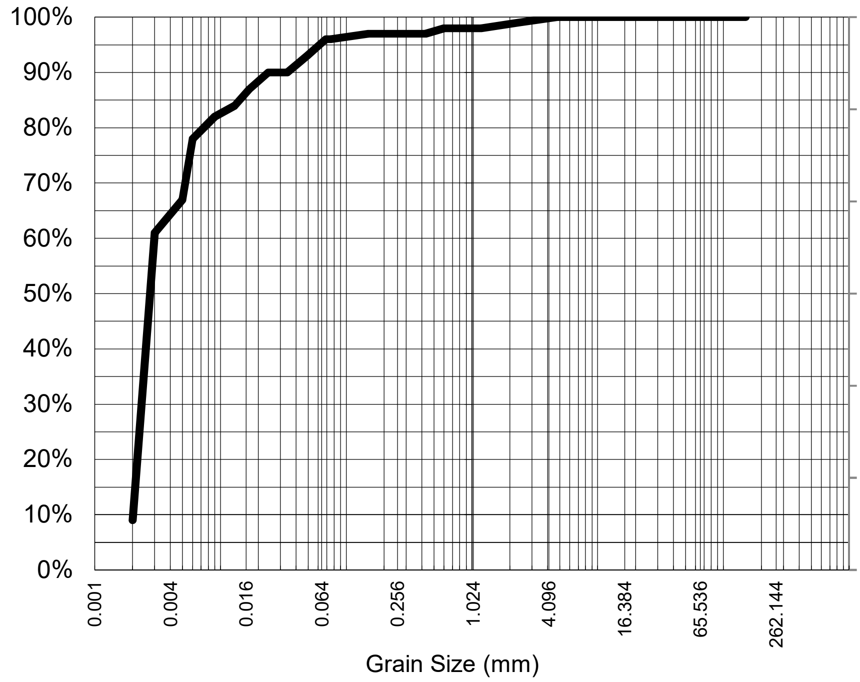
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-004 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	RF7

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	98%
0.425	97%
0.300	97%
0.150	97%
0.075	96%
Particle Size (microns)	
49	93%
34	90%
24	90%
17	87%
13	84%
9	82%
6	78%
5	67%
2	9%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.006

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.24 (2.45)*

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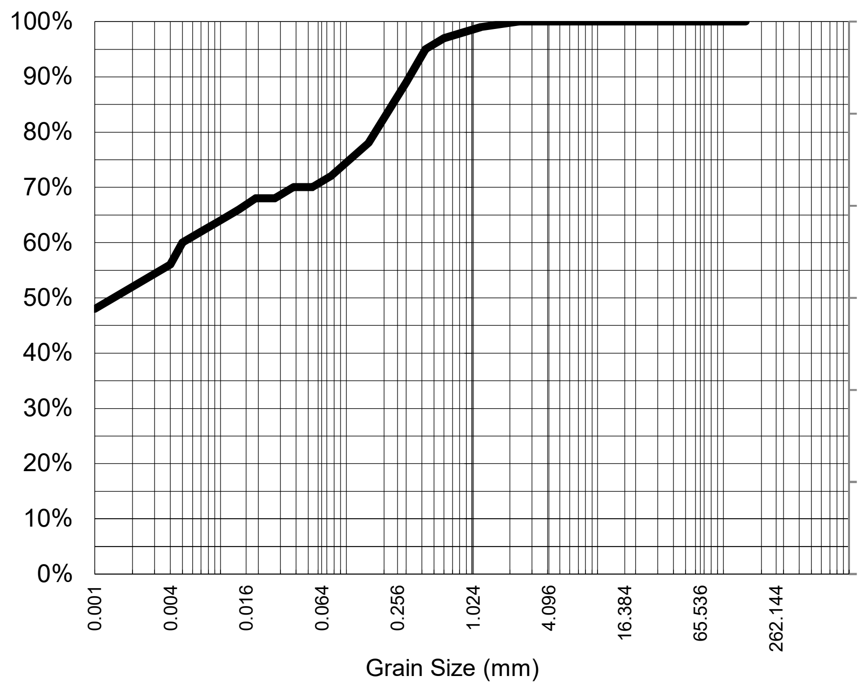
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-005 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	RF4

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	97%
0.425	95%
0.300	89%
0.150	78%
0.075	72%
Particle Size (microns)	
54	70%
38	70%
27	68%
19	68%
14	66%
10	64%
7	62%
5	60%
1	48%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.28 (2.45)*

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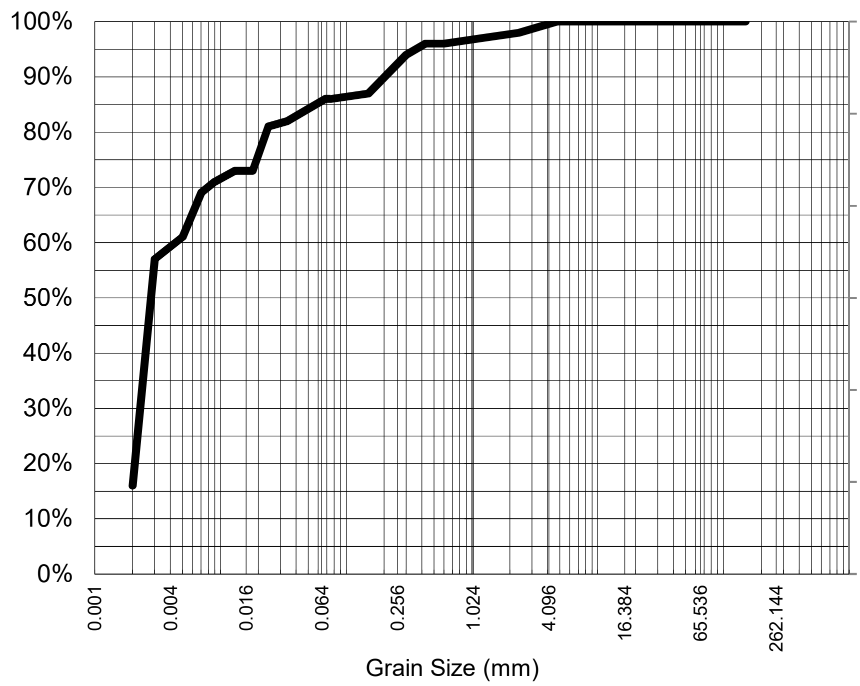
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-006 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B13-9

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	98%
1.18	97%
0.600	96%
0.425	96%
0.300	94%
0.150	87%
0.075	86%
Particle Size (microns)	
48	84%
34	82%
24	81%
18	73%
13	73%
9	71%
7	69%
5	61%
2	16%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65

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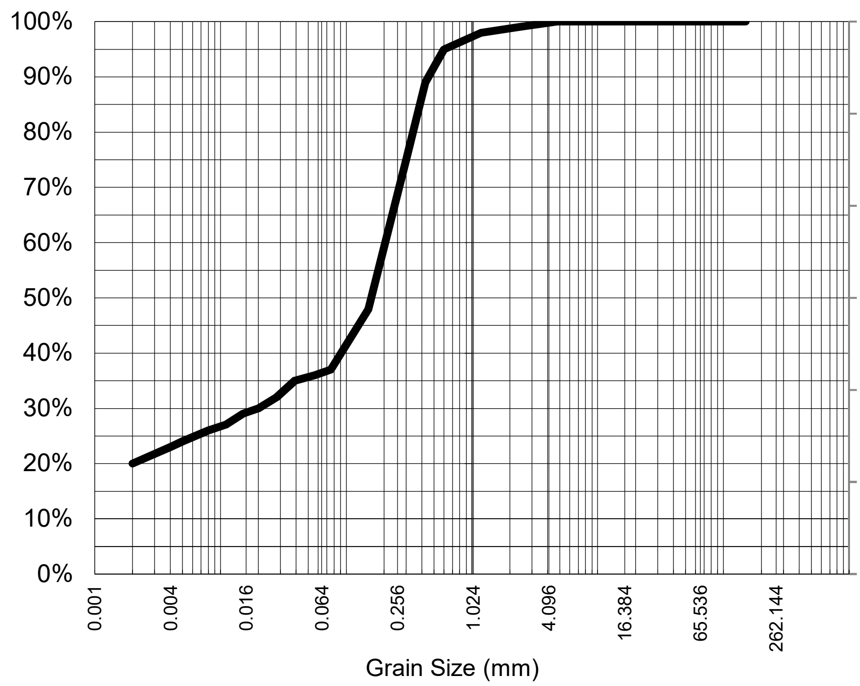
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-007 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	16-1

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	95%
0.425	89%
0.300	75%
0.150	48%
0.075	37%
Particle Size (microns)	
56	36%
39	35%
28	32%
20	30%
15	29%
11	27%
8	26%
5	24%
2	20%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.161

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.5

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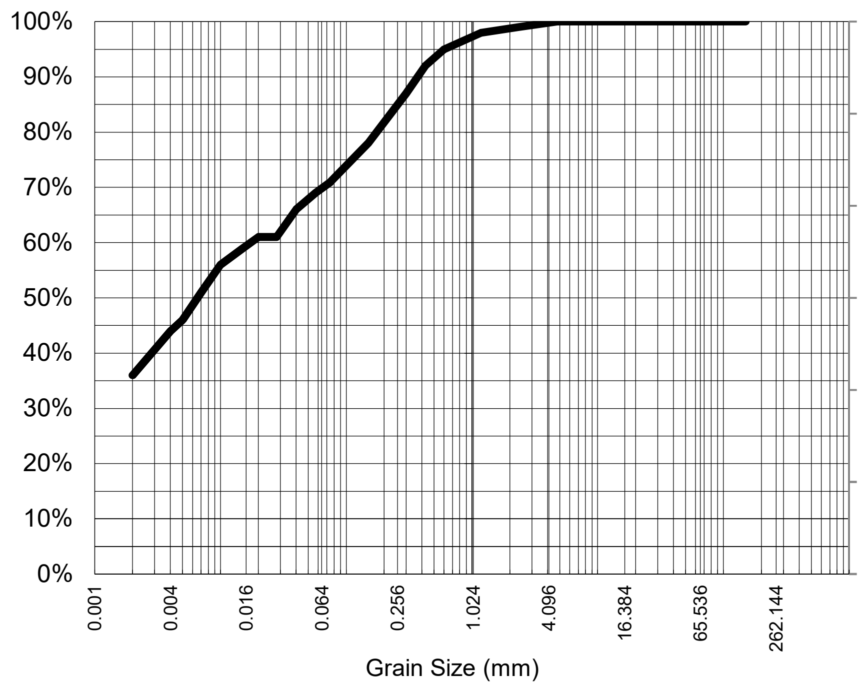
CLIENT:	DARRENRICHARDSON	**DATE REPORTED:**	20-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-008 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	16-0

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	95%
0.425	92%
0.300	87%
0.150	78%
0.075	71%
Particle Size (microns)	
57	69%
40	66%
28	61%
20	61%
15	59%
10	56%
7	51%
5	46%
2	36%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.45

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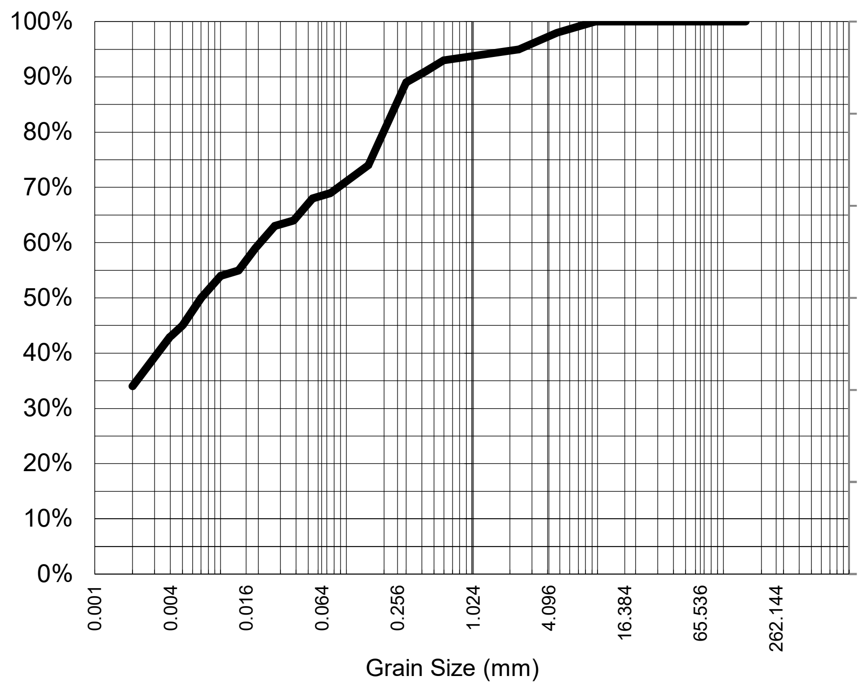
CLIENT:	DARRENRICHARDSON	**DATE REPORTED:**	20-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-009 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	13-8

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	98%
2.36	95%
1.18	94%
0.600	93%
0.425	91%
0.300	89%
0.150	74%
0.075	69%
Particle Size (microns)	
54	68%
38	64%
27	63%
19	59%
14	55%
10	54%
7	50%
5	45%
2	34%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.21 (2.45)*

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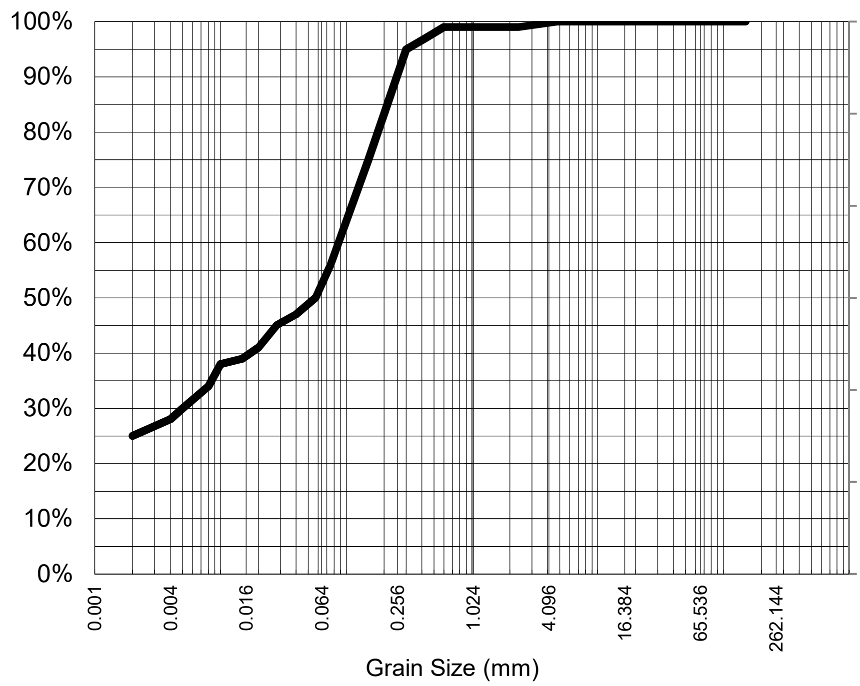
Brisbane QLD

CLIENT:	DARRENRICHARDSON	**DATE REPORTED:**	20-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-010 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	13-5

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	99%
0.600	99%
0.425	97%
0.300	95%
0.150	75%
0.075	56%
Particle Size (microns)	
57	50%
40	47%
28	45%
20	41%
15	39%
10	38%
8	34%
5	30%
2	25%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	0.057

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.34 (2.45)*

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Satish Trivedi
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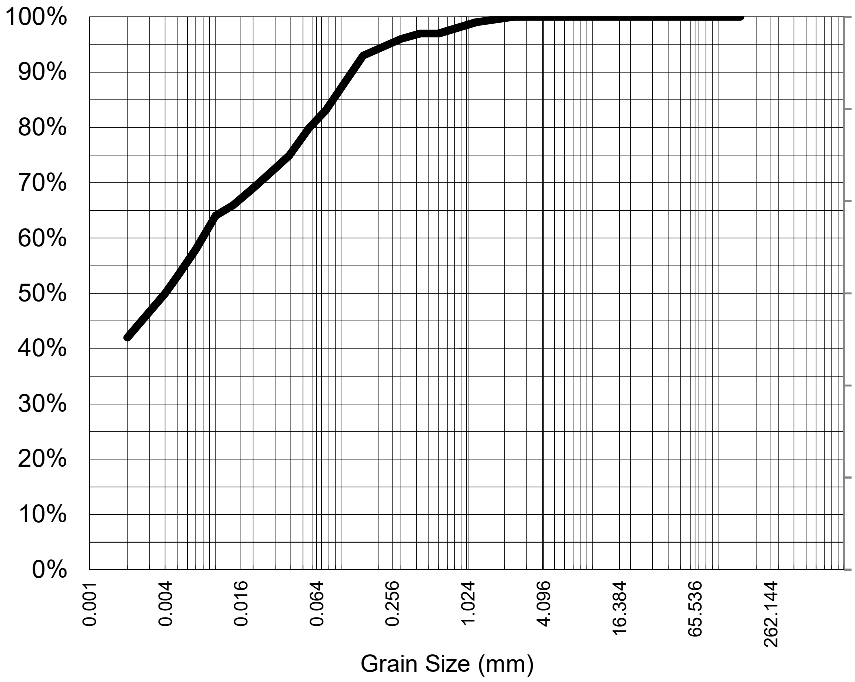
CLIENT:	DARRENRICHARDSON	**DATE REPORTED:**	20-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-011 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	13-4

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	97%
0.425	97%
0.300	96%
0.150	93%
0.075	83%
Particle Size (microns)	
56	80%
39	75%
28	72%
20	69%
14	66%
10	64%
7	58%
5	53%
2	42%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.51

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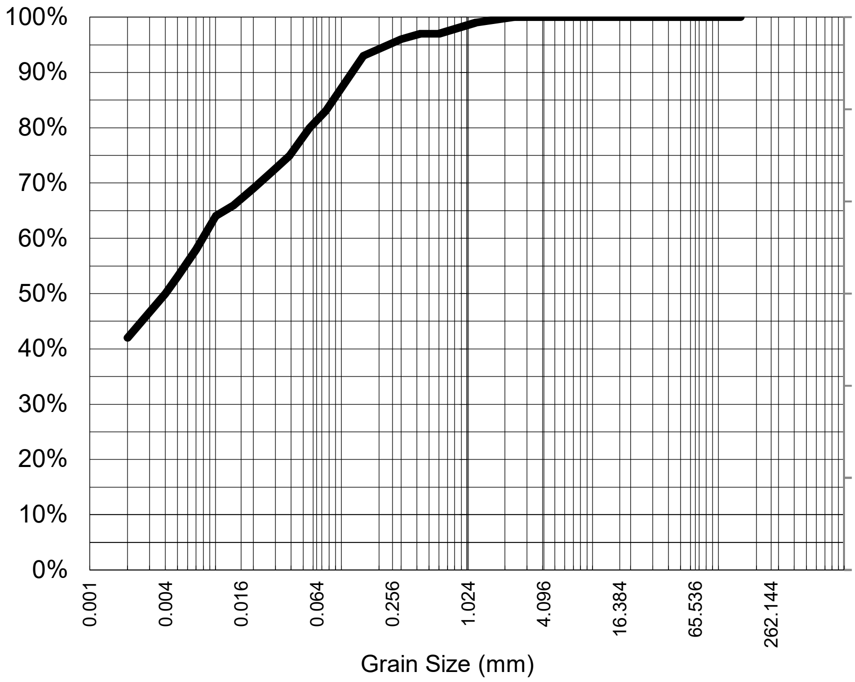
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-011DUP / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	13-4

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	97%
0.425	97%
0.300	96%
0.150	93%
0.075	83%
Particle Size (microns)	
56	80%
39	75%
28	72%
20	69%
14	66%
10	64%
7	58%
5	53%
2	42%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.51

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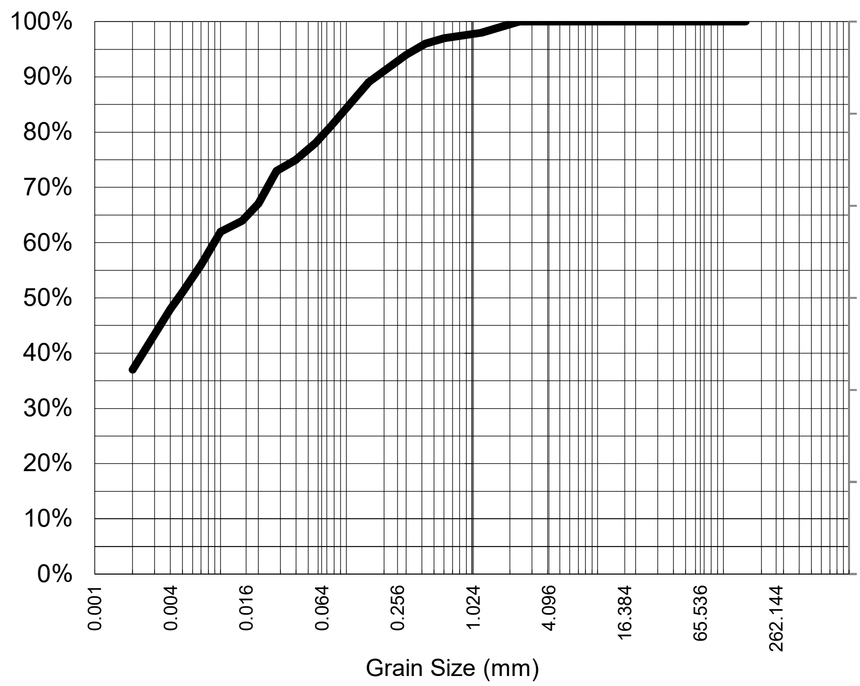
CLIENT:	DARRENRICHARDSON	**DATE REPORTED:**	20-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-012 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	13-4B

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	98%
0.600	97%
0.425	96%
0.300	94%
0.150	89%
0.075	81%
Particle Size (microns)	
57	78%
40	75%
28	73%
20	67%
15	64%
10	62%
7	56%
5	51%
2	37%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.39 (2.45)*

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Template Version PKV8.0 180919

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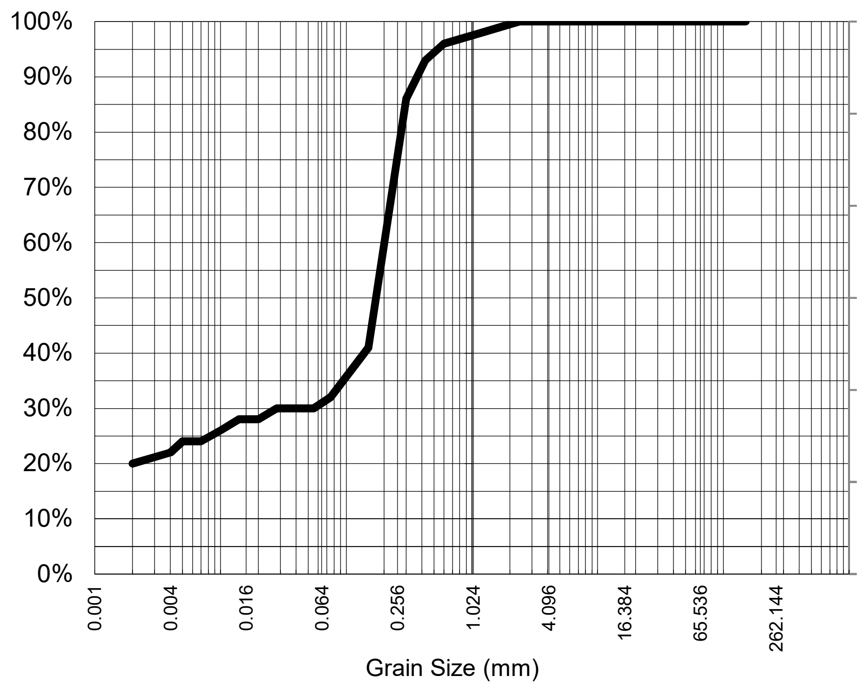
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-014 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	13-1

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	98%
0.600	96%
0.425	93%
0.300	86%
0.150	41%
0.075	32%
Particle Size (microns)	
55	30%
39	30%
28	30%
20	28%
14	28%
10	26%
7	24%
5	24%
2	20%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.180

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.67

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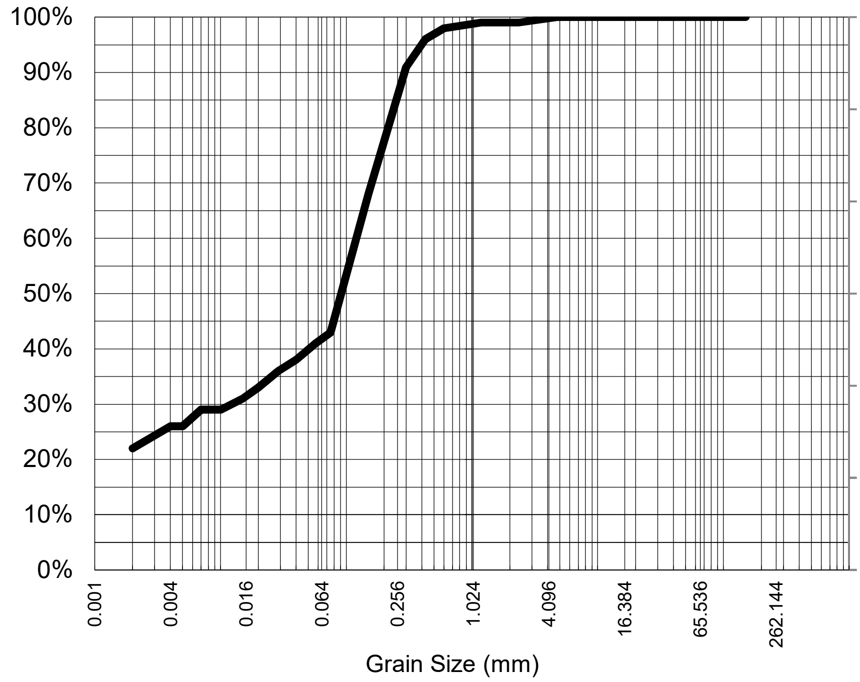
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-015 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	15-1

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	99%
0.600	98%
0.425	96%
0.300	91%
0.150	68%
0.075	43%
Particle Size (microns)	
57	41%
40	38%
29	36%
20	33%
15	31%
10	29%
7	29%
5	26%
2	22%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.096

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.55

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CLIENT: DARRENRICHARDSON

DATE REPORTED: 20-Oct-2020

COMPANY: BMT COMMERCIAL AUSTRALIA PTY LTD

DATE RECEIVED: 7-Oct-2020

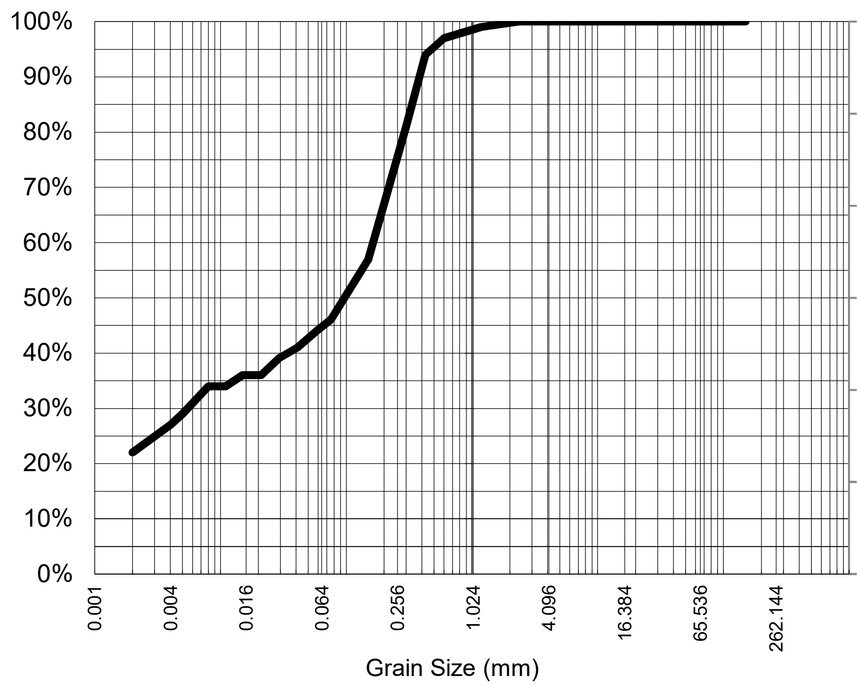
ADDRESS: Po Box 203
Spring Hill
Brisbane Qld

REPORT NO: EB2026300-016 / PSD

PROJECT: Port of Brisbane SAP

SAMPLE ID: 44140

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	97%
0.425	94%
0.300	81%
0.150	57%
0.075	46%
Particle Size (microns)	
58	44%
41	41%
29	39%
21	36%
15	36%
11	34%
8	34%
5	29%
2	22%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.102

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.54

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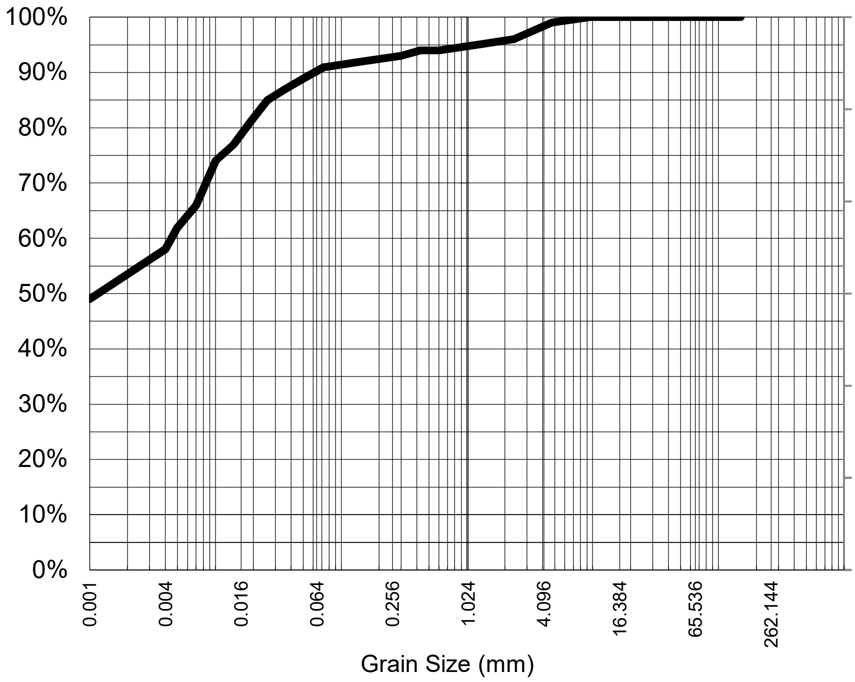
CLIENT:	DARRENRICHARDSON	**DATE REPORTED:**	20-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	7-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026300-017 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	44112

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	96%
1.18	95%
0.600	94%
0.425	94%
0.300	93%
0.150	92%
0.075	91%
Particle Size (microns)	
51	89%
36	87%
26	85%
19	81%
14	77%
10	74%
7	66%
5	62%
1	49%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.28 (2.45)*

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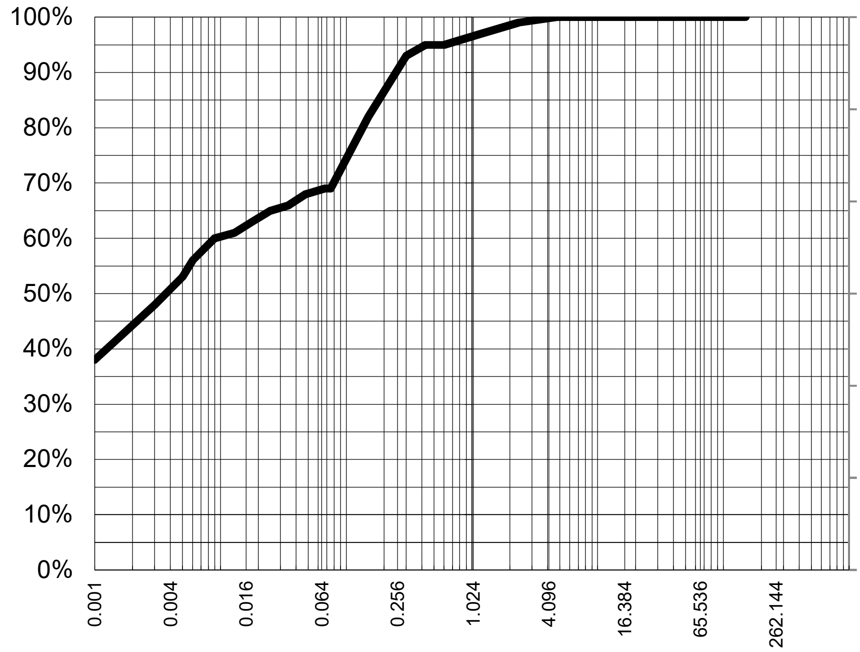
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	26-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-001 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B8-1

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	97%
0.600	95%
0.425	95%
0.300	93%
0.150	82%
0.075	69%
Particle Size (microns)	
48	68%
35	66%
25	65%
18	63%
13	61%
9	60%
6	56%
5	53%
1	38%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.006

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.73

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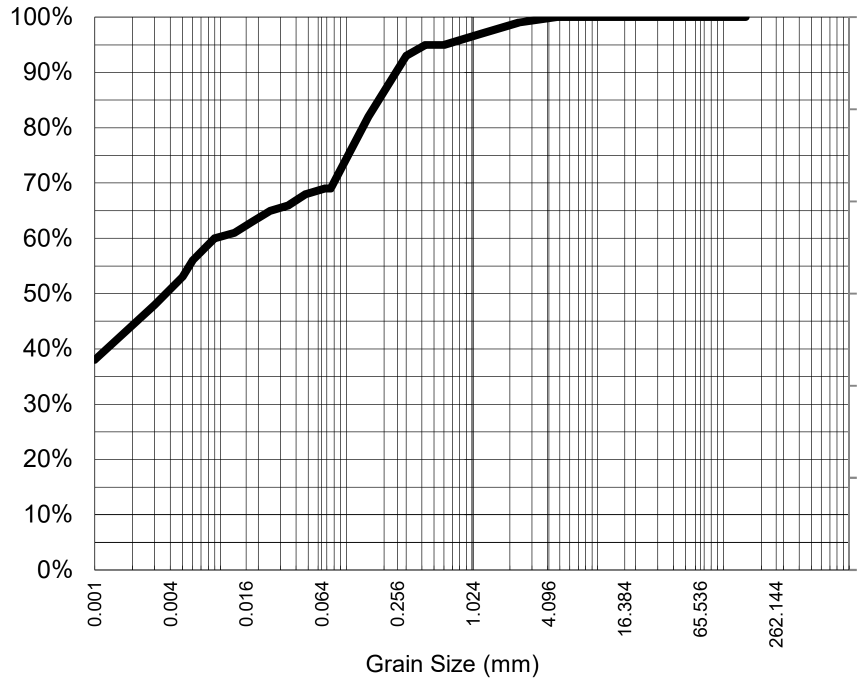
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	26-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-001DUP / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B8-1

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	97%
0.600	95%
0.425	95%
0.300	93%
0.150	82%
0.075	69%
Particle Size (microns)	
48	68%
35	66%
25	65%
18	63%
13	61%
9	60%
6	56%
5	53%
1	38%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.006

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.73

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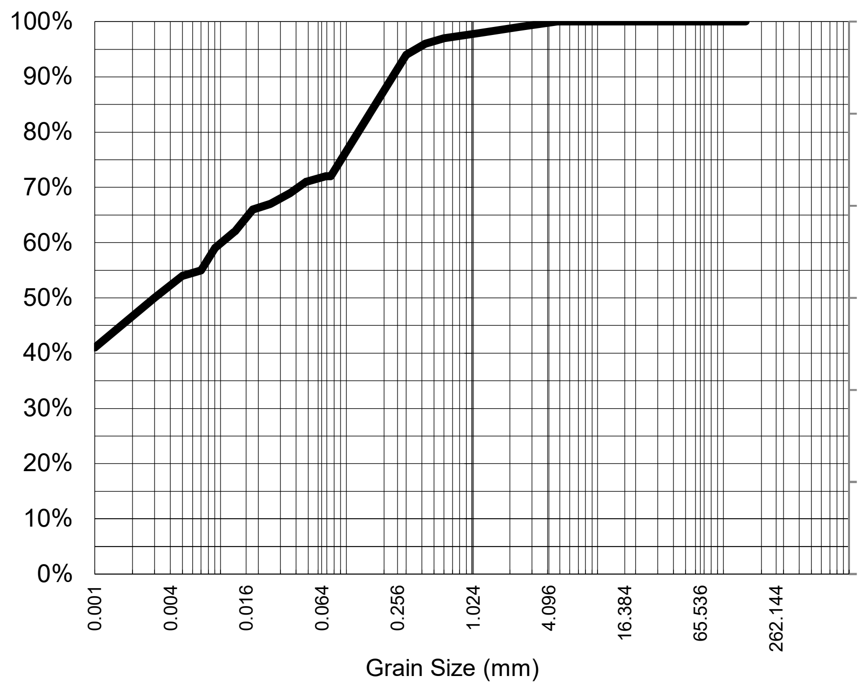
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-002 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B10-6

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	97%
0.425	96%
0.300	94%
0.150	83%
0.075	72%
Particle Size (microns)	
48	71%
36	69%
25	67%
18	66%
13	62%
9	59%
7	55%
5	54%
1	41%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.68

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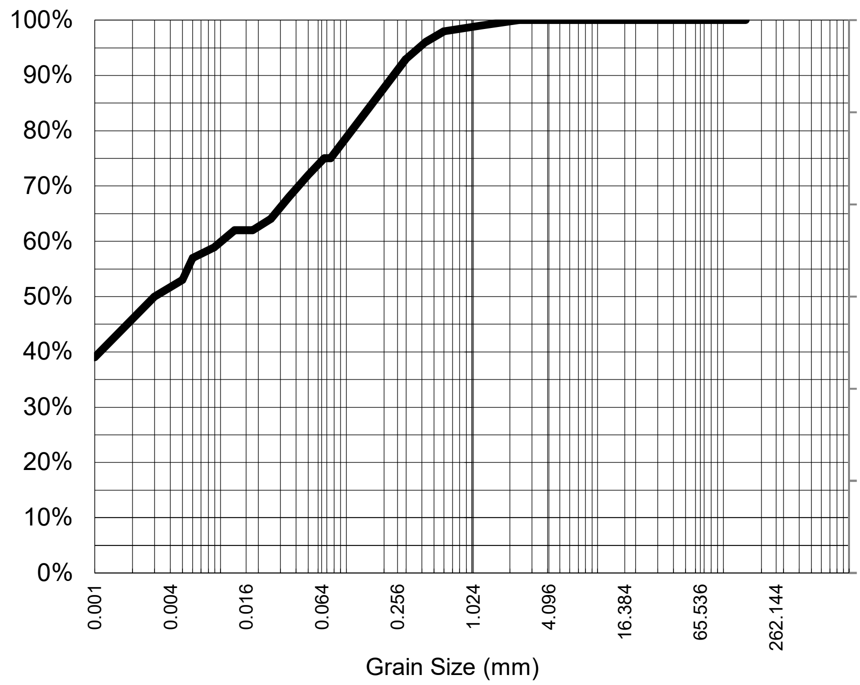
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	26-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-003 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B10-6B

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	98%
0.425	96%
0.300	93%
0.150	84%
0.075	75%
Particle Size (microns)	
50	72%
35	68%
25	64%
18	62%
13	62%
9	59%
6	57%
5	53%
1	39%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.006

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.72

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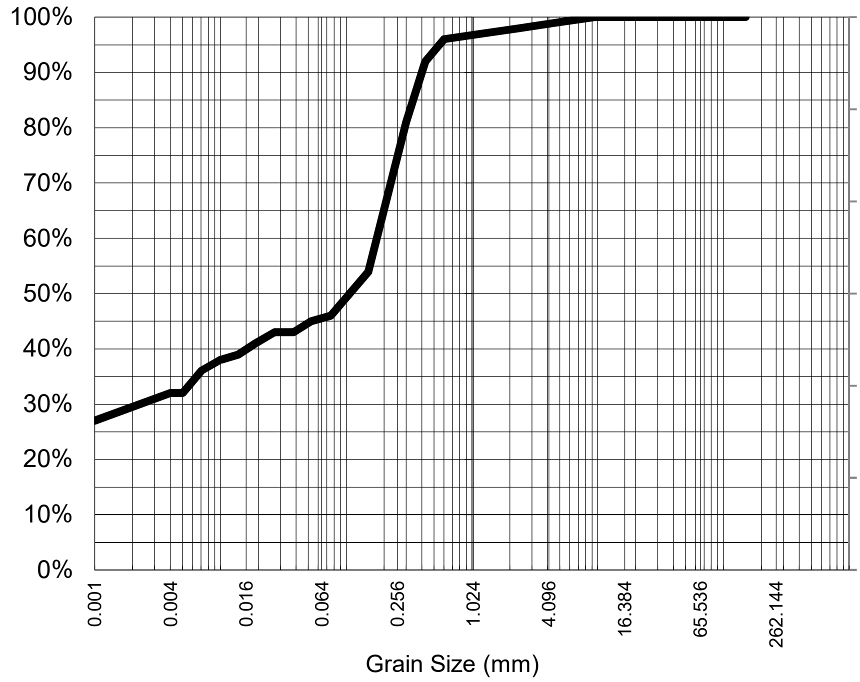
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	26-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-004 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B15-3

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	98%
1.18	97%
0.600	96%
0.425	92%
0.300	81%
0.150	54%
0.075	46%
Particle Size (microns)	
53	45%
38	43%
27	43%
19	41%
14	39%
10	38%
7	36%
5	32%
1	27%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.113

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.66

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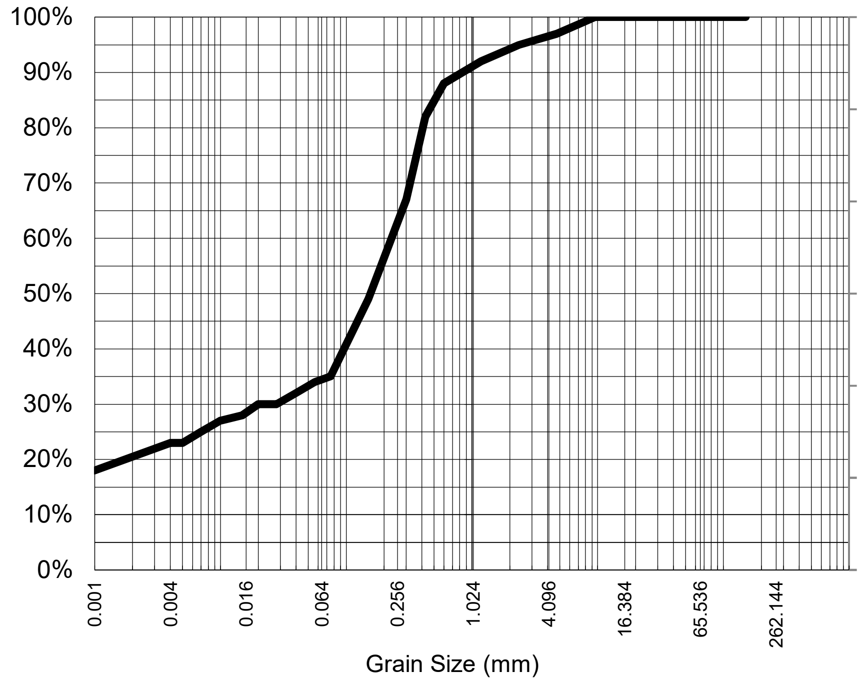
Brisbane QLD

CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	26-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-005 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B15-2

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	97%
2.36	95%
1.18	92%
0.600	88%
0.425	82%
0.300	67%
0.150	49%
0.075	35%
Particle Size (microns)	
56	34%
40	32%
28	30%
20	30%
15	28%
10	27%
7	25%
5	23%
1	18%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.158

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.61

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Satish Trivedi
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Template Version PKV8.0 180919

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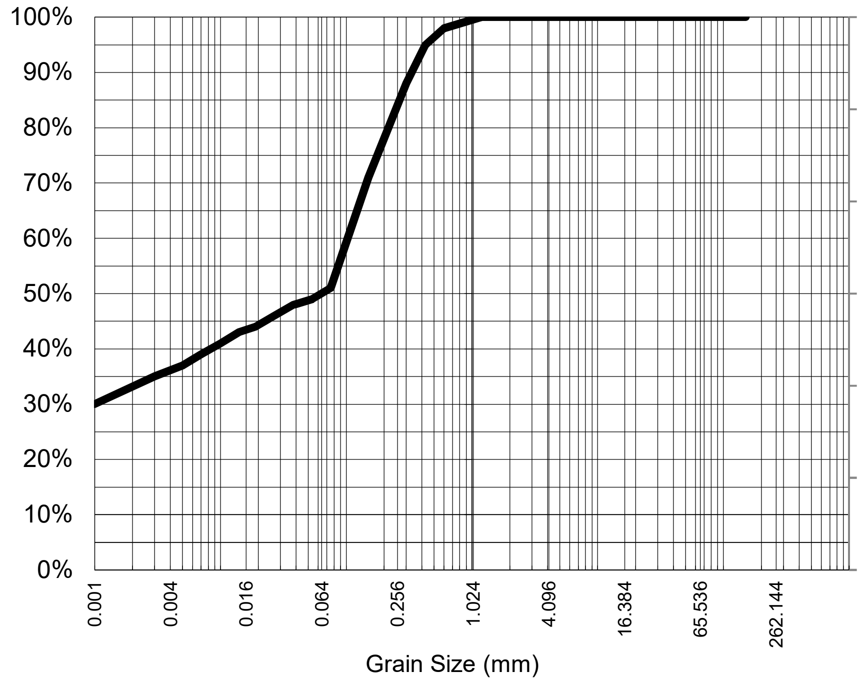
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	26-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-006 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B12-2

Particle Size Distribution



Particle Size (mm)	% Passing
1.18	100%
0.600	98%
0.425	95%
0.300	88%
0.150	71%
0.075	51%
Particle Size (microns)	
54	49%
38	48%
27	46%
19	44%
14	43%
10	41%
7	39%
5	37%
1	30%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.065

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.63

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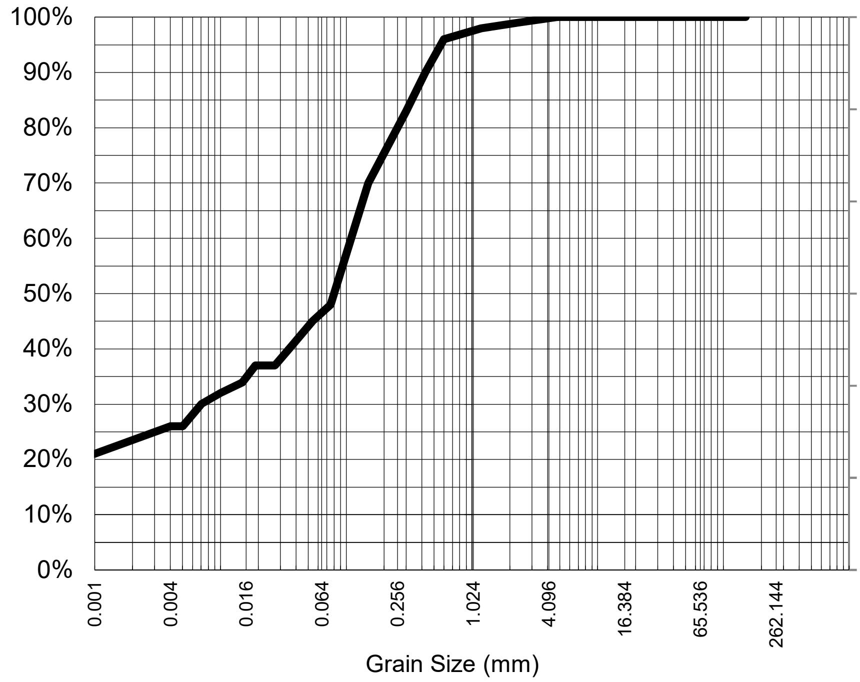
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-007 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B12-1

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	96%
0.425	90%
0.300	83%
0.150	70%
0.075	48%
Particle Size (microns)	
54	45%
38	41%
27	37%
19	37%
15	34%
10	32%
7	30%
5	26%
1	21%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.082

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.62

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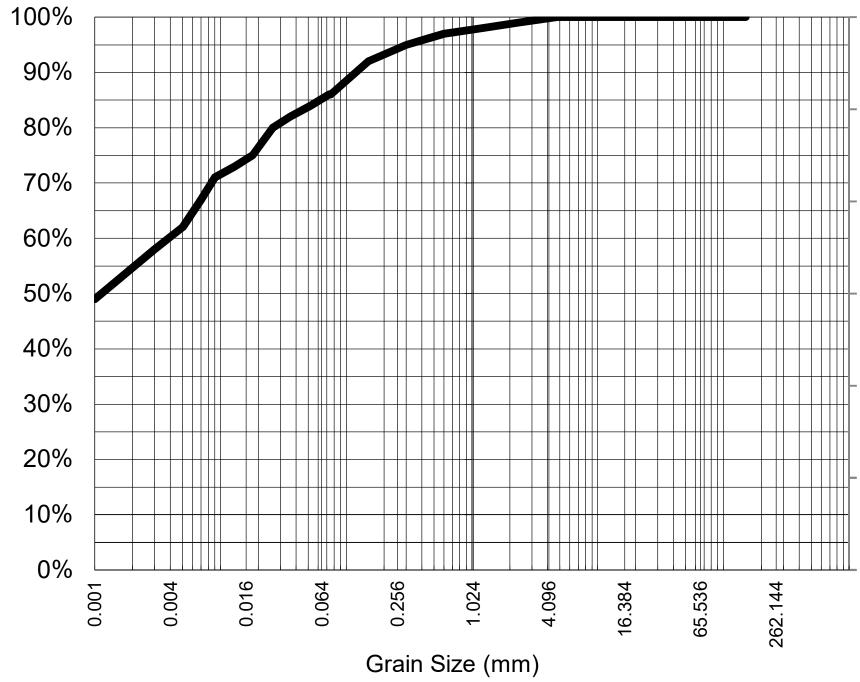
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-008 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B11-8

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	98%
0.600	97%
0.425	96%
0.300	95%
0.150	92%
0.075	86%
Particle Size (microns)	
52	84%
36	82%
26	80%
18	75%
13	73%
9	71%
7	67%
5	62%
1	49%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.6

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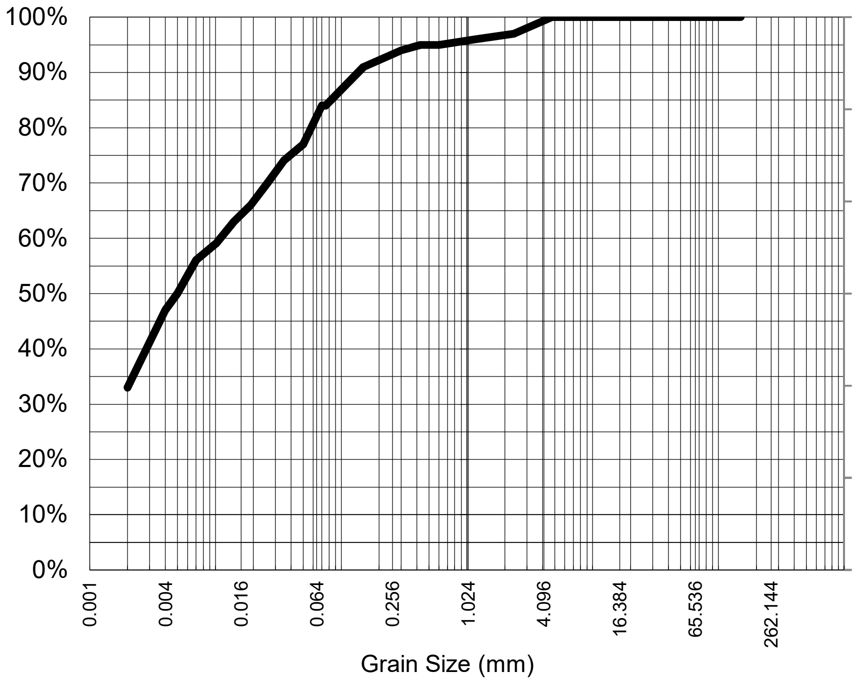
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-009 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B11-9

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	97%
1.18	96%
0.600	95%
0.425	95%
0.300	94%
0.150	91%
0.075	84%
Particle Size (microns)	
50	77%
35	74%
26	70%
19	66%
14	63%
10	59%
7	56%
5	50%
2	33%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.58

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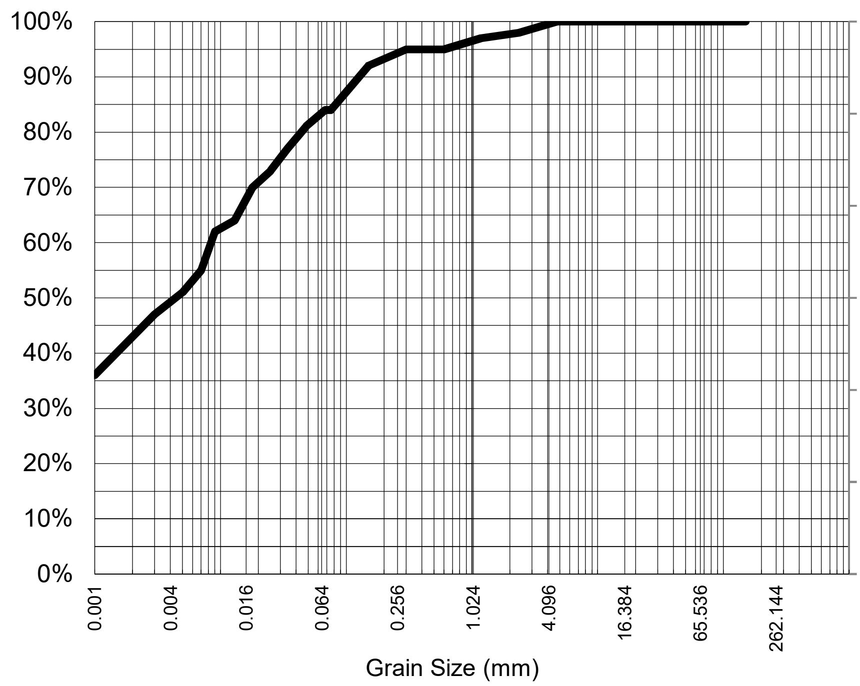
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-010 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B11-9B

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	98%
1.18	97%
0.600	95%
0.425	95%
0.300	95%
0.150	92%
0.075	84%
Particle Size (microns)	
48	81%
34	77%
25	73%
18	70%
13	64%
9	62%
7	55%
5	51%
1	36%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.67

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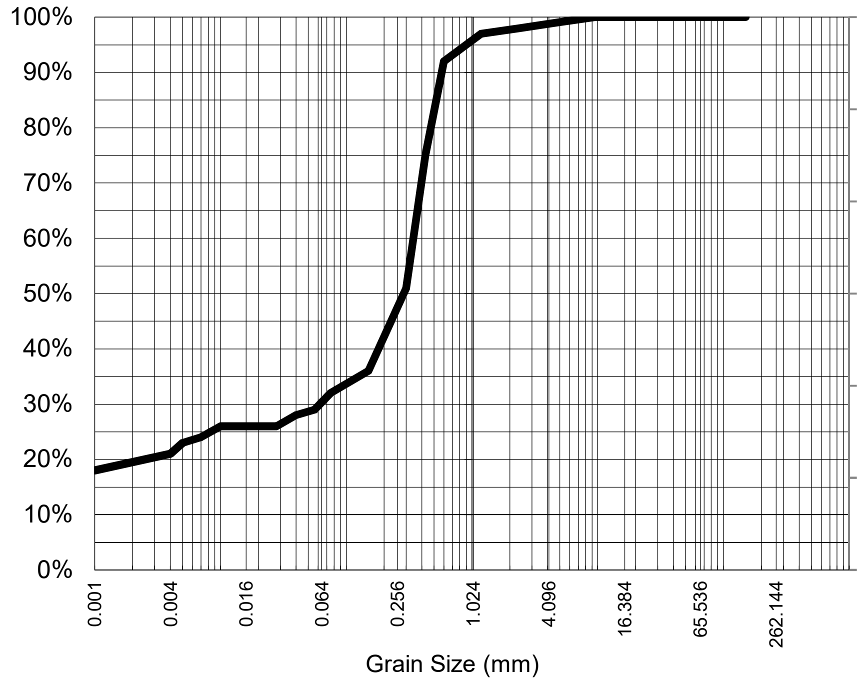
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-011 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B9-1

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	98%
1.18	97%
0.600	92%
0.425	75%
0.300	51%
0.150	36%
0.075	32%
Particle Size (microns)	
56	29%
40	28%
28	26%
20	26%
15	26%
10	26%
7	24%
5	23%
1	18%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.290

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.62

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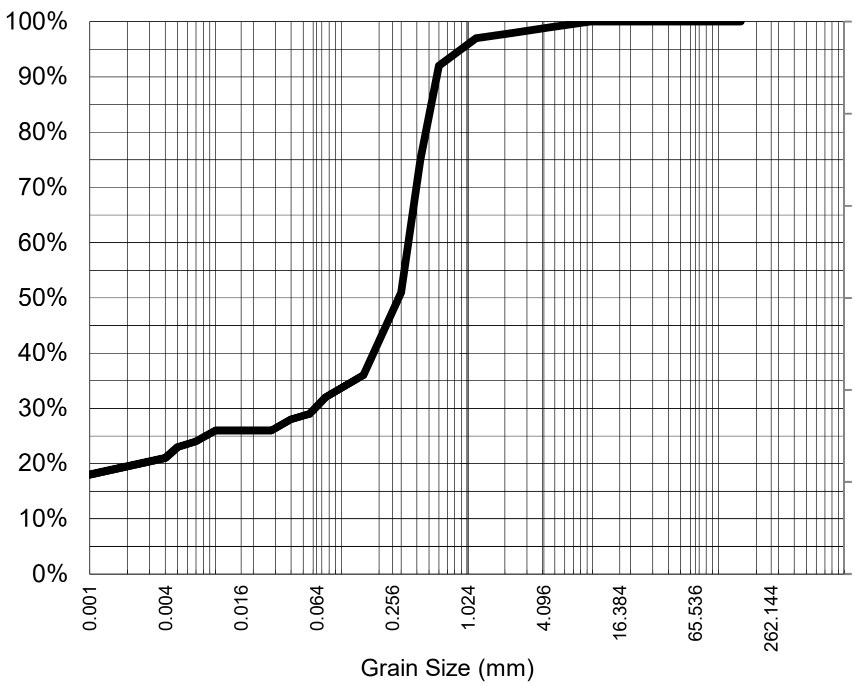
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	26-Oct-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-011DUP / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B9-1

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	98%
1.18	97%
0.600	92%
0.425	75%
0.300	51%
0.150	36%
0.075	32%
Particle Size (microns)	
56	29%
40	28%
28	26%
20	26%
15	26%
10	26%
7	24%
5	23%
1	18%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.290

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.62

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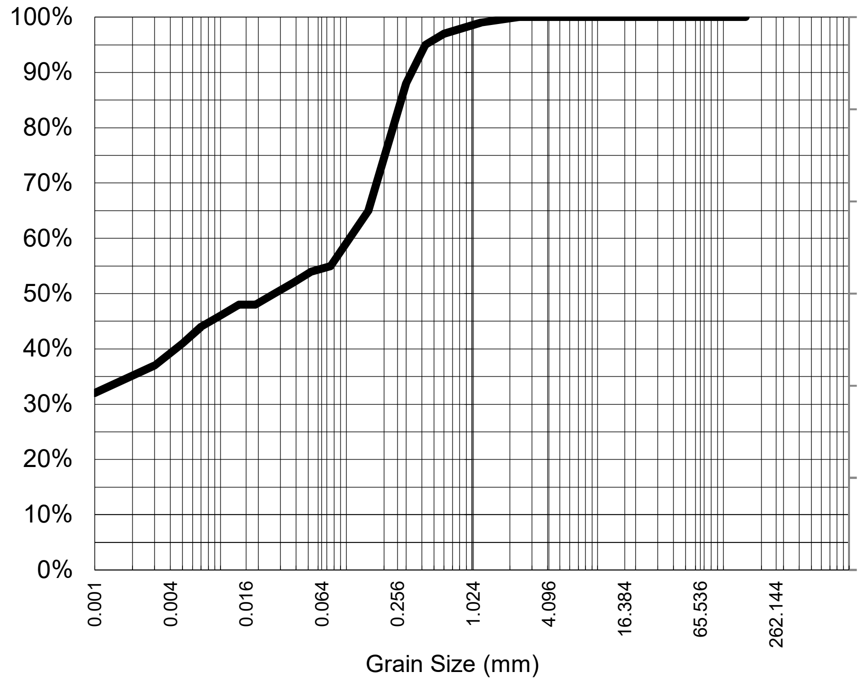
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	8-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026442-012 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B10-5

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	97%
0.425	95%
0.300	88%
0.150	65%
0.075	55%
Particle Size (microns)	
53	54%
38	52%
27	50%
19	48%
14	48%
10	46%
7	44%
5	41%
1	32%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.027

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 16-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.67

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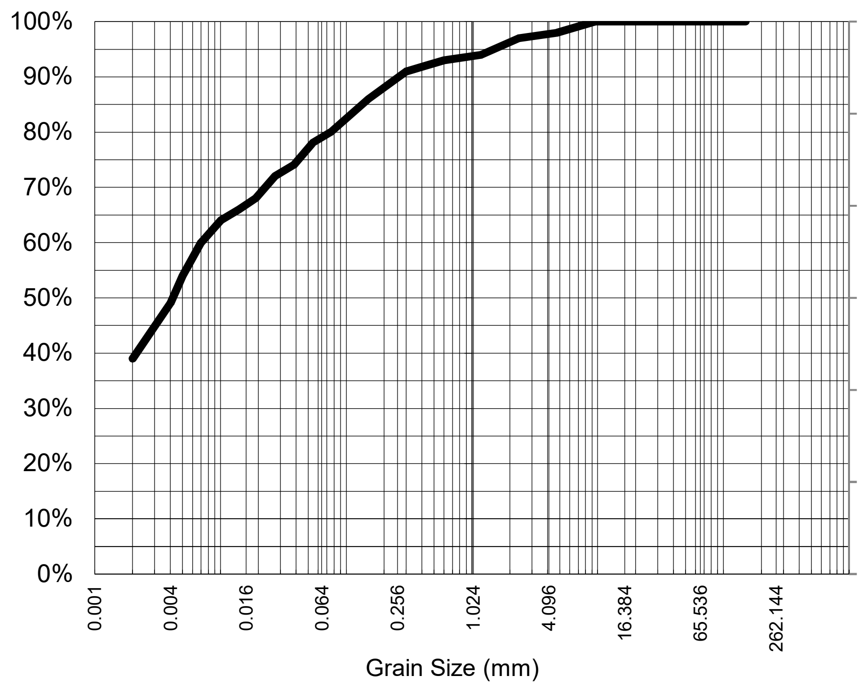
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-001 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B8-3

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	98%
2.36	97%
1.18	94%
0.600	93%
0.425	92%
0.300	91%
0.150	86%
0.075	80%
Particle Size (microns)	
54	78%
38	74%
27	72%
19	68%
14	66%
10	64%
7	60%
5	54%
2	39%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.41 (2.45)*

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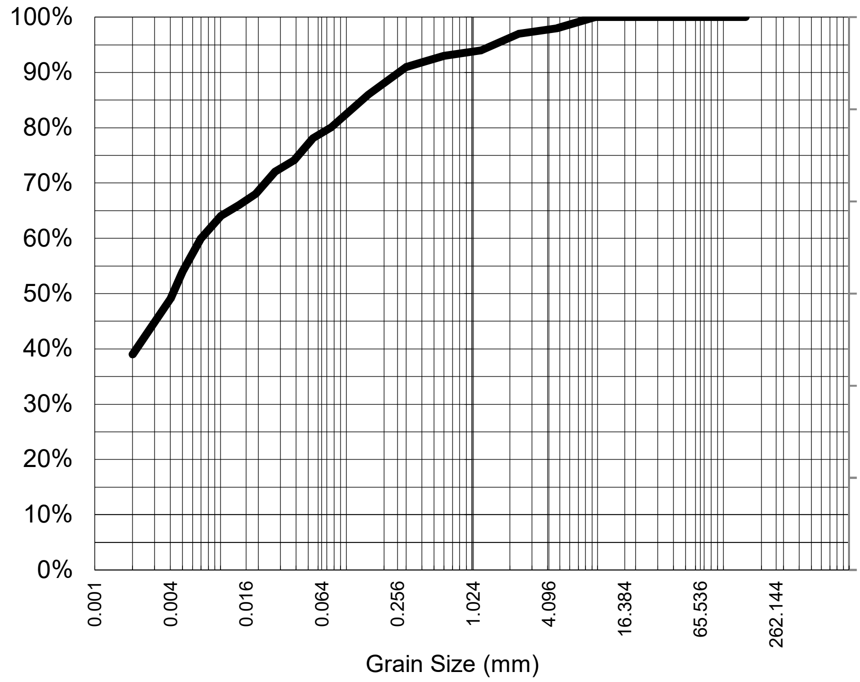
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-001DUP / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B8-3

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	98%
2.36	97%
1.18	94%
0.600	93%
0.425	92%
0.300	91%
0.150	86%
0.075	80%
Particle Size (microns)	
54	78%
38	74%
27	72%
19	68%
14	66%
10	64%
7	60%
5	54%
2	39%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.41 (2.45)*

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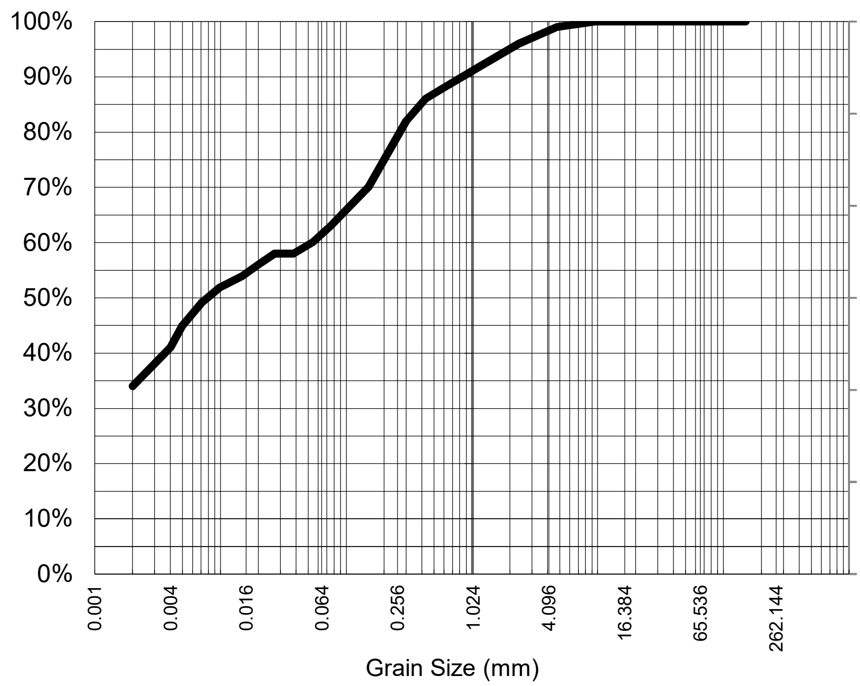
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-002 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B7-1

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	96%
1.18	92%
0.600	88%
0.425	86%
0.300	82%
0.150	70%
0.075	63%
Particle Size (microns)	
54	60%
38	58%
27	58%
20	56%
15	54%
10	52%
7	49%
5	45%
2	34%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	0.008

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.3 (2.45)*

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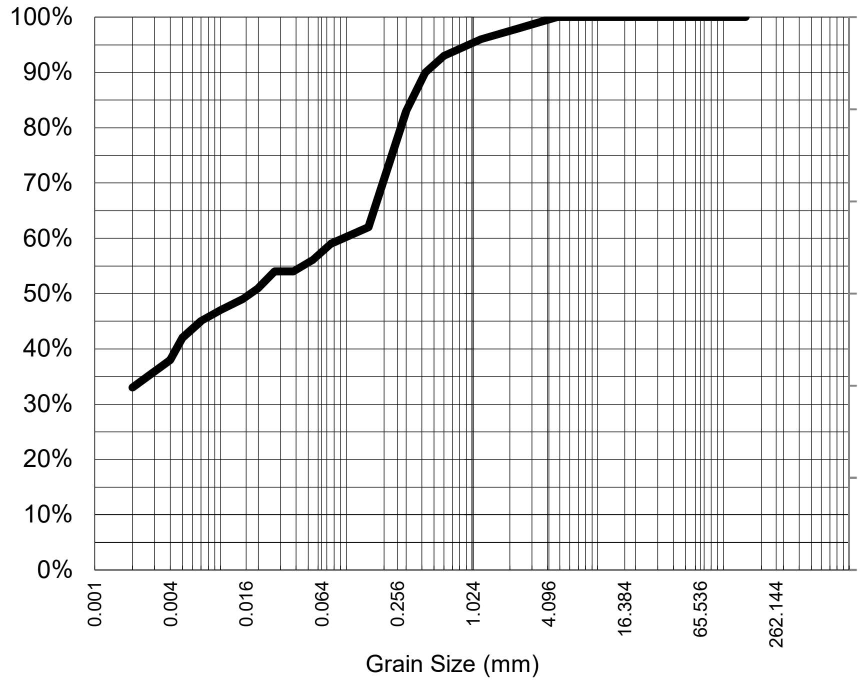
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-003 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B6-2

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	98%
1.18	96%
0.600	93%
0.425	90%
0.300	83%
0.150	62%
0.075	59%
Particle Size (microns)	
54	56%
38	54%
27	54%
20	51%
15	49%
10	47%
7	45%
5	42%
2	33%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	0.018

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.33 (2.45)*

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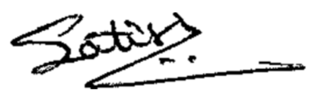

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Certificate of Analysis

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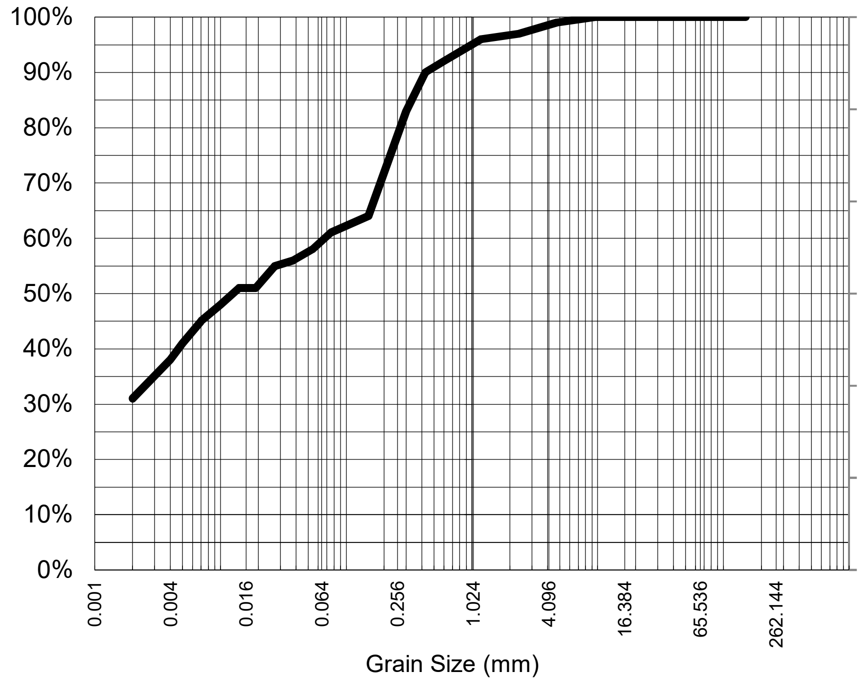
ALS Environmental

Brisbane QLD

CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-004 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B6-2B

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	97%
1.18	96%
0.600	92%
0.425	90%
0.300	83%
0.150	64%
0.075	61%
Particle Size (microns)	
54	58%
38	56%
27	55%
19	51%
14	51%
10	48%
7	45%
5	41%
2	31%

Median Particle Size (mm)*	0.013

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.35 (2.45)*

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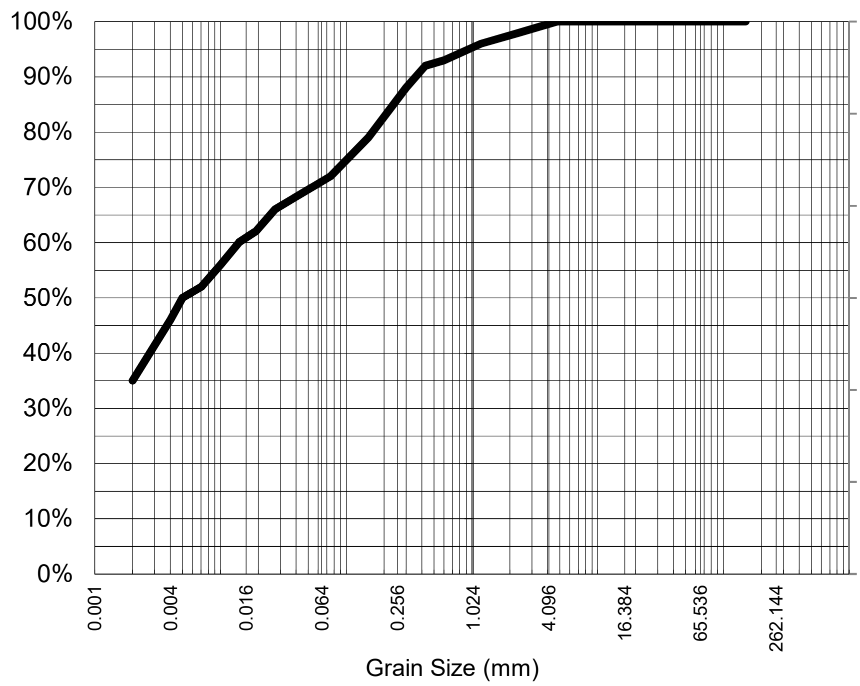
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-005 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B6-3

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	98%
1.18	96%
0.600	93%
0.425	92%
0.300	88%
0.150	79%
0.075	72%
Particle Size (microns)	
54	70%
38	68%
27	66%
19	62%
14	60%
10	56%
7	52%
5	50%
2	35%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.45

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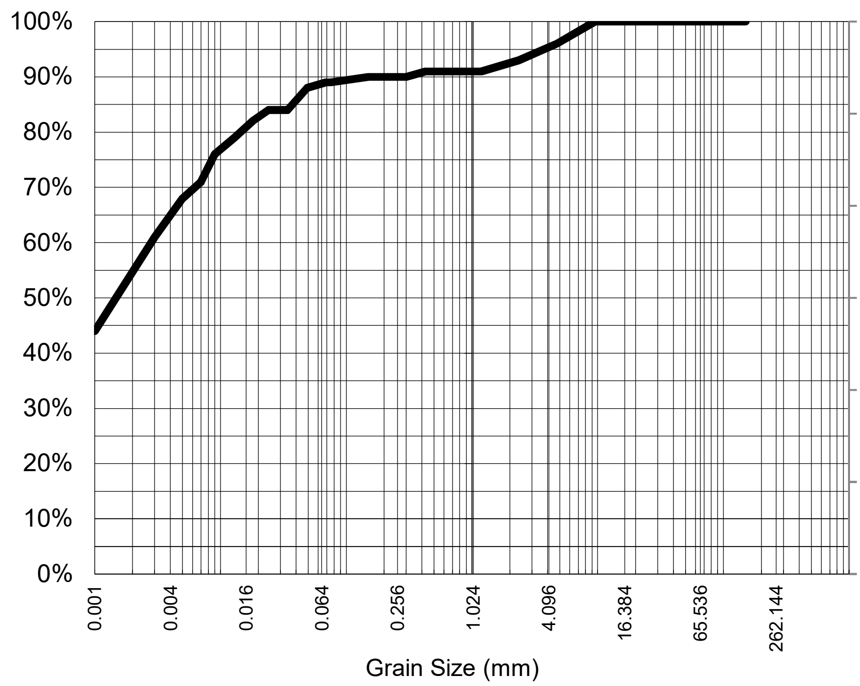
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-006 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B5-1

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	96%
2.36	93%
1.18	91%
0.600	91%
0.425	91%
0.300	90%
0.150	90%
0.075	89%
Particle Size (microns)	
49	88%
34	84%
24	84%
18	82%
13	79%
9	76%
7	71%
5	68%
1	44%

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.33 (2.45)*

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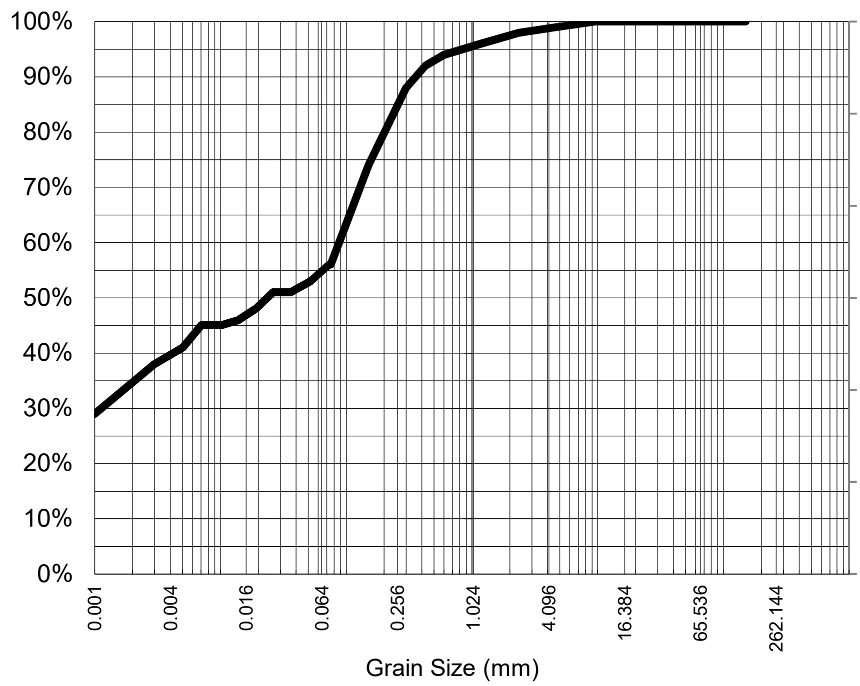
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-007 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B5-1B

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	98%
1.18	96%
0.600	94%
0.425	92%
0.300	88%
0.150	74%
0.075	56%
Particle Size (microns)	
52	53%
36	51%
26	51%
19	48%
14	46%
10	45%
7	45%
5	41%
1	29%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.024

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.63

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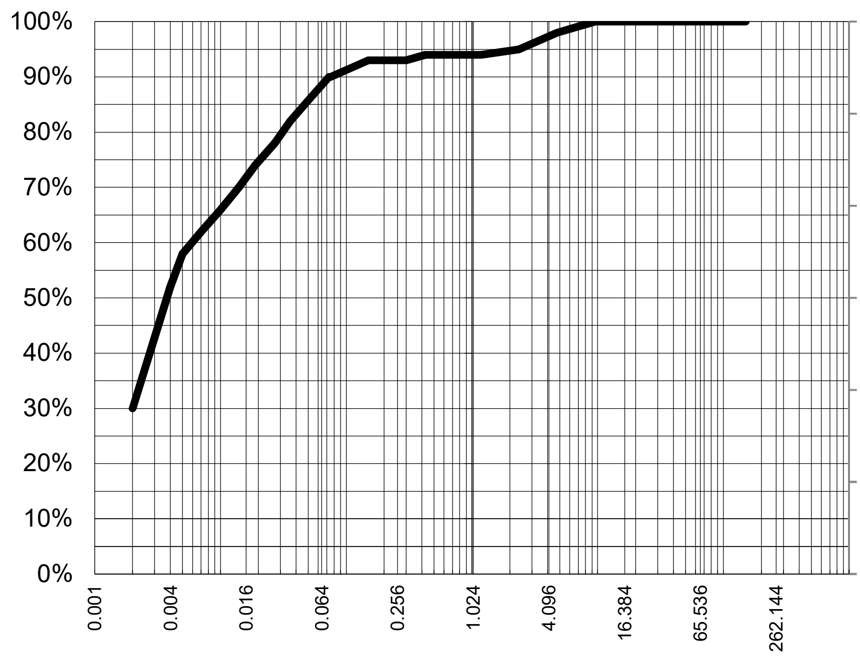
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-008 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B5-0

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	98%
2.36	95%
1.18	94%
0.600	94%
0.425	94%
0.300	93%
0.150	93%
0.075	90%
Particle Size (microns)	
51	86%
36	82%
27	78%
19	74%
14	70%
10	66%
7	62%
5	58%
2	30%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.4 (2.45)*

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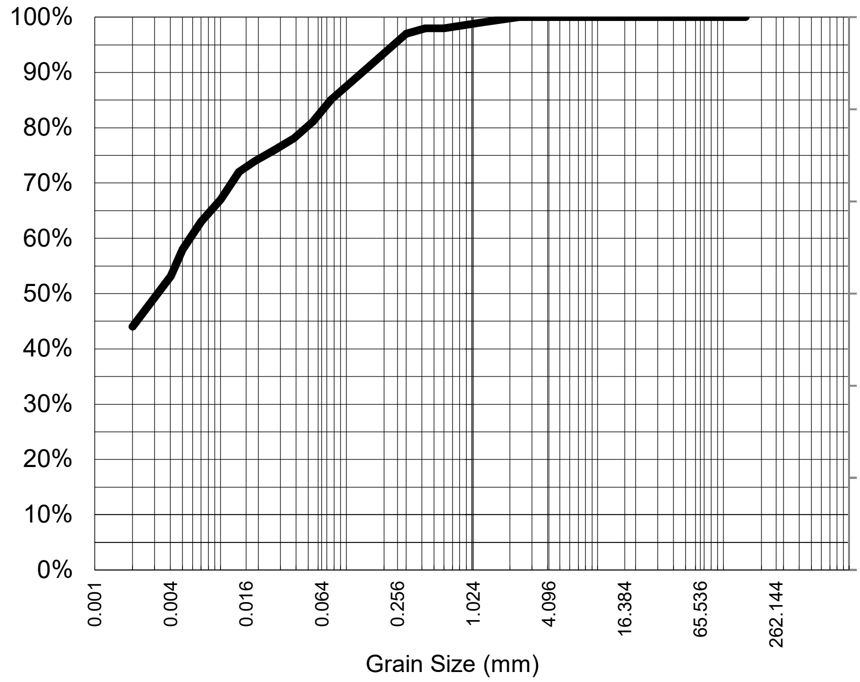
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-009 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B4-0

Particle Size Distribution



Particle Size (mm)	% Passing
2.36	100%
1.18	99%
0.600	98%
0.425	98%
0.300	97%
0.150	91%
0.075	85%
Particle Size (microns)	
54	81%
38	78%
27	76%
19	74%
14	72%
10	67%
7	63%
5	58%
2	44%

Median Particle Size (mm)*	<0.007

Analysis Notes

Samples analysed as received.
** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.41 (2.45)*

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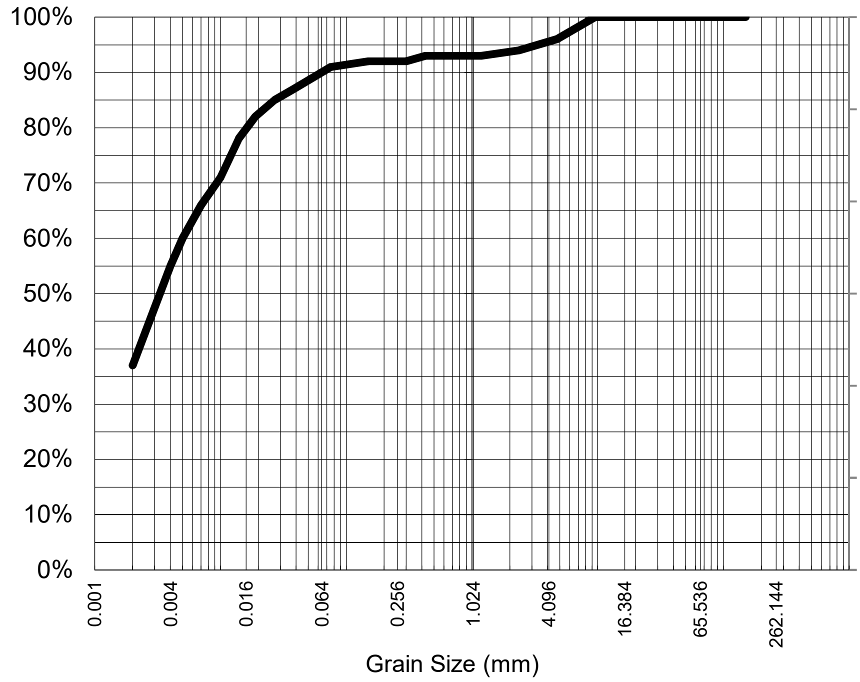
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-010 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B4-4

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	96%
2.36	94%
1.18	93%
0.600	93%
0.425	93%
0.300	92%
0.150	92%
0.075	91%
Particle Size (microns)	
54	89%
38	87%
27	85%
19	82%
14	78%
10	71%
7	66%
5	60%
2	37%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	<0.007

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.49

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Brisbane QLD

CLIENT: DARREN RICHARDSON

DATE REPORTED: 3-Nov-2020

COMPANY: BMT COMMERCIAL AUSTRALIA PTY LTD

DATE RECEIVED: 9-Oct-2020

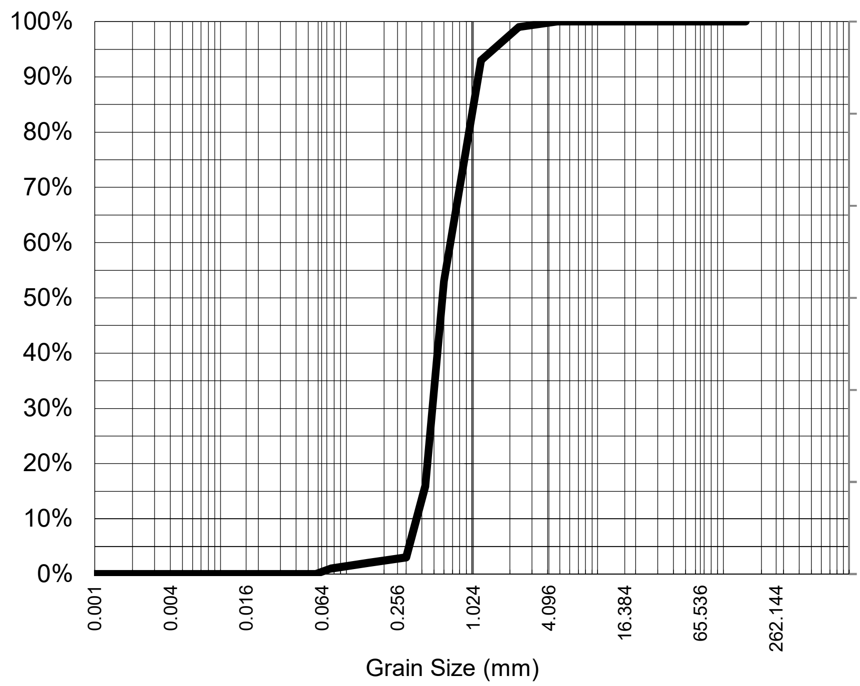
ADDRESS: Po Box 203
Spring Hill
Brisbane Qld

REPORT NO: EB2026597-011 / PSD

PROJECT: Port of Brisbane SAP

SAMPLE ID: B2-0

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	93%
0.600	53%
0.425	16%
0.300	3%
0.150	2%
0.075	1%
Particle Size (microns)	

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.586

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments: AS1289.3.6.3 states that hydrometer analysis is not applicable for samples containing <10% fines (<75um). Results should be assessed accordingly

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.74

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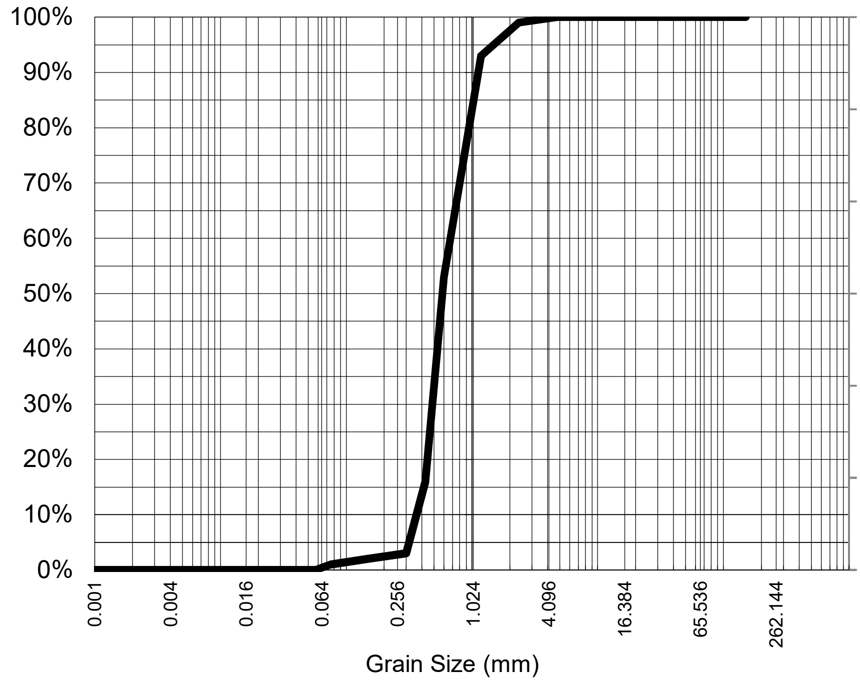
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-011DUP / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B2-0

Particle Size Distribution



Particle Size (mm)	% Passing
4.75	100%
2.36	99%
1.18	93%
0.600	53%
0.425	16%
0.300	3%
0.150	2%
0.075	1%
Particle Size (microns)	

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.586

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments: AS1289.3.6.3 states that hydrometer analysis is not applicable for samples containing <10% fines (<75um). Results should be assessed accordingly

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.74

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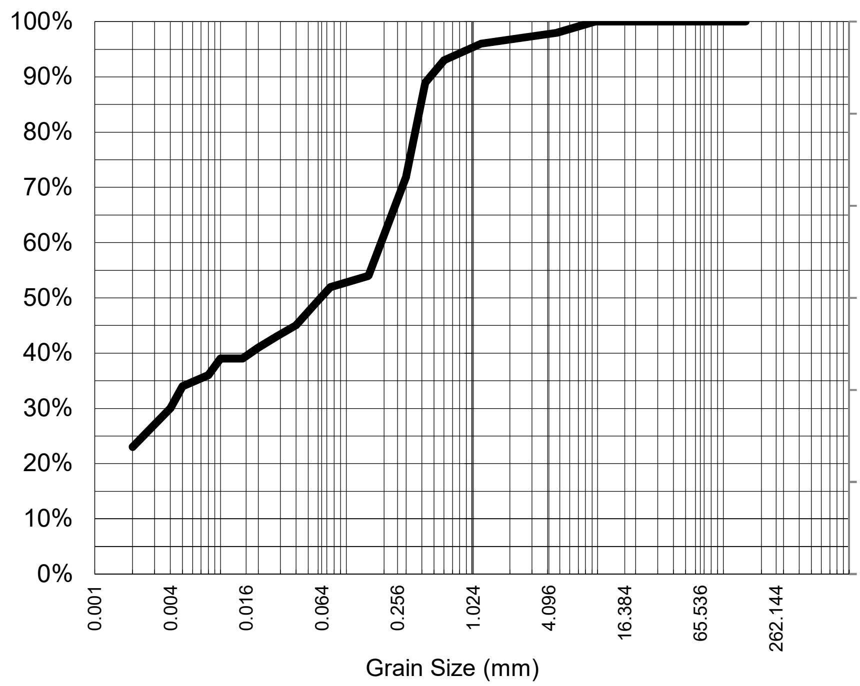
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-012 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	BC-2

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	98%
2.36	97%
1.18	96%
0.600	93%
0.425	89%
0.300	72%
0.150	54%
0.075	52%
Particle Size (microns)	
57	49%
40	45%
28	43%
20	41%
15	39%
10	39%
8	36%
5	34%
2	23%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.063

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.49

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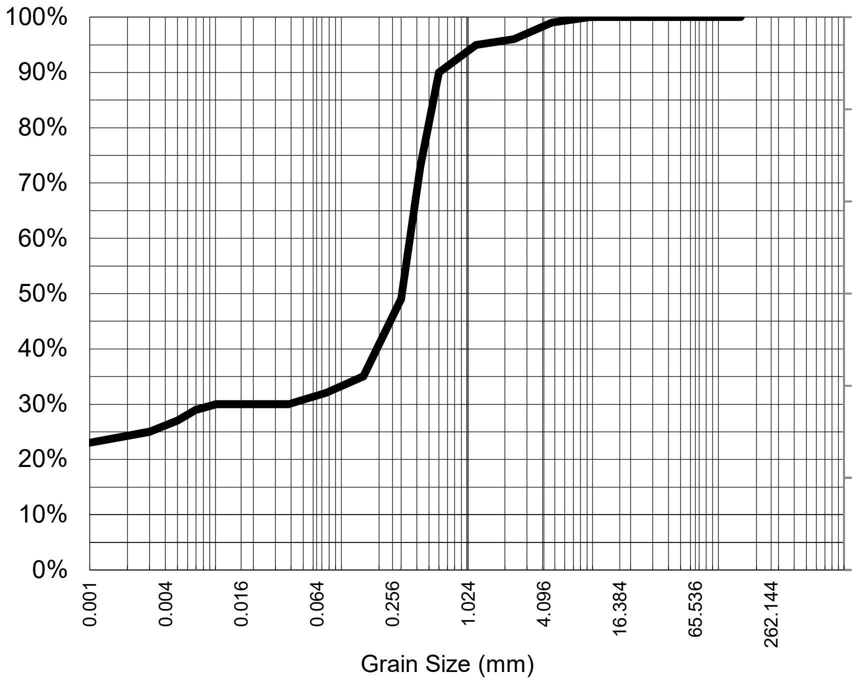
CLIENT:	DARREN RICHARDSON	**DATE REPORTED:**	3-Nov-2020
COMPANY:	BMT COMMERCIAL AUSTRALIA PTY LTD	**DATE RECEIVED:**	9-Oct-2020
ADDRESS:	Po Box 203 Spring Hill Brisbane Qld	**REPORT NO:**	EB2026597-013 / PSD
PROJECT:	Port of Brisbane SAP	**SAMPLE ID:**	B9-1

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	99%
2.36	96%
1.18	95%
0.600	90%
0.425	73%
0.300	49%
0.150	35%
0.075	32%
Particle Size (microns)	
54	31%
38	30%
27	30%
19	30%
14	30%
10	30%
7	29%
5	27%
1	23%

Analysis Notes

Samples analysed as received.

Median Particle Size (mm)*	0.305

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Analysed: 13-Oct-20

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description:

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.64

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QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2026300**	Page	: 1 of 13
Client	: **BMT COMMERCIAL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DARREN RICHARDSON	Telephone	: +61 7 3552 8639
Project	: Port of Brisbane SAP	Date Samples Received	: 07-Oct-2020
Site	: ----	Issue Date	: 20-Oct-2020
Sampler	: BRAD HILES	No. of samples received	: 18
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.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP090: Organotin Compounds	EB2026300--002	RF6	**Monobutyltin**	78763-54-9	14.0 %	20.0-130%	**Recovery less than lower data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Soil Particle Density	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Total Metals by ICP-AES	0	16	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	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA029-A: pH Measurements								
Pulp Bag (EA029) 13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓
EA029-B: Acidity Trail								
Pulp Bag (EA029) 13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓
EA029-C: Sulfur Trail								
Pulp Bag (EA029) 13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓
EA029-D: Calcium Values								
Pulp Bag (EA029) 13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓
EA029-E: Magnesium Values								
Pulp Bag (EA029) 13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓

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
EA029-F: Excess Acid Neutralising Capacity								
Pulp Bag (EA029)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓
EA029-G: Retained Acidity								
Pulp Bag (EA029)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓
EA029-H: Acid Base Accounting								
Pulp Bag (EA029)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	03-Jul-2023	✓	**15-Oct-2020**	13-Jan-2021	✓
EA033-A: Actual Acidity								
Pulp Bag (EA033)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	07-Oct-2021	✓	**15-Oct-2020**	13-Jan-2021	✓
EA033-B: Potential Acidity								
Pulp Bag (EA033)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	07-Oct-2021	✓	**15-Oct-2020**	13-Jan-2021	✓
EA033-C: Acid Neutralising Capacity								
Pulp Bag (EA033)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	07-Oct-2021	✓	**15-Oct-2020**	13-Jan-2021	✓
EA033-D: Retained Acidity								
Pulp Bag (EA033)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	07-Oct-2021	✓	**15-Oct-2020**	13-Jan-2021	✓
EA033-E: Acid Base Accounting								
Pulp Bag (EA033)								
13-8,	13-1	**07-Oct-2020**	**15-Oct-2020**	07-Oct-2021	✓	**15-Oct-2020**	13-Jan-2021	✓
EA055: Moisture Content (Dried @ 105-110°C)								
Snap Lock Bag (EA055)								
RF4		**07-Oct-2020**	**----**	----	----	**08-Oct-2020**	21-Oct-2020	✓
Soil Glass Jar - Unpreserved (EA055)								
RF2,	RF6,	**07-Oct-2020**	**----**	----	----	**08-Oct-2020**	21-Oct-2020	✓
RF3,	RF7,							
B13-9,	16-1,							
16-0,	13-8,							
13-5,	13-4,							
13-4B,	13-1,							
15-1,	11-5,							
10-8,	Trip Blank							

Matrix: **SOIL**

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

Method		Sample Date	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)			**Date extracted**	*Due for extraction*	*Evaluation*	**Date analysed**	*Due for analysis*	*Evaluation*
EA150: Particle Sizing								
Snap Lock Bag (EA150H)								
RF2,	RF6,	**07-Oct-2020**	**----**	----	----	**20-Oct-2020**	05-Apr-2021	✓
RF3,	RF7,							
RF4,	B13-9,							
16-1,	16-0,							
13-8,	13-5,							
13-4,	13-4B,							
13-1,	15-1,							
11-5,	10-8							
EA150: Soil Classification based on Particle Size								
Snap Lock Bag (EA150H)								
RF2,	RF6,	**07-Oct-2020**	**----**	----	----	**20-Oct-2020**	05-Apr-2021	✓
RF3,	RF7,							
RF4,	B13-9,							
16-1,	16-0,							
13-8,	13-5,							
13-4,	13-4B,							
13-1,	15-1,							
11-5,	10-8							
EA152: Soil Particle Density								
Snap Lock Bag (EA152)								
RF2,	RF6,	**07-Oct-2020**	**----**	----	----	**20-Oct-2020**	05-Apr-2021	✓
RF3,	RF7,							
RF4,	B13-9,							
16-1,	16-0,							
13-8,	13-5,							
13-4,	13-4B,							
13-1,	15-1,							
11-5,	10-8							
EG005(ED093)T: Total Metals by ICP-AES								
Snap Lock Bag (EG005T)								
RF4		**07-Oct-2020**	**08-Oct-2020**	05-Apr-2021	✓	**09-Oct-2020**	05-Apr-2021	✓
Soil Glass Jar - Unpreserved (EG005T)								
RF2,	RF6,	**07-Oct-2020**	**08-Oct-2020**	05-Apr-2021	✓	**09-Oct-2020**	05-Apr-2021	✓
RF3,	RF7,							
B13-9,	16-1,							
16-0,	13-8,							
13-5,	13-4,							
13-4B,	13-1,							
15-1,	11-5,							
10-8								

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
EG020-SD: Total Metals in Sediments by ICPMS								
Snap Lock Bag (EG020-SD)								
RF4		**07-Oct-2020**	**08-Oct-2020**	05-Apr-2021	✓	**09-Oct-2020**	05-Apr-2021	✓
Soil Glass Jar - Unpreserved (EG020-SD)								
RF2, RF3, B13-9, 16-0, 13-5, 13-4B, 15-1, 10-8	RF6, RF7, 16-1, 13-8, 13-4, 13-1, 11-5,	**07-Oct-2020**	**08-Oct-2020**	05-Apr-2021	✓	**09-Oct-2020**	05-Apr-2021	✓
EG035T: Total Recoverable Mercury by FIMS (Low Level)								
Snap Lock Bag (EG035T-LL)								
RF4		**07-Oct-2020**	**08-Oct-2020**	04-Nov-2020	✓	**09-Oct-2020**	04-Nov-2020	✓
Soil Glass Jar - Unpreserved (EG035T-LL)								
RF2, RF3, B13-9, 16-0, 13-5, 13-4B, 15-1, 10-8	RF6, RF7, 16-1, 13-8, 13-4, 13-1, 11-5,	**07-Oct-2020**	**08-Oct-2020**	04-Nov-2020	✓	**09-Oct-2020**	04-Nov-2020	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Soil Glass Jar - Unpreserved (EK059G)								
13-8,	13-1	**07-Oct-2020**	**09-Oct-2020**	04-Nov-2020	✓	**09-Oct-2020**	11-Oct-2020	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Soil Glass Jar - Unpreserved (EK061G)								
13-8,	13-1	**07-Oct-2020**	**08-Oct-2020**	04-Nov-2020	✓	**14-Oct-2020**	05-Nov-2020	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Soil Glass Jar - Unpreserved (EK067G)								
13-8,	13-1	**07-Oct-2020**	**08-Oct-2020**	04-Nov-2020	✓	**14-Oct-2020**	05-Nov-2020	✓

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
EP003: Total Organic Carbon (TOC) in Soil								
Pulp Bag (EP003)								
RF2,	RF6,	**07-Oct-2020**	**19-Oct-2020**	04-Nov-2020	✓	**19-Oct-2020**	04-Nov-2020	✓
RF3,	RF7,							
RF4,	B13-9,							
16-1,	16-0,							
13-8,	13-5,							
13-4,	13-4B,							
13-1,	15-1,							
11-5,	10-8							
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)								
Trip Blank		**07-Oct-2020**	**08-Oct-2020**	21-Oct-2020	✓	**09-Oct-2020**	21-Oct-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP080)								
Trip Blank		**07-Oct-2020**	**08-Oct-2020**	21-Oct-2020	✓	**09-Oct-2020**	21-Oct-2020	✓
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)								
Trip Blank		**07-Oct-2020**	**08-Oct-2020**	21-Oct-2020	✓	**09-Oct-2020**	21-Oct-2020	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080-SD)								
13-8,	13-1	**07-Oct-2020**	**08-Oct-2020**	21-Oct-2020	✓	**09-Oct-2020**	21-Oct-2020	✓
Soil Glass Jar - Unpreserved (EP071-SD-SV)								
13-8,	13-1	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**14-Oct-2020**	22-Nov-2020	✓
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080-SD)								
13-8,	13-1	**07-Oct-2020**	**08-Oct-2020**	21-Oct-2020	✓	**09-Oct-2020**	21-Oct-2020	✓
Soil Glass Jar - Unpreserved (EP071-SD-SV)								
13-8,	13-1	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**14-Oct-2020**	22-Nov-2020	✓
EP080-SD: BTEXN								
Soil Glass Jar - Unpreserved (EP080-SD)								
13-8,	13-1	**07-Oct-2020**	**08-Oct-2020**	21-Oct-2020	✓	**09-Oct-2020**	21-Oct-2020	✓

Matrix: **SOIL**

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

Method ***Container*** */ Client Sample ID(s)*	***Sample Date***	*Extraction / Preparation* ***Date extracted***	*Due for extraction*	*Evaluation*	*Analysis* ***Date analysed***	*Due for analysis*	*Evaluation*
EP090: Organotin Compounds							
Snap Lock Bag (EP090) RF4	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**14-Oct-2020**	22-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP090) RF2, RF6, RF3, RF7, B13-9, 16-1, 16-0, 13-8, 13-5, 13-4, 13-4B, 13-1, 15-1, 11-5, 10-8	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**14-Oct-2020**	22-Nov-2020	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)							
Snap Lock Bag (EP130) RF4	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**18-Oct-2020**	22-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP130) RF2, RF6, RF3, RF7, B13-9, 16-1, 16-0, 13-8, 13-5, 13-4, 13-4B, 13-1, 15-1, 11-5, 10-8	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**18-Oct-2020**	22-Nov-2020	✓
EP131A: Organochlorine Pesticides							
Snap Lock Bag (EP131A) RF4	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**18-Oct-2020**	22-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP131A) RF2, RF6, RF3, RF7, B13-9, 16-1, 16-0, 13-8, 13-5, 13-4, 13-4B, 13-1, 15-1, 11-5, 10-8	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**18-Oct-2020**	22-Nov-2020	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)							
Soil Glass Jar - Unpreserved (EP131B) 13-8, 13-1	**07-Oct-2020**	**13-Oct-2020**	21-Oct-2020	✓	**18-Oct-2020**	22-Nov-2020	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP132B-SD) 13-8, 13-1	**07-Oct-2020**	**14-Oct-2020**	21-Oct-2020	✓	**14-Oct-2020**	23-Nov-2020	✓

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)							
Chromium Suite for Acid Sulphate Soils	EA033	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	3	29	**10.34**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	0	16	**0.00**	**10.00**	✗	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	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 in Sediments by ICPMS	EG020-SD	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	16	**12.50**	**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
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	6	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	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

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 Control Samples (LCS) - Continued							
Total Metals in Sediments by ICPMS	EG020-SD	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	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 in Sediments by ICPMS	EG020-SD	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	16	**6.25**	**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
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	0	16	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	16	**6.25**	**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
TPH - Semivolatile Fractions Only	EP071-SD-SV	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*	
Matrix Spikes (MS) - Continued							
TRH Volatiles/BTEX	EP080	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	2	**50.00**	**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
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	In house: Referenced to Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1: 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 Schedule B(3)
Total Metals in Sediments by ICPMS	EG020-SD	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. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	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 Schedule B(3)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Thermo Scientific Method D08727 and NEMI (National Environmental Method Index) Method ID: 9171. This method covers the determination of total oxidised nitrogen (NOx-N) and nitrate (NO3-N) by calculation, Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by 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.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
TPH - Semivolatile Fractions Only	EP071-SD-SV	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
TRH Volatiles/BTEX in Sediments	EP080-SD	SOIL	In house: Referenced to USEPA SW 846 - 8260 Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Organotin Analysis	EP090	SOIL	In house: Referenced to USEPA SW 846 - 8270 Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quanitified against an established calibration curve.
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM Schedule B(3)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/µECD/µECD) This technique is compliant with NEPM Schedule B(3)
PCB's (Ultra-trace)	EP131B	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/µECD/µECD) This technique is compliant with NEPM Schedule B(3)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	In house: Referenced to USEPA 8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.

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.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade 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 Schedule B(3).
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
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/ Sample Cleanup	ORG17A-UTP	SOIL	In house: Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na2SO4 and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Organotin Sample Preparation	ORG35	SOIL	In house: 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2026442**	Page	: 1 of 16
Client	: **BMT COMMERCIAL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DARREN RICHARDSON	Telephone	: +61 7 3552 8639
Project	: Port of Brisbane SAP	Date Samples Received	: 08-Oct-2020
Site	: ----	Issue Date	: 06-Nov-2020
Sampler	: BRAD HILES	No. of samples received	: 16
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.**
- **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							
EG020-SD: Total Metals in Sediments by ICPMS	EB2026442--002	B10-6	**Lead**	7439-92-1	56.7 %	70.0-130%	**Recovery less than lower data quality objective**
EK067G: Total Phosphorus as P by Discrete Analyser	EB2026442--003	B10-6B	**Total Phosphorus as P**	----	59.1 %	70.0-130%	**Recovery less than lower data quality objective**
EP090: Organotin Compounds	EB2026442--002	B10-6	**Monobutyltin**	78763-54-9	10.4 %	20.0-130%	**Recovery less than lower data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	**Days overdue**	*Date analysed*	*Due for analysis*	**Days overdue**
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)						
Non-Volatile Leach: 14 day HT(e.g. SV organics) B15-2, B12-1, Elutriate Blank	28-Oct-2020	22-Oct-2020	**6**	----	----	----
EN82: Porewater Extraction						
Non-Volatile Leach: 14 day HT(e.g. SV organics) B12-1 - Pore water	04-Nov-2020	22-Oct-2020	**13**	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Soil Particle Density	0	12	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Total Metals by ICP-AES	0	12	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Organotin Compounds (Soluble)	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Organotin Compounds (Soluble)	0	18	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
EA029-A: pH Measurements								
Snap Lock Bag - frozen on receipt at ALS (EA029)								
B10-6,	B10-6B,	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
B15-3,	B15-2,							
B12-1,	B11-8							
Soil Glass Jar - Frozen on receipt (EA029)								
B9-1		**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
EA029-B: Acidity Trail								
Snap Lock Bag - frozen on receipt at ALS (EA029)								
B10-6,	B10-6B,	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
B15-3,	B15-2,							
B12-1,	B11-8							
Soil Glass Jar - Frozen on receipt (EA029)								
B9-1		**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
EA029-C: Sulfur Trail								
Snap Lock Bag - frozen on receipt at ALS (EA029)								
B10-6,	B10-6B,	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
B15-3,	B15-2,							
B12-1,	B11-8							
Soil Glass Jar - Frozen on receipt (EA029)								
B9-1		**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
EA029-D: Calcium Values								
Snap Lock Bag - frozen on receipt at ALS (EA029)								
B10-6,	B10-6B,	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
B15-3,	B15-2,							
B12-1,	B11-8							
Soil Glass Jar - Frozen on receipt (EA029)								
B9-1		**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA029-E: Magnesium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
Soil Glass Jar - Frozen on receipt (EA029)							
B9-1	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
EA029-F: Excess Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
Soil Glass Jar - Frozen on receipt (EA029)							
B9-1	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
EA029-G: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
Soil Glass Jar - Frozen on receipt (EA029)							
B9-1	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
EA029-H: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
Soil Glass Jar - Frozen on receipt (EA029)							
B9-1	**08-Oct-2020**	**21-Oct-2020**	04-Jul-2023	✓	**21-Oct-2020**	19-Jan-2021	✓
EA033-A: Actual Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8	**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
Soil Glass Jar - Frozen on receipt (EA033)							
B9-1	**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
EA033-B: Potential Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8	**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
Soil Glass Jar - Frozen on receipt (EA033)							
B9-1	**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓

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
EA033-C: Acid Neutralising Capacity								
Snap Lock Bag - frozen on receipt at ALS (EA033)								
B10-6,	B10-6B,	**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
B15-3,	B15-2,							
B12-1,	B11-8							
Soil Glass Jar - Frozen on receipt (EA033)								
B9-1		**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
EA033-D: Retained Acidity								
Snap Lock Bag - frozen on receipt at ALS (EA033)								
B10-6,	B10-6B,	**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
B15-3,	B15-2,							
B12-1,	B11-8							
Soil Glass Jar - Frozen on receipt (EA033)								
B9-1		**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
EA033-E: Acid Base Accounting								
Snap Lock Bag - frozen on receipt at ALS (EA033)								
B10-6,	B10-6B,	**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
B15-3,	B15-2,							
B12-1,	B11-8							
Soil Glass Jar - Frozen on receipt (EA033)								
B9-1		**08-Oct-2020**	**21-Oct-2020**	08-Oct-2021	✓	**21-Oct-2020**	19-Jan-2021	✓
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
B8-1,	B10-6,	**08-Oct-2020**	**----**	----	----	**09-Oct-2020**	22-Oct-2020	✓
B10-6B,	B15-3,							
B15-2,	B12-2,							
B12-1,	B11-8,							
B11-9,	B11-9B,							
B9-1,	B10-5							
EA150: Particle Sizing								
Snap Lock Bag (EA150H)								
B8-1,	B10-6,	**08-Oct-2020**	**----**	----	----	**23-Oct-2020**	06-Apr-2021	✓
B10-6B,	B15-3,							
B15-2,	B12-2,							
B12-1,	B11-8,							
B11-9,	B11-9B,							
B10-5								
Soil Glass Jar - Unpreserved (EA150H)								
B9-1		**08-Oct-2020**	**----**	----	----	**23-Oct-2020**	06-Apr-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA150: Soil Classification based on Particle Size								
Snap Lock Bag (EA150H)								
B8-1, B10-6B, B15-2, B12-1, B11-9, B10-5	B10-6, B15-3, B12-2, B11-8, B11-9B,	**08-Oct-2020**	----	----	----	**23-Oct-2020**	06-Apr-2021	✓
Soil Glass Jar - Unpreserved (EA150H)								
B9-1		**08-Oct-2020**	----	----	----	**23-Oct-2020**	06-Apr-2021	✓
EA152: Soil Particle Density								
Snap Lock Bag (EA152)								
B8-1, B10-6B, B15-2, B12-1, B11-9, B10-5	B10-6, B15-3, B12-2, B11-8, B11-9B,	**08-Oct-2020**	----	----	----	**23-Oct-2020**	06-Apr-2021	✓
Soil Glass Jar - Unpreserved (EA152)								
B9-1		**08-Oct-2020**	----	----	----	**23-Oct-2020**	06-Apr-2021	✓
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
B8-1, B10-6B, B15-2, B12-1, B11-9, B9-1,	B10-6, B15-3, B12-2, B11-8, B11-9B, B10-5	**08-Oct-2020**	**12-Oct-2020**	06-Apr-2021	✓	**13-Oct-2020**	06-Apr-2021	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved (EG020-SD)								
B8-1, B10-6B, B15-2, B12-1, B11-9, B9-1,	B10-6, B15-3, B12-2, B11-8, B11-9B, B10-5	**08-Oct-2020**	**12-Oct-2020**	06-Apr-2021	✓	**13-Oct-2020**	06-Apr-2021	✓

Matrix: **SOIL**

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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS (Low Level)							
Soil Glass Jar - Unpreserved (EG035T-LL) B8-1, B10-6, B10-6B, B15-3, B15-2, B12-2, B12-1, B11-8, B11-9, B11-9B, B9-1, B10-5	**08-Oct-2020**	**12-Oct-2020**	05-Nov-2020	✓	**13-Oct-2020**	05-Nov-2020	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK059G) B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8, B9-1	**08-Oct-2020**	**12-Oct-2020**	05-Nov-2020	✓	**13-Oct-2020**	14-Oct-2020	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Soil Glass Jar - Unpreserved (EK061G) B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8, B9-1	**08-Oct-2020**	**12-Oct-2020**	05-Nov-2020	✓	**13-Oct-2020**	09-Nov-2020	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK067G) B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8, B9-1	**08-Oct-2020**	**12-Oct-2020**	05-Nov-2020	✓	**13-Oct-2020**	09-Nov-2020	✓
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN68a-G) B15-2, B12-1, Elutriate Blank	**08-Oct-2020**	**28-Oct-2020**	22-Oct-2020	✗	**----**	----	----
EN82: Porewater Extraction							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN82) B12-1 - Pore water	**08-Oct-2020**	**04-Nov-2020**	22-Oct-2020	✗	**----**	----	----
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag (EP003) B8-1, B10-6, B10-6B, B15-3, B15-2, B12-2, B12-1, B11-8, B11-9, B11-9B, B9-1, B10-5	**08-Oct-2020**	**22-Oct-2020**	05-Nov-2020	✓	**22-Oct-2020**	05-Nov-2020	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)								
Trip Blank		**08-Oct-2020**	**09-Oct-2020**	22-Oct-2020	✓	**09-Oct-2020**	22-Oct-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP080)								
Trip Blank		**08-Oct-2020**	**09-Oct-2020**	22-Oct-2020	✓	**09-Oct-2020**	22-Oct-2020	✓
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)								
Trip Blank		**08-Oct-2020**	**09-Oct-2020**	22-Oct-2020	✓	**09-Oct-2020**	22-Oct-2020	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080-SD)								
B10-6,	B10-6B,	**08-Oct-2020**	**09-Oct-2020**	22-Oct-2020	✓	**09-Oct-2020**	22-Oct-2020	✓
B15-3,	B15-2,							
B12-1,	B11-8,							
B9-1								
Soil Glass Jar - Unpreserved (EP071-SD-SV)								
B10-6,	B10-6B,	**08-Oct-2020**	**13-Oct-2020**	22-Oct-2020	✓	**14-Oct-2020**	22-Nov-2020	✓
B15-3,	B15-2,							
B12-1,	B11-8,							
B9-1								
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080-SD)								
B10-6,	B10-6B,	**08-Oct-2020**	**09-Oct-2020**	22-Oct-2020	✓	**09-Oct-2020**	22-Oct-2020	✓
B15-3,	B15-2,							
B12-1,	B11-8,							
B9-1								
Soil Glass Jar - Unpreserved (EP071-SD-SV)								
B10-6,	B10-6B,	**08-Oct-2020**	**13-Oct-2020**	22-Oct-2020	✓	**14-Oct-2020**	22-Nov-2020	✓
B15-3,	B15-2,							
B12-1,	B11-8,							
B9-1								
EP080-SD: BTEXN								
Soil Glass Jar - Unpreserved (EP080-SD)								
B10-6,	B10-6B,	**08-Oct-2020**	**09-Oct-2020**	22-Oct-2020	✓	**09-Oct-2020**	22-Oct-2020	✓
B15-3,	B15-2,							
B12-1,	B11-8,							
B9-1								

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP090: Organotin Compounds							
Soil Glass Jar - Unpreserved (EP090)							
B8-1, B10-6, B10-6B, B15-3, B15-2, B12-2, B12-1, B11-8, B11-9, B11-9B, B9-1, B10-5	**08-Oct-2020**	**20-Oct-2020**	22-Oct-2020	✓	**21-Oct-2020**	29-Nov-2020	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)							
Soil Glass Jar - Unpreserved (EP130)							
B8-1, B10-6, B10-6B, B15-3, B15-2, B12-2, B12-1, B11-8, B11-9, B11-9B, B9-1, B10-5	**08-Oct-2020**	**14-Oct-2020**	22-Oct-2020	✓	**16-Oct-2020**	23-Nov-2020	✓
EP131A: Organochlorine Pesticides							
Soil Glass Jar - Unpreserved (EP131A)							
B8-1, B10-6, B10-6B, B15-3, B15-2, B12-2, B12-1, B11-8, B11-9, B11-9B, B9-1, B10-5	**08-Oct-2020**	**14-Oct-2020**	22-Oct-2020	✓	**16-Oct-2020**	23-Nov-2020	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)							
Soil Glass Jar - Unpreserved (EP131B)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8, B9-1	**08-Oct-2020**	**14-Oct-2020**	22-Oct-2020	✓	**16-Oct-2020**	23-Nov-2020	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP132B-SD)							
B10-6, B10-6B, B15-3, B15-2, B12-1, B11-8, B9-1	**08-Oct-2020**	**14-Oct-2020**	22-Oct-2020	✓	**14-Oct-2020**	23-Nov-2020	✓

Matrix: **WATER**

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

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

Matrix: **WATER**

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

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP090: Organotin Compounds (Soluble)							
Amber Glass Bottle - Unpreserved (EP090S)							
B12-1 - Pore water	**04-Nov-2020**	**04-Nov-2020**	11-Nov-2020	✓	**05-Nov-2020**	14-Dec-2020	✓
Amber Glass Bottle - Unpreserved (EP090S)							
B15-2, B12-1, Elutriate Blank	**28-Oct-2020**	**30-Oct-2020**	04-Nov-2020	✓	**30-Oct-2020**	09-Dec-2020	✓

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)							
Chromium Suite for Acid Sulphate Soils	EA033	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	0	12	**0.00**	**10.00**	✘	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	13	**7.69**	**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 (Low Level)	EG035T-LL	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	12	**8.33**	**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*	
Laboratory Control Samples (LCS) - Continued							
Total Metals in Sediments by ICPMS	EG020-SD	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Seawater Elutriate Testing Procedure - Glass Leaching Vessel	EN68a-G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	13	**7.69**	**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 (Low Level)	EG035T-LL	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	12	**8.33**	**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 (Low Level)	EG035T-LL	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	0	12	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	12	**8.33**	**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*	
Matrix Spikes (MS) - Continued							
Total Phosporus By Discrete Analyser	EK067G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	7	**14.29**	**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)							
Organotin Compounds (Soluble)	EP090S	0	18	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Organotin Compounds (Soluble)	EP090S	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Organotin Compounds (Soluble)	EP090S	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Organotin Compounds (Soluble)	EP090S	0	18	**0.00**	**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*
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	In house: Referenced to Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1: 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 Schedule B(3)
Total Metals in Sediments by ICPMS	EG020-SD	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. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	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 Schedule B(3)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Thermo Scientific Method D08727 and NEMI (National Environmental Method Index) Method ID: 9171. This method covers the determination of total oxidised nitrogen (NOx-N) and nitrate (NO3-N) by calculation, Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by 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.

Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
TPH - Semivolatile Fractions Only	EP071-SD-SV	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
TRH Volatiles/BTEX in Sediments	EP080-SD	SOIL	In house: Referenced to USEPA SW 846 - 8260 Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Organotin Analysis	EP090	SOIL	In house: Referenced to USEPA SW 846 - 8270 Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quanitified against an established calibration curve.
Organotin Compounds (Soluble)	EP090S	SOIL	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM Schedule B(3)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/μECD/μECD) This technique is compliant with NEPM Schedule B(3)
PCB's (Ultra-trace)	EP131B	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/μECD/μECD) This technique is compliant with NEPM Schedule B(3)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	In house: Referenced to USEPA 8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.

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.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade 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.
Seawater Elutriate Testing Procedure - Glass Leaching Vessel	EN68a-G	SOIL	USEPA Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Guide, EPA-503/8-91/001, USEPA and US Army Corps of Engineers. ANZECC Interim Ocean Disposal Guidelines This Procedure outlines the preparation of leachate designed to simulate release of contaminants from sediment during the disposal of dredged material. Release can occur by physical processes or a variety of chemical changes such as oxidation of metal sulphides and release of contaminants adsorbed to particles or organic matter.
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 Schedule B(3).
Porewater Extraction	EN82	SOIL	Extraction of porewater from sediment samples using centrifuge.

Preparation Methods	Method	Matrix	Method Descriptions
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
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/ Sample Cleanup	ORG17A-UTP	SOIL	In house: Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na2SO4 and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG34	SOIL	In house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivitisated, extracted and the subtitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.
Organotin Sample Preparation	ORG35	SOIL	In house: 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2026597**	Page	: 1 of 16
Client	: **BMT COMMERCIAL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DARREN RICHARDSON	Telephone	: +61 7 3552 8639
Project	: Port of Brisbane SAP	Date Samples Received	: 09-Oct-2020
Site	: ----	Issue Date	: 06-Nov-2020
Sampler	: BRAD HILES	No. of samples received	: 18
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.**
- **Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.**

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-SD: BTEXN	QC-3303315-002	----	**ortho-Xylene**	95-47-6	108 %	68.0-105%	**Recovery greater than upper control limit**
Matrix Spike (MS) Recoveries							
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons	EB2026597--005	B6-3	**C6 - C9 Fraction**	----	59.1 %	70.0-130%	**Recovery less than lower data quality objective**
EP080-SD / EP071-SD: Total Recoverable Hydrocarbor	EB2026597--005	B6-3	**C6 - C10 Fraction**	C6_C10	58.1 %	70.0-130%	**Recovery less than lower data quality objective**
EP080-SD: BTEXN	EB2026597--005	B6-3	**Benzene**	71-43-2	62.2 %	70.0-130%	**Recovery less than lower data quality objective**
EP080-SD: BTEXN	EB2026597--005	B6-3	**Toluene**	108-88-3	67.5 %	70.0-130%	**Recovery less than lower data quality objective**
EP090: Organotin Compounds	EB2026597--002	B7-1	**Monobutyltin**	78763-54-9	3.82 %	20.0-130%	**Recovery less than lower data quality objective**

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	EB2026597-016	B5-0 Pore Water	**Tripropyltin**	----	8.69 %	24.0-116 %	**Recovery less than lower data quality objective**
EP090S: Organotin Surrogate	EB2026597-017	B4-0 Pore Water	**Tripropyltin**	----	19.0 %	24.0-116 %	**Recovery less than lower data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser						
Soil Glass Jar - Unpreserved B7-1, B6-3, B5-1, B5-1B, B5-0	----	----	----	19-Oct-2020	17-Oct-2020	**2**
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)						
Non-Volatile Leach: 14 day HT(e.g. SV organics) B5-1B, B5-0, B4-0, B4-4, Elutriate Blank	28-Oct-2020	23-Oct-2020	**5**	----	----	----
EN82: Porewater Extraction						

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Due for extraction	Days overdue	Analysis: Date analysed	Due for analysis	Days overdue
EN82: Porewater Extraction - Analysis Holding Time Compliance						
Non-Volatile Leach: 14 day HT(e.g. SV organics)						
B5-0 - Pore Water, B4-0 - Pore Water	28-Oct-2020	23-Oct-2020	**5**	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Soil Particle Density	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Total Metals by ICP-AES	0	12	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Organotin Compounds (Soluble)	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Organotin Compounds (Soluble)	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: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA029-A: pH Measurements							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓

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*
EA029-B: Acidity Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
EA029-C: Sulfur Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
EA029-D: Calcium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
EA029-E: Magnesium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
EA029-F: Excess Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
EA029-G: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓

Work Order : EB2026597
Client : BMT COMMERCIAL AUSTRALIA PTY LTD
Project : Port of Brisbane SAP

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
EA029-H: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA029) B9-1	**08-Oct-2020**	**22-Oct-2020**	04-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA029) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	05-Jul-2023	✓	**22-Oct-2020**	20-Jan-2021	✓
EA033-A: Actual Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033) B9-1	**08-Oct-2020**	**22-Oct-2020**	08-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	09-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
EA033-B: Potential Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033) B9-1	**08-Oct-2020**	**22-Oct-2020**	08-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	09-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
EA033-C: Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA033) B9-1	**08-Oct-2020**	**22-Oct-2020**	08-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	09-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
EA033-D: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033) B9-1	**08-Oct-2020**	**22-Oct-2020**	08-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	09-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
EA033-E: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA033) B9-1	**08-Oct-2020**	**22-Oct-2020**	08-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**22-Oct-2020**	09-Oct-2021	✓	**22-Oct-2020**	20-Jan-2021	✓

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 (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
B8-3,	B7-1,	**09-Oct-2020**	**----**	----	----	**12-Oct-2020**	23-Oct-2020	✓
B6-2,	B6-2B,							
B6-3,	B5-1,							
B5-1B,	B5-0,							
B4-0,	B4-4,							
B2-0,	BC-2							
EA150: Particle Sizing								
Snap Lock Bag (EA150H)								
B9-1		**08-Oct-2020**	**----**	----	----	**23-Oct-2020**	06-Apr-2021	✓
Snap Lock Bag (EA150H)								
B8-3,	B7-1,	**09-Oct-2020**	**----**	----	----	**23-Oct-2020**	07-Apr-2021	✓
B6-2,	B6-2B,							
B6-3,	B5-1,							
B5-1B,	B5-0,							
B4-0,	B4-4,							
B2-0,	BC-2							
EA150: Soil Classification based on Particle Size								
Snap Lock Bag (EA150H)								
B9-1		**08-Oct-2020**	**----**	----	----	**23-Oct-2020**	06-Apr-2021	✓
Snap Lock Bag (EA150H)								
B8-3,	B7-1,	**09-Oct-2020**	**----**	----	----	**23-Oct-2020**	07-Apr-2021	✓
B6-2,	B6-2B,							
B6-3,	B5-1,							
B5-1B,	B5-0,							
B4-0,	B4-4,							
B2-0,	BC-2							
EA152: Soil Particle Density								
Snap Lock Bag (EA152)								
B9-1		**08-Oct-2020**	**----**	----	----	**23-Oct-2020**	06-Apr-2021	✓
Snap Lock Bag (EA152)								
B8-3,	B7-1,	**09-Oct-2020**	**----**	----	----	**23-Oct-2020**	07-Apr-2021	✓
B6-2,	B6-2B,							
B6-3,	B5-1,							
B5-1B,	B5-0,							
B4-0,	B4-4,							
B2-0,	BC-2							

Matrix: **SOIL**

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

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
B8-3, B7-1, B6-2, B6-2B, B6-3, B5-1, B5-1B, B5-0, B4-0, B4-4, B2-0, BC-2	**09-Oct-2020**	**15-Oct-2020**	07-Apr-2021	✓	**22-Oct-2020**	07-Apr-2021	✓
EG020-SD: Total Metals in Sediments by ICPMS							
Soil Glass Jar - Unpreserved (EG020-SD)							
B8-3, B7-1, B6-2, B6-2B, B6-3, B5-1, B5-1B, B5-0, B4-0, B4-4, B2-0, BC-2	**09-Oct-2020**	**15-Oct-2020**	07-Apr-2021	✓	**22-Oct-2020**	07-Apr-2021	✓
EG035T: Total Recoverable Mercury by FIMS (Low Level)							
Soil Glass Jar - Unpreserved (EG035T-LL)							
B8-3, B7-1, B6-2, B6-2B, B6-3, B5-1, B5-1B, B5-0, B4-0, B4-4, B2-0, BC-2	**09-Oct-2020**	**15-Oct-2020**	06-Nov-2020	✓	**22-Oct-2020**	06-Nov-2020	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK059G)							
B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**15-Oct-2020**	06-Nov-2020	✓	**19-Oct-2020**	17-Oct-2020	✗
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Soil Glass Jar - Unpreserved (EK061G)							
B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**15-Oct-2020**	06-Nov-2020	✓	**21-Oct-2020**	12-Nov-2020	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK067G)							
B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**15-Oct-2020**	06-Nov-2020	✓	**21-Oct-2020**	12-Nov-2020	✓

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
EN68: Seawater Elutriate Testing Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN68a-G) B5-1B, B5-0, B4-0, B4-4, Elutriate Blank	**09-Oct-2020**	**28-Oct-2020**	23-Oct-2020	×	----	----	----
EN82: Porewater Extraction							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN82) B5-0 - Pore Water, B4-0 - Pore Water	**09-Oct-2020**	**28-Oct-2020**	23-Oct-2020	×	----	----	----
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag (EP003) B8-3, B7-1, B6-2, B6-2B, B6-3, B5-1, B5-1B, B5-0, B4-0, B4-4, B2-0, BC-2	**09-Oct-2020**	**29-Oct-2020**	06-Nov-2020	✓	**29-Oct-2020**	06-Nov-2020	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) Trip blank	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Oct-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) Trip blank	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Oct-2020	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) Trip blank	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Oct-2020	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080-SD) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Oct-2020	✓
Soil Glass Jar - Unpreserved (EP071-SD-SV) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**15-Oct-2020**	23-Oct-2020	✓	**19-Oct-2020**	24-Nov-2020	✓

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-SD / EP071-SD: Total Recoverable Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080-SD)								
B7-1, B5-1, B5-0	B6-3, B5-1B,	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Oct-2020	✓
Soil Glass Jar - Unpreserved (EP071-SD-SV)								
B7-1, B5-1, B5-0	B6-3, B5-1B,	**09-Oct-2020**	**15-Oct-2020**	23-Oct-2020	✓	**19-Oct-2020**	24-Nov-2020	✓
EP080-SD: BTEXN								
Soil Glass Jar - Unpreserved (EP080-SD)								
B7-1, B5-1, B5-0	B6-3, B5-1B,	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Oct-2020	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved (EP090)								
B8-3, B6-2, B6-3, B5-1B, B4-0, B2-0,	B7-1, B6-2B, B5-1, B5-0, B4-4, BC-2	**09-Oct-2020**	**15-Oct-2020**	23-Oct-2020	✓	**20-Oct-2020**	24-Nov-2020	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Soil Glass Jar - Unpreserved (EP130)								
B4-0, B2-0,	B4-4, BC-2	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP130)								
B8-3, B6-2, B6-3, B5-1B,	B7-1, B6-2B, B5-1, B5-0	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**16-Oct-2020**	23-Nov-2020	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved (EP131A)								
B4-0, B2-0,	B4-4, BC-2	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**15-Oct-2020**	23-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP131A)								
B8-3, B6-2, B6-3, B5-1B,	B7-1, B6-2B, B5-1, B5-0	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**16-Oct-2020**	23-Nov-2020	✓

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*
EP131B: Polychlorinated Biphenyls (as Aroclors)							
Soil Glass Jar - Unpreserved (EP131B) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**16-Oct-2020**	23-Nov-2020	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP132B-SD) B7-1, B6-3, B5-1, B5-1B, B5-0	**09-Oct-2020**	**14-Oct-2020**	23-Oct-2020	✓	**14-Oct-2020**	23-Nov-2020	✓

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*
EP090: Organotin Compounds (Soluble)							
Amber Glass Bottle - Unpreserved (EP090S) B5-0 - Pore Water, B4-0 - Pore Water	**28-Oct-2020**	**04-Nov-2020**	04-Nov-2020	✓	**05-Nov-2020**	14-Dec-2020	✓
Amber Glass Bottle - Unpreserved (EP090S) B5-1B, B5-0, B4-0, B4-4, Elutriate Blank	**28-Oct-2020**	**30-Oct-2020**	04-Nov-2020	✓	**30-Oct-2020**	09-Dec-2020	✓

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)							
Chromium Suite for Acid Sulphate Soils	EA033	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	3	24	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	3	24	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	5	**40.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	12	**8.33**	**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 / *Analytical Methods*	*Method*	*Count* QC	*Count* Regular	*Rate (%)* Actual	*Rate (%)* Expected	*Evaluation*	*Quality Control Specification*
Laboratory Control Samples (LCS) - Continued							
Total Metals in Sediments by ICPMS	EG020-SD	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	5	**40.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Seawater Elutriate Testing Procedure - Glass Leaching Vessel	EN68a-G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	0	12	**0.00**	**5.00**	✘	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	12	**8.33**	**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*	
Matrix Spikes (MS) - Continued							
Total Phosporus By Discrete Analyser	EK067G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fractions Only	EP071-SD-SV	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	5	**20.00**	**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*	
Laboratory Duplicates (DUP)							
Organotin Compounds (Soluble)	EP090S	0	8	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Organotin Compounds (Soluble)	EP090S	2	8	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Organotin Compounds (Soluble)	EP090S	2	8	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Organotin Compounds (Soluble)	EP090S	0	8	**0.00**	**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*
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	In house: Referenced to Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1: 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 Schedule B(3)
Total Metals in Sediments by ICPMS	EG020-SD	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. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	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 Schedule B(3)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Thermo Scientific Method D08727 and NEMI (National Environmental Method Index) Method ID: 9171. This method covers the determination of total oxidised nitrogen (NOx-N) and nitrate (NO3-N) by calculation, Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by 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.

Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
TPH - Semivolatile Fractions Only	EP071-SD-SV	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
TRH Volatiles/BTEX in Sediments	EP080-SD	SOIL	In house: Referenced to USEPA SW 846 - 8260 Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Organotin Analysis	EP090	SOIL	In house: Referenced to USEPA SW 846 - 8270 Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quanitified against an established calibration curve.
Organotin Compounds (Soluble)	EP090S	SOIL	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM Schedule B(3)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/µECD/µECD) This technique is compliant with NEPM Schedule B(3)
PCB's (Ultra-trace)	EP131B	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/µECD/µECD) This technique is compliant with NEPM Schedule B(3)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	In house: Referenced to USEPA 8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.

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.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade 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.
Seawater Elutriate Testing Procedure - Glass Leaching Vessel	EN68a-G	SOIL	USEPA Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Guide, EPA-503/8-91/001, USEPA and US Army Corps of Engineers. ANZECC Interim Ocean Disposal Guidelines This Procedure outlines the preparation of leachate designed to simulate release of contaminants from sediment during the disposal of dredged material. Release can occur by physical processes or a variety of chemical changes such as oxidation of metal sulphides and release of contaminants adsorbed to particles or organic matter.
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 Schedule B(3).
Porewater Extraction	EN82	SOIL	Extraction of porewater from sediment samples using centrifuge.

Preparation Methods	Method	Matrix	Method Descriptions
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
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/ Sample Cleanup	ORG17A-UTP	SOIL	In house: Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na2SO4 and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG34	SOIL	In house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivitisated, extracted and the subtitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.
Organotin Sample Preparation	ORG35	SOIL	In house: 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.

CERTIFICATE OF ANALYSIS

Work Order	: **EB1923231**	Page	: 1 of 15
Client	: **BMT EASTERN AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DR DARREN RICHARDSON	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	: B23621 Port of Brisbane	Date Samples Received	: 04-Sep-2019 15:05
Order number	:	Date Analysis Commenced	: 09-Sep-2019
C-O-C number	: ----	Issue Date	: 27-Sep-2019 16:34
Sampler	: GRACE BOURKE, Wills Brassil		
Site	: ----		
Quote number	: BN/016/19		
No. of samples received	: 33		
No. of samples analysed	: 29		

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 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*
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
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 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.

- EG035T-LL (Total Mercury by FIMS - Low Level): Limit of reporting for sample EB1923231-033 (B6-2) was raised due to insufficient sample volume.
- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders (EB1923225, EB1923230, EB1923231) due to the size of the sample numbers and analysis requested. Standard as-received analysis will be reported under EB1923225, Radionuclide analysis under EB1923230, and Elutriate/Porewater analysis under EB1923231. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**
- EP090S (TBT): Insufficient porewater was recoverable for standard analysis. Where applicable LOR values have been adjusted accordingly.
- EP090S: High surrogate recovery deemed acceptable as all associated analyte results are less than LOR
- EG093-T (Total Metals in Saline Water by ORC-ICP-MS): Limit of reporting raised for sample EB1923231-020 (B11-8A) due to matrix interference.
- EG035T-LL (Total Mercury Low Level): Sample EB1923231-031 and -036 have insufficient sample remaining to perform positive result check.
- EN68: This analysis in accordance with National Ocean Disposal Guidelines, Commonwealth of Australia, 2002 - (modified). Results reported are those determined on a 1:4 sediment/seawater elutriate without blank correction.
- EG093: Samples containing high levels of sulfate may precipitate barium under the acidic conditions of this method and may therefore bias results low.

Analytical Results

Sub-Matrix: ELUTRIATE (Matrix: WATER)			Client sample ID	B12-1	B11-8A	B11-8B	B11-9	B10-6
			Client sampling date / time	02-Sep-2019 10:45	02-Sep-2019 11:25	02-Sep-2019 11:25	02-Sep-2019 11:50	02-Sep-2019 12:40
Compound	CAS Number	LOR	Unit	EB1923231-001	EB1923231-002	EB1923231-003	EB1923231-004	EB1923231-005
				Result	Result	Result	Result	Result
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Nickel	7440-02-0	0.5	µg/L	**1.0**	**0.6**	**0.9**	**2.2**	**0.9**
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	<2	<2	<2	<2
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**88.1**	**79.4**	**143**	**77.9**	**61.3**

Analytical Results

Sub-Matrix: ELUTRIATE (Matrix: WATER)			Client sample ID	B10-5A	B10-5B	B8-3	B10-8	B7-1
			Client sampling date / time	02-Sep-2019 13:10	02-Sep-2019 13:10	02-Sep-2019 14:05	03-Sep-2019 13:00	04-Sep-2019 07:20
Compound	CAS Number	LOR	Unit	EB1923231-006	EB1923231-007	EB1923231-008	EB1923231-013	EB1923231-014
				Result	Result	Result	Result	Result
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Nickel	7440-02-0	0.5	µg/L	**1.8**	**1.2**	**2.4**	**1.1**	<0.5
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	<2	<2	<2	<2
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**51.3**	**68.5**	**74.4**	**53.8**	**97.8**

Analytical Results

Sub-Matrix: ELUTRIATE (Matrix: WATER)			Client sample ID	B6-2	B5-0A	B5-0B	B4-0	Elutriate Blank
			Client sampling date / time	04-Sep-2019 07:45	04-Sep-2019 10:20	04-Sep-2019 10:20	04-Sep-2019 10:30	02-Sep-2019 00:00
Compound	CAS Number	LOR	Unit	EB1923231-015	EB1923231-016	EB1923231-017	EB1923231-018	EB1923231-037
				Result	Result	Result	Result	Result
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Nickel	7440-02-0	0.5	µg/L	**1.7**	**0.5**	<0.5	**1.0**	<0.5
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	**5**	<2	<2	<2
EP090S: Organotin Surrogate								
Tripropyltin	----	5	%	**73.9**	**78.1**	**77.5**	**80.6**	**102**

Analytical Results

Sub-Matrix: PORE WATER (Matrix: WATER)			Client sample ID	B12-1 Pore Water	B11-8A Pore Water	B11-8B Pore Water	B11-9 Pore Water	B10-6 Pore Water
			Client sampling date / time	02-Sep-2019 01:04	02-Sep-2019 11:25	02-Sep-2019 11:25	02-Sep-2019 11:50	02-Sep-2019 12:40
Compound	CAS Number	LOR	Unit	EB1923231-019	EB1923231-020	EB1923231-021	EB1923231-022	EB1923231-023
				Result	Result	Result	Result	Result
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Nickel	7440-02-0	0.5	µg/L	**2.3**	<2.6	**2.6**	**1.7**	**12.8**
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<3	<3	<3	<7	<8
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
alpha-BHC	319-84-6	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
beta-BHC	319-85-7	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	319-86-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
4.4`-DDD	72-54-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
4.4`-DDE	72-55-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
4.4`-DDT	50-29-3	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Dieldrin	60-57-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
alpha-Endosulfan	959-98-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
beta-Endosulfan	33213-65-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	1031-07-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Endosulfan (sum)	115-29-7	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin	72-20-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin aldehyde	7421-93-4	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	53494-70-5	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Heptachlor	76-44-8	0.005	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	1024-57-3	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Hexachlorobenzene (HCB)	118-74-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
gamma-BHC	58-89-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Methoxychlor	72-43-5	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
cis-Chlordane	5103-71-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	5103-74-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Total Chlordane (sum)	----	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Oxychlordane	27304-13-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
EP090S: Organotin Surrogate								

Analytical Results

Sub-Matrix: **PORE WATER** (Matrix: **WATER**)			Client sample ID	**B12-1 Pore Water**	**B11-8A Pore Water**	**B11-8B Pore Water**	**B11-9 Pore Water**	**B10-6 Pore Water**
			Client sampling date / time	02-Sep-2019 01:04	02-Sep-2019 11:25	02-Sep-2019 11:25	02-Sep-2019 11:50	02-Sep-2019 12:40
Compound	*CAS Number*	*LOR*	*Unit*	**EB1923231-019**	**EB1923231-020**	**EB1923231-021**	**EB1923231-022**	**EB1923231-023**
				Result	Result	Result	Result	Result
EP090S: Organotin Surrogate - Continued								
Tripropyltin	----	5	%	**53.4**	**65.4**	**68.7**	**43.3**	**72.4**
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.010	%	**89.4**	**93.0**	**83.6**	**82.0**	**90.9**

Analytical Results

Sub-Matrix: PORE WATER (Matrix: WATER)			Client sample ID	B10-5A Pore Water	B10-5B Pore Water	B8-3 Pore Water	B10-8 Pore Water	B7-1 Pore Water
			Client sampling date / time	02-Sep-2019 13:10	02-Sep-2019 13:10	02-Sep-2019 14:05	03-Sep-2019 13:00	04-Sep-2019 07:20
Compound	CAS Number	LOR	Unit	EB1923231-024	EB1923231-025	EB1923231-026	EB1923231-031	EB1923231-032
				Result	Result	Result	Result	Result
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	**0.00005**	<0.00004
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Nickel	7440-02-0	0.5	µg/L	**7.0**	**5.6**	**17.3**	**20.6**	**8.4**
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<5	<9	<4	<8	<5
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
alpha-BHC	319-84-6	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
beta-BHC	319-85-7	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	319-86-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
4.4`-DDD	72-54-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
4.4`-DDE	72-55-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
4.4`-DDT	50-29-3	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Dieldrin	60-57-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
alpha-Endosulfan	959-98-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
beta-Endosulfan	33213-65-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	1031-07-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Endosulfan (sum)	115-29-7	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin	72-20-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin aldehyde	7421-93-4	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	53494-70-5	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Heptachlor	76-44-8	0.005	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	1024-57-3	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Hexachlorobenzene (HCB)	118-74-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
gamma-BHC	58-89-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Methoxychlor	72-43-5	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
cis-Chlordane	5103-71-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	5103-74-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Total Chlordane (sum)	----	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Oxychlordane	27304-13-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
EP090S: Organotin Surrogate								

Analytical Results

Sub-Matrix: PORE WATER (Matrix: WATER)			Client sample ID	B10-5A Pore Water	B10-5B Pore Water	B8-3 Pore Water	B10-8 Pore Water	B7-1 Pore Water
			Client sampling date / time	02-Sep-2019 13:10	02-Sep-2019 13:10	02-Sep-2019 14:05	03-Sep-2019 13:00	04-Sep-2019 07:20
Compound	*CAS Number*	*LOR*	*Unit*	EB1923231-024	EB1923231-025	EB1923231-026	EB1923231-031	EB1923231-032
				Result	Result	Result	Result	Result
EP090S: Organotin Surrogate - Continued								
Tripropyltin	----	5	%	**46.0**	**67.7**	**61.7**	**49.6**	**71.7**
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.010	%	**88.6**	**92.0**	**112**	**95.9**	**85.8**

Analytical Results

Sub-Matrix: PORE WATER (Matrix: WATER)			Client sample ID	B6-2 Pore Water	B5-0A Pore Water	B5-0B Pore Water	B4-0 Pore Water	----
			Client sampling date / time	04-Sep-2019 07:45	04-Sep-2019 10:20	04-Sep-2019 10:20	04-Sep-2019 10:30	----
Compound	CAS Number	LOR	Unit	EB1923231-033	EB1923231-034	EB1923231-035	EB1923231-036	--------
				Result	Result	Result	Result	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00020	<0.00004	<0.00004	**0.00004**	----
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Nickel	7440-02-0	0.5	µg/L	**2.5**	**7.8**	**3.4**	**18.4**	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<5	<7	<6	<10	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
alpha-BHC	319-84-6	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
beta-BHC	319-85-7	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
delta-BHC	319-86-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
4.4`-DDD	72-54-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
4.4`-DDE	72-55-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
4.4`-DDT	50-29-3	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Dieldrin	60-57-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
alpha-Endosulfan	959-98-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
beta-Endosulfan	33213-65-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Endosulfan sulfate	1031-07-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
^ Endosulfan (sum)	115-29-7	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Endrin	72-20-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Endrin aldehyde	7421-93-4	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Endrin ketone	53494-70-5	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Heptachlor	76-44-8	0.005	µg/L	<0.005	<0.005	<0.005	<0.005	----
Heptachlor epoxide	1024-57-3	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Hexachlorobenzene (HCB)	118-74-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
gamma-BHC	58-89-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Methoxychlor	72-43-5	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
cis-Chlordane	5103-71-9	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
trans-Chlordane	5103-74-2	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
^ Total Chlordane (sum)	----	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
Oxychlordane	27304-13-8	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
EP090S: Organotin Surrogate								

Analytical Results

Sub-Matrix: PORE WATER (Matrix: WATER)			Client sample ID	B6-2 Pore Water	B5-0A Pore Water	B5-0B Pore Water	B4-0 Pore Water	----
			Client sampling date / time	04-Sep-2019 07:45	04-Sep-2019 10:20	04-Sep-2019 10:20	04-Sep-2019 10:30	----
Compound	CAS Number	LOR	Unit	EB1923231-033	EB1923231-034	EB1923231-035	EB1923231-036	--------
				Result	Result	Result	Result	----
EP090S: Organotin Surrogate - Continued								
Tripropyltin	----	5	%	58.8	67.8	72.1	58.2	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.010	%	92.0	86.6	84.6	109	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B12-1	B11-8A	B11-8B	B11-9	B10-6
			Client sampling date / time	02-Sep-2019 10:45	02-Sep-2019 11:25	02-Sep-2019 11:25	02-Sep-2019 11:50	02-Sep-2019 12:40
Compound	CAS Number	LOR	Unit	EB1923231-001	EB1923231-002	EB1923231-003	EB1923231-004	EB1923231-005
				Result	Result	Result	Result	Result
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	-	-	25/09/2019	25/09/2019	25/09/2019	25/09/2019	25/09/2019

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B10-5A	B10-5B	B8-3	B10-8	B7-1
			Client sampling date / time	02-Sep-2019 13:10	02-Sep-2019 13:10	02-Sep-2019 14:05	03-Sep-2019 13:00	04-Sep-2019 07:20
Compound	CAS Number	LOR	Unit	EB1923231-006	EB1923231-007	EB1923231-008	EB1923231-013	EB1923231-014
				Result	Result	Result	Result	Result
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	-	-	25/09/2019	25/09/2019	25/09/2109	25/09/2019	25/09/2019

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B6-2	B5-0A	B5-0B	B4-0	Elutriate Blank
			Client sampling date / time	04-Sep-2019 07:45	04-Sep-2019 10:20	04-Sep-2019 10:20	04-Sep-2019 10:30	02-Sep-2019 00:00
Compound	CAS Number	LOR	Unit	EB1923231-015	EB1923231-016	EB1923231-017	EB1923231-018	EB1923231-037
				Result	Result	Result	Result	Result
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	-	-	25/09/2019	25/09/2019	25/09/2019	25/09/2019	25/09/2019

Surrogate Control Limits

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	Recovery Limits (%) Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116

Sub-Matrix: **PORE WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	14	166

CERTIFICATE OF ANALYSIS

Work Order	: **EB1925939**	Page	: 1 of 5
Client	: **BMT COMMERCIAL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DR DARREN RICHARDSON	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	: B23621 Port of Brisbane	Date Samples Received	: 24-Sep-2019 18:37
Order number	: ----	Date Analysis Commenced	: 01-Oct-2019
C-O-C number	: ----	Issue Date	: 10-Oct-2019 16:07
Sampler	: GRACE BOURKE, WILLS BRASSIL		
Site	: ----		
Quote number	: BN/016/19		
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

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

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.

- EG035-SDH (1M HCl Extractable Mercury by FIMS): Sample EB1925939-013 (B4-4) shows poor matrix spike recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- EG035-SDH (1M HCl Extractable Mercury) : EB1925939-013 shows poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B15-1	B11-8	B9-1	B8-3	RF2
			Client sampling date / time	02-Sep-2019 10:10	02-Sep-2019 11:25	02-Sep-2019 13:45	02-Sep-2019 14:05	03-Sep-2019 08:00
Compound	CAS Number	LOR	Unit	EB1925939-001	EB1925939-002	EB1925939-003	EB1925939-004	EB1925939-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**47.5**	**53.6**	**35.5**	**55.0**	**54.4**
EG005(ED093)-SDH: 1M HCl-Extractable Metals by ICPAES								
Nickel	7440-02-0	1.0	mg/kg	**8.6**	**7.5**	**7.3**	**8.2**	**8.2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	RF6	RF3	RF7	B10-8	B5-2
			Client sampling date / time	03-Sep-2019 08:20	03-Sep-2019 08:35	03-Sep-2019 08:55	03-Sep-2019 13:00	04-Sep-2019 08:07
Compound	CAS Number	LOR	Unit	EB1925939-006	EB1925939-007	EB1925939-008	EB1925939-009	EB1925939-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**52.2**	**64.4**	**59.3**	**57.4**	**55.4**
EG005(ED093)-SDH: 1M HCl-Extractable Metals by ICPAES								
Nickel	7440-02-0	1.0	mg/kg	**7.4**	**8.9**	**8.7**	**8.8**	**11.6**
EG035-SDH: 1M HCl extractable Mercury by FIMS								
Mercury	7439-97-6	0.10	mg/kg	----	----	----	----	<0.10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B5-0	B4-0	B4-4	B5-3	----
			Client sampling date / time	04-Sep-2019 10:20	04-Sep-2019 10:30	04-Sep-2019 10:45	04-Sep-2019 09:00	----
Compound	CAS Number	LOR	Unit	EB1925939-011	EB1925939-012	EB1925939-013	EB1925939-014	--------
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**60.5**	**58.4**	**64.3**	**56.0**	----
EG005(ED093)-SDH: 1M HCl-Extractable Metals by ICPAES								
Nickel	7440-02-0	1.0	mg/kg	**11.6**	**10.9**	**10.2**	----	----
EG035-SDH: 1M HCl extractable Mercury by FIMS								
Mercury	7439-97-6	0.10	mg/kg	----	----	<0.10	<0.10	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1923230**	Page	: 1 of 5
Client	: **BMT EASTERN AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DR DARREN RICHARDSON	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	: B23621 Port of Brisbane	Date Samples Received	: 04-Sep-2019 15:05
Order number	:	Date Analysis Commenced	: 06-Sep-2019
C-O-C number	: ----	Issue Date	: 30-Sep-2019 12:32
Sampler	: GRACE BOURKE, Wills Brassil		
Site	: ----		
Quote number	: BN/016/19		
No. of samples received	: 15		
No. of samples analysed	: 15		

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 Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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 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 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.

- Radiological work undertaken by ALS Laboratory Group (Ceska Lipa) under CAI accreditation No. L1163. Report No. $$. NATA and CAI accreditations' are both recognised under ILAC.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B15-3	B15-2	B12-1	B11-8	B10-6
			Client sampling date / time	02-Sep-2019 09:20	02-Sep-2019 09:50	02-Sep-2019 10:45	02-Sep-2019 11:25	02-Sep-2019 12:40
Compound	CAS Number	LOR	Unit	EB1923230-001	EB1923230-002	EB1923230-005	EB1923230-007	EB1923230-011
				Result	Result	Result	Result	Result
Radionuclides / Activity								
Gross alpha	----	500	Bq/kg DW	<500	<500	<500	<500	<500
Gross beta	----	500	Bq/kg DW	<500	<500	<500	<500	<500

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B10-7	B9-1	B13-8	B13-1	B7-1
			Client sampling date / time	02-Sep-2019 12:40	02-Sep-2019 13:45	03-Sep-2019 10:05	03-Sep-2019 12:10	04-Sep-2019 07:20
Compound	CAS Number	LOR	Unit	EB1923230-012	EB1923230-014	EB1923230-022	EB1923230-029	EB1923230-032
				Result	Result	Result	Result	Result
Radionuclides / Activity								
Gross alpha	----	500	Bq/kg DW	<500	<500	<500	<500	<500
Gross beta	----	500	Bq/kg DW	**500**	<500	<500	**560**	**510**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**B6-3**	**B5-1**	**B5-2**	**B5-3**	**B5-0**
			Client sampling date / time	04-Sep-2019 08:05	04-Sep-2019 08:35	04-Sep-2019 08:45	04-Sep-2019 09:00	04-Sep-2019 10:20
Compound	CAS Number	LOR	Unit	**EB1923230-035**	**EB1923230-036**	**EB1923230-037**	**EB1923230-038**	**EB1923230-039**
				Result	Result	Result	Result	Result
Radionuclides / Activity								
Gross alpha	----	500	Bq/kg DW	<500	**640**	<500	**600**	**570**
Gross beta	----	500	Bq/kg DW	<500	**540**	**510**	<500	**510**

microanalysis australia

37 Kensington Street
East Perth
WA 6004

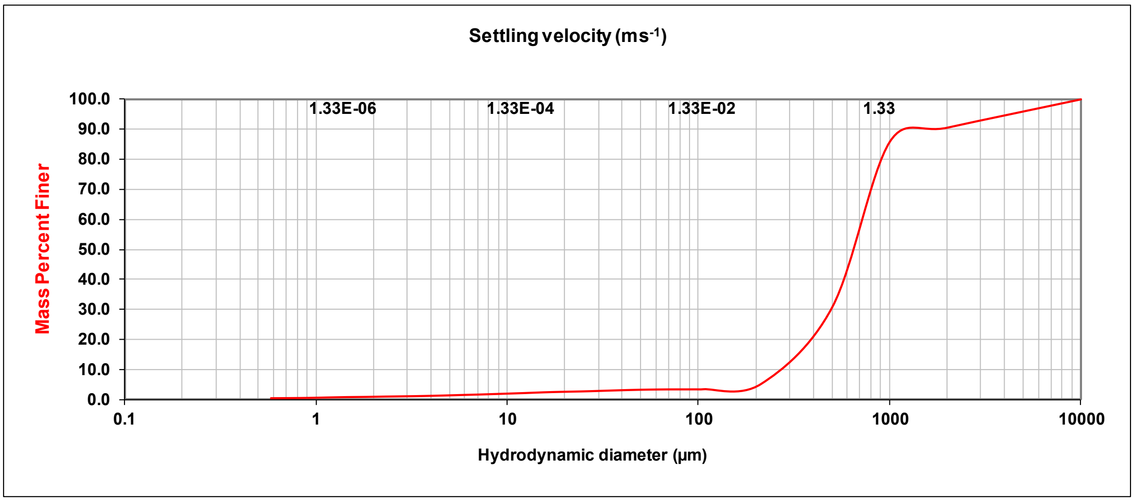
Client: BMT Eastern Australia Pty Ltd
Client ID: B2-0
Job No: 19_1531
Laboratory ID: 19_1531_41

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate

Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp

Critical diameter: 54.36 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	9.4	1.64E+01	12.23	9.17	0.3	9.20E-05
2000.00	1000.00	4.7	1.64E+00	9.17	7.29	0.2	5.48E-05
1000.00	500.00	55.2	4.10E-01	7.29	5.79	0.2	3.46E-05
500.00	212.00	25.6	8.69E-02	5.79	4.60	0.2	2.18E-05
212.00	106.00	1.7	1.84E-02	4.60	3.65	0.2	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	0.1	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	0.1	5.47E-06
77.18	61.31	0.0	3.88E-03	2.30	1.83	0.1	3.45E-06
61.31	48.70	0.1	2.45E-03	1.83	1.45	0.1	2.18E-06
48.70	38.68	0.2	1.54E-03	1.45	1.15	0.1	1.37E-06
38.68	30.73	0.2	9.75E-04	1.15	0.92	0.1	8.68E-07
30.73	24.41	0.2	6.15E-04	0.92	0.73	0.1	5.51E-07
24.41	19.39	0.1	3.88E-04	0.73	0.58	0.0	3.47E-07
19.39	15.40	0.2	2.45E-04	0.58	0.10	0.4	4.76E-08
15.40	12.23	0.2	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

Characterisation from the micro to the macro www.microanalysis.com.au

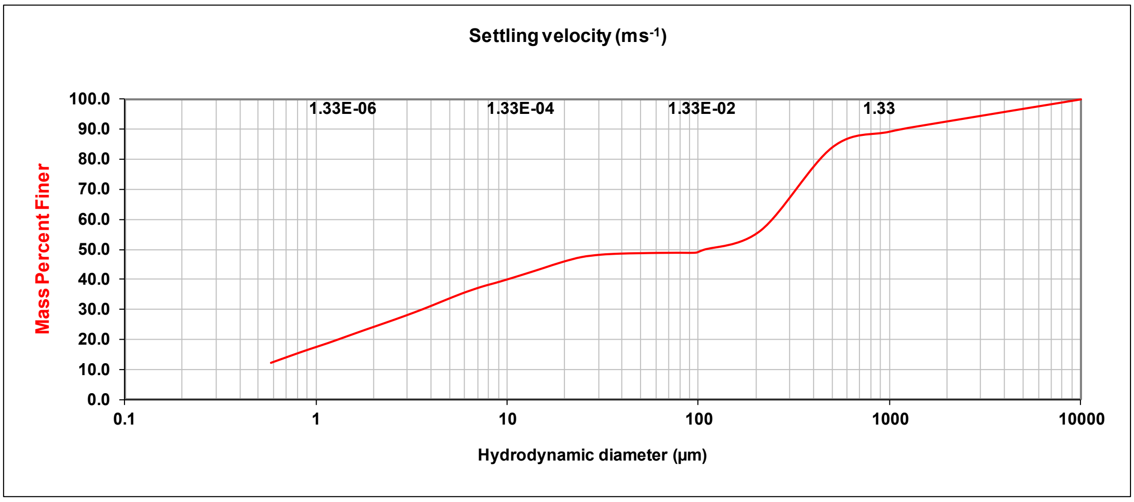
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: BC-2
Job No: 19_1531
Laboratory ID: 19_1531_40

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.36 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	7.4	1.64E+01	12.23	9.17	2.4	9.20E-05
2000.00	1000.00	3.4	1.64E+00	9.17	7.29	1.8	5.48E-05
1000.00	500.00	5.3	4.10E-01	7.29	5.79	2.2	3.46E-05
500.00	212.00	27.7	8.69E-02	5.79	4.60	2.5	2.18E-05
212.00	106.00	6.5	1.84E-02	4.60	3.65	2.6	1.38E-05
106.00	97.16	0.9	8.45E-03	3.65	2.90	2.4	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	2.3	5.47E-06
77.18	61.31	0.0	3.88E-03	2.30	1.83	2.2	3.45E-06
61.31	48.70	0.1	2.45E-03	1.83	1.45	2.3	2.18E-06
48.70	38.68	0.1	1.54E-03	1.45	1.15	2.3	1.37E-06
38.68	30.73	0.3	9.75E-04	1.15	0.92	2.0	8.68E-07
30.73	24.41	0.8	6.15E-04	0.92	0.73	2.2	5.51E-07
24.41	19.39	1.6	3.88E-04	0.73	0.58	2.3	3.47E-07
19.39	15.40	2.0	2.45E-04	0.58	0.10	12.1	4.76E-08
15.40	12.23	2.0	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

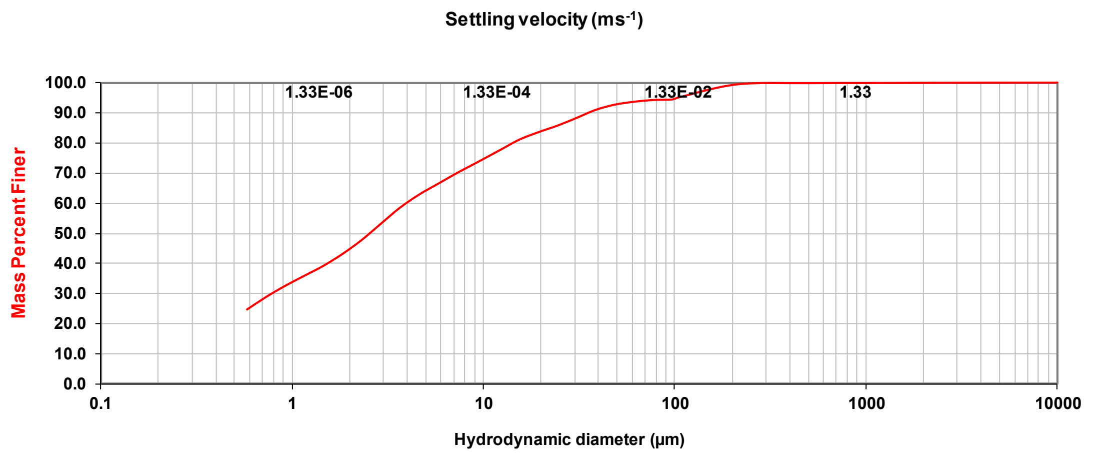
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B4-0
Job No: 19_1531
Laboratory ID: 19_1531_38

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.1	1.64E+01	12.23	9.17	4.3	9.20E-05
2000.00	1000.00	0.1	1.64E+00	9.17	7.29	3.3	5.48E-05
1000.00	500.00	0.0	4.10E-01	7.29	5.79	3.6	3.46E-05
500.00	212.00	0.4	8.69E-02	5.79	4.60	3.6	2.18E-05
212.00	106.00	4.2	1.84E-02	4.60	3.65	4.4	1.38E-05
106.00	97.16	0.8	8.45E-03	3.65	2.90	5.3	8.68E-06
97.16	77.18	0.2	6.15E-03	2.90	2.30	5.4	5.47E-06
77.18	61.31	0.6	3.88E-03	2.30	1.83	4.6	3.45E-06
61.31	48.70	1.0	2.45E-03	1.83	1.45	4.0	2.18E-06
48.70	38.68	1.7	1.54E-03	1.45	1.15	3.3	1.37E-06
38.68	30.73	2.7	9.75E-04	1.15	0.92	3.2	8.68E-07
30.73	24.41	2.6	6.15E-04	0.92	0.73	3.7	5.51E-07
24.41	19.39	2.2	3.88E-04	0.73	0.58	4.2	3.47E-07
19.39	15.40	2.5	2.45E-04	0.58	0.10	24.6	4.76E-08
15.40	12.23	3.4	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

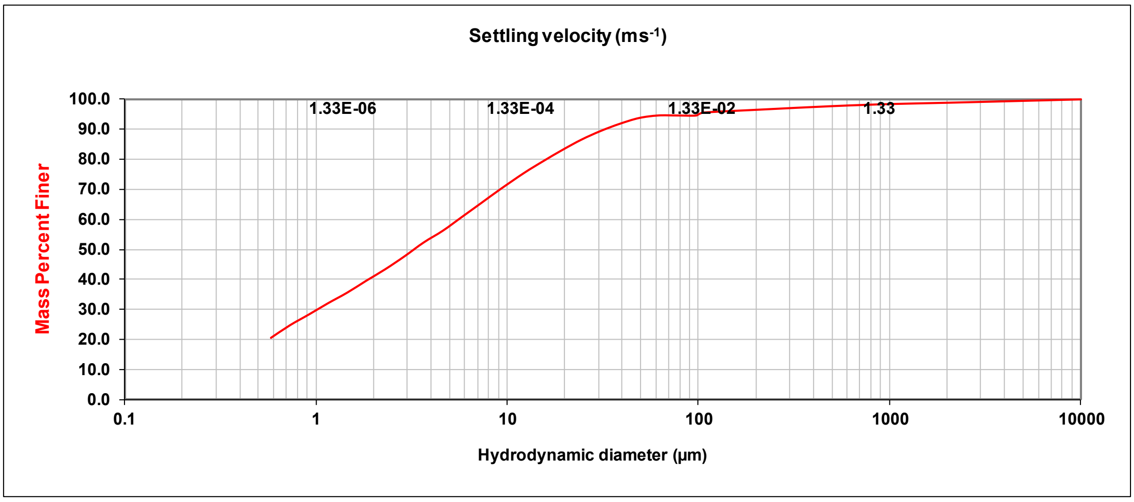
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B4-4
Job No: 19_1531
Laboratory ID: 19_1531_39

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.36 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	1.1	1.64E+01	12.23	9.17	5.4	9.20E-05
2000.00	1000.00	0.4	1.64E+00	9.17	7.29	4.6	5.48E-05
1000.00	500.00	0.7	4.10E-01	7.29	5.79	4.6	3.46E-05
500.00	212.00	1.1	8.69E-02	5.79	4.60	4.6	2.18E-05
212.00	106.00	1.0	1.84E-02	4.60	3.65	3.9	1.38E-05
106.00	97.16	1.0	8.45E-03	3.65	2.90	4.6	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	4.3	5.47E-06
77.18	61.31	0.0	3.88E-03	2.30	1.83	3.8	3.45E-06
61.31	48.70	0.9	2.45E-03	1.83	1.45	4.0	2.18E-06
48.70	38.68	1.9	1.54E-03	1.45	1.15	3.5	1.37E-06
38.68	30.73	2.4	9.75E-04	1.15	0.92	3.6	8.68E-07
30.73	24.41	2.9	6.15E-04	0.92	0.73	3.6	5.51E-07
24.41	19.39	3.4	3.88E-04	0.73	0.58	4.2	3.47E-07
19.39	15.40	3.7	2.45E-04	0.58	0.10	20.6	4.76E-08
15.40	12.23	3.9	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

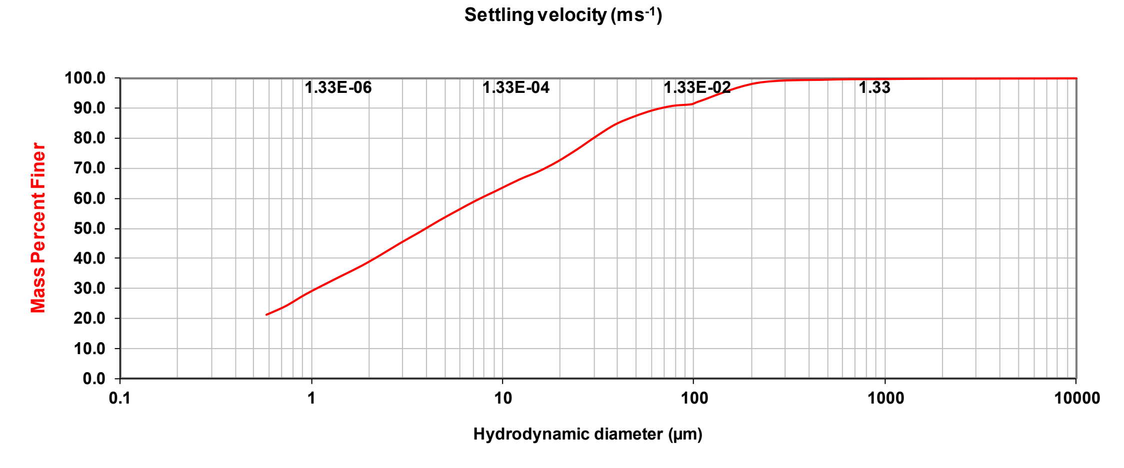
BMT

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B5-0
Job No: 19_1531
Laboratory ID: 19_1531_37

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.724 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.1	1.64E+01	12.23	9.17	3.9	9.20E-05
2000.00	1000.00	0.1	1.64E+00	9.17	7.29	3.0	5.48E-05
1000.00	500.00	0.2	4.10E-01	7.29	5.79	3.4	3.46E-05
500.00	212.00	1.1	8.69E-02	5.79	4.60	3.5	2.18E-05
212.00	106.00	6.1	1.84E-02	4.60	3.65	3.8	1.38E-05
106.00	97.16	0.9	8.45E-03	3.65	2.90	3.6	8.68E-06
97.16	77.18	0.6	6.15E-03	2.90	2.30	3.9	5.47E-06
77.18	61.31	1.4	3.88E-03	2.30	1.83	3.6	3.45E-06
61.31	48.70	2.1	2.45E-03	1.83	1.45	3.2	2.18E-06
48.70	38.68	2.7	1.54E-03	1.45	1.15	3.2	1.37E-06
38.68	30.73	4.0	9.75E-04	1.15	0.92	3.2	8.68E-07
30.73	24.41	4.3	6.15E-04	0.92	0.73	3.8	5.51E-07
24.41	19.39	4.0	3.88E-04	0.73	0.58	2.9	3.47E-07
19.39	15.40	3.3	2.45E-04	0.58	0.10	21.3	4.76E-08
15.40	12.23	2.7	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd

Client ID: B5-1

Job No: 19_1531

Laboratory ID: 19_1531_34

Analysis: X-ray sedimentation by Sedigraph 5100 — **Analysis temp.:** 35.7 °C

Dispersant: Water — **Sonication:** 10 min

Additives: 10 mL sodium hexametaphosphate — **Concentration:** ~5 % w/w

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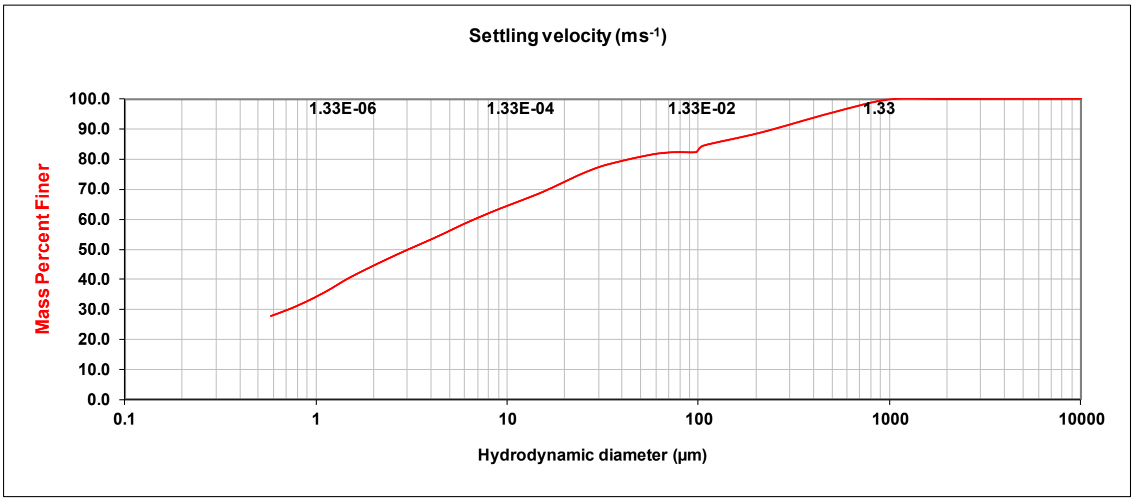
Sample density: 2.650 g/cm^3 (assumed)

Liquid density: 0.994 g/cm^3 — **Critical diameter:** 54.36 µm

Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.1	1.64E+01	12.23	9.17	3.0	9.20E-05
2000.00	1000.00	0.2	1.64E+00	9.17	7.29	2.6	5.48E-05
1000.00	500.00	4.4	4.10E-01	7.29	5.79	2.8	3.46E-05
500.00	212.00	6.6	8.69E-02	5.79	4.60	3.0	2.18E-05
212.00	106.00	4.4	1.84E-02	4.60	3.65	2.9	1.38E-05
106.00	97.16	2.1	8.45E-03	3.65	2.90	2.8	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	3.0	5.47E-06
77.18	61.31	0.5	3.88E-03	2.30	1.83	3.0	3.45E-06
61.31	48.70	1.2	2.45E-03	1.83	1.45	3.3	2.18E-06
48.70	38.68	1.4	1.54E-03	1.45	1.15	3.8	1.37E-06
38.68	30.73	1.7	9.75E-04	1.15	0.92	3.2	8.68E-07
30.73	24.41	2.4	6.15E-04	0.92	0.73	2.9	5.51E-07
24.41	19.39	3.0	3.88E-04	0.73	0.58	2.4	3.47E-07
19.39	15.40	3.0	2.45E-04	0.58	0.10	27.9	4.76E-08
15.40	12.23	2.5	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

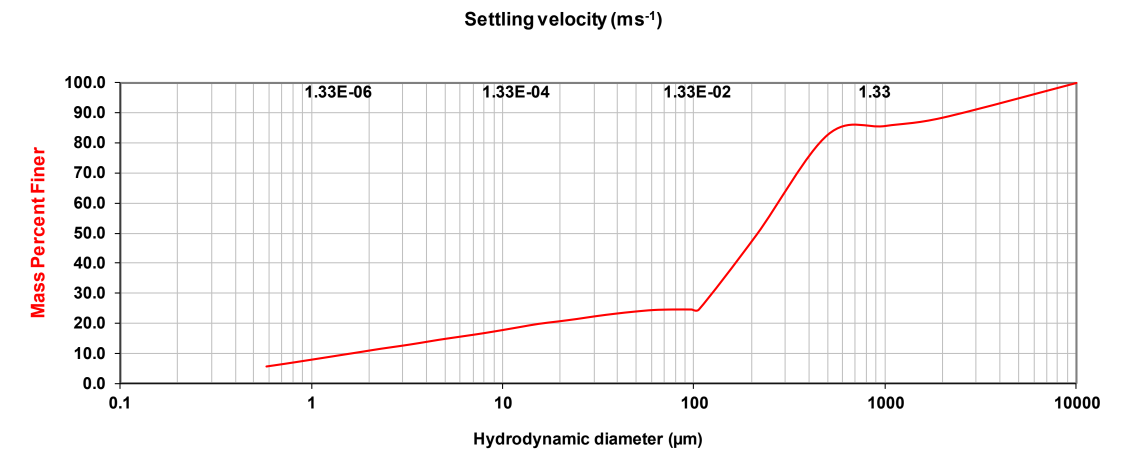
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B6-2
Job No: 19_1531
Laboratory ID: 19_1531_32

Analysis: X-ray sedimentation by Sedigraph 5100 **Analysis temp.:** 35.7 °C
Dispersant: Water **Sonication:** 10 min
Additives: 10 mL sodium hexametaphosphate **Concentration:** ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3 **Critical diameter:** 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	11.5	1.64E+01	12.23	9.17	1.4	9.20E-05
2000.00	1000.00	2.8	1.64E+00	9.17	7.29	1.0	5.48E-05
1000.00	500.00	2.9	4.10E-01	7.29	5.79	0.9	3.46E-05
500.00	212.00	33.3	8.69E-02	5.79	4.60	0.9	2.18E-05
212.00	106.00	24.8	1.84E-02	4.60	3.65	1.1	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	1.0	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	0.9	5.47E-06
77.18	61.31	0.2	3.88E-03	2.30	1.83	1.0	3.45E-06
61.31	48.70	0.5	2.45E-03	1.83	1.45	1.0	2.18E-06
48.70	38.68	0.7	1.54E-03	1.45	1.15	1.0	1.37E-06
38.68	30.73	0.8	9.75E-04	1.15	0.92	1.0	8.68E-07
30.73	24.41	0.9	6.15E-04	0.92	0.73	1.0	5.51E-07
24.41	19.39	0.8	3.88E-04	0.73	0.58	0.9	3.47E-07
19.39	15.40	0.8	2.45E-04	0.58	0.10	5.6	4.76E-08
15.40	12.23	1.1	1.54E-04	Total:		100.0	

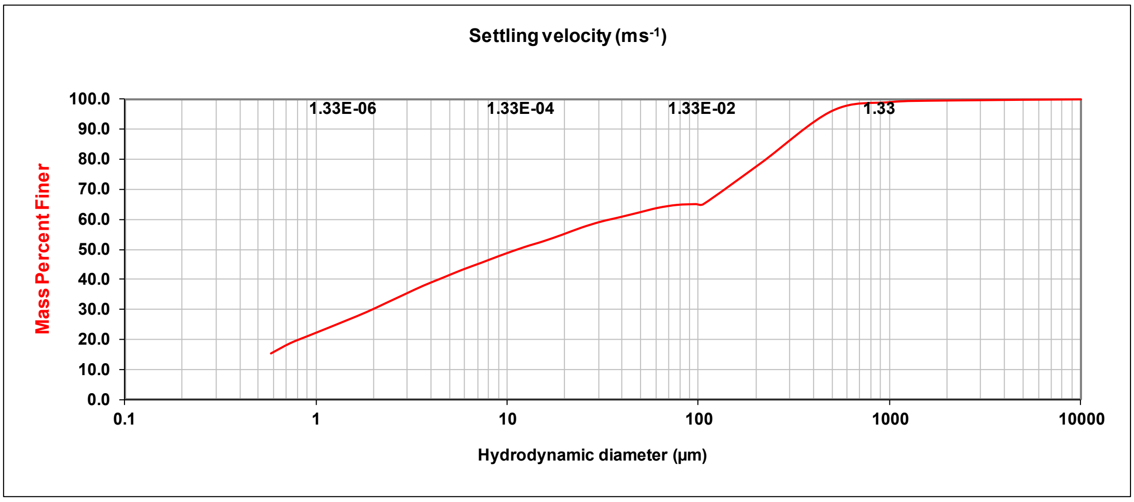
Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B6-3
Job No: 19_1531
Laboratory ID: 19_1531_33

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.724 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.4	1.64E+01	12.23	9.17	2.8	9.20E-05
2000.00	1000.00	0.5	1.64E+00	9.17	7.29	2.4	5.48E-05
1000.00	500.00	2.9	4.10E-01	7.29	5.79	2.3	3.46E-05
500.00	212.00	17.4	8.69E-02	5.79	4.60	2.6	2.18E-05
212.00	106.00	13.7	1.84E-02	4.60	3.65	2.6	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	2.9	8.68E-06
97.16	77.18	0.3	6.15E-03	2.90	2.30	3.0	5.47E-06
77.18	61.31	1.0	3.88E-03	2.30	1.83	2.9	3.45E-06
61.31	48.70	1.6	2.45E-03	1.83	1.45	2.7	2.18E-06
48.70	38.68	1.6	1.54E-03	1.45	1.15	2.6	1.37E-06
38.68	30.73	1.5	9.75E-04	1.15	0.92	2.5	8.68E-07
30.73	24.41	2.0	6.15E-04	0.92	0.73	2.6	5.51E-07
24.41	19.39	2.3	3.88E-04	0.73	0.58	3.4	3.47E-07
19.39	15.40	2.2	2.45E-04	0.58	0.10	15.4	4.76E-08
15.40	12.23	2.0	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

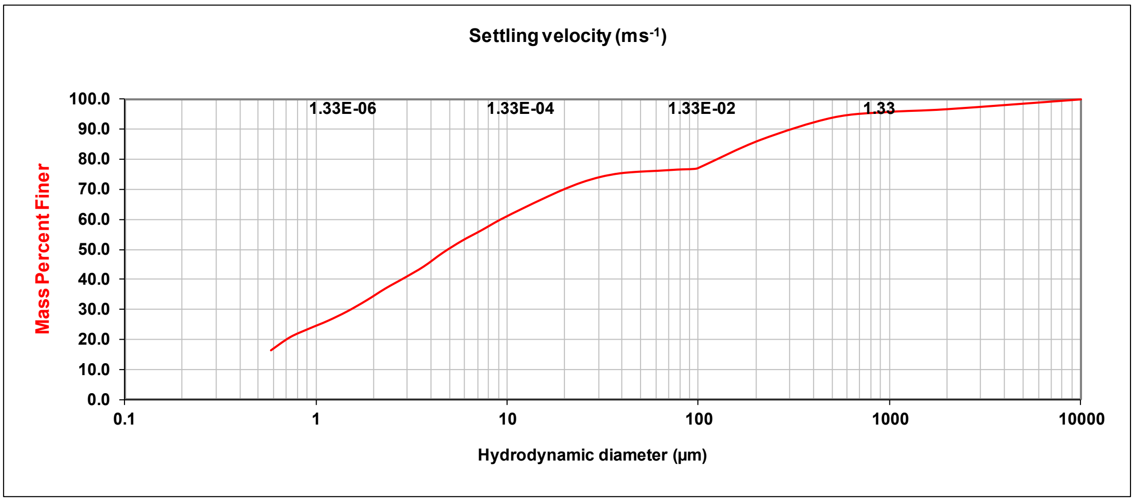
Characterisation from the micro to the macro www.microanalysis.com.au

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B7-1
Job No: 19_1531
Laboratory ID: 19_1531_31

Analysis: X-ray sedimentation by Sedigraph 5100
Analysis temp.: 35.7 °C
Dispersant: Water
Sonication: 10 min
Additives: 10 mL sodium hexametaphosphate
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Critical diameter: 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	3.3	1.64E+01	12.23	9.17	4.0	9.20E-05
2000.00	1000.00	0.9	1.64E+00	9.17	7.29	3.6	5.48E-05
1000.00	500.00	1.9	4.10E-01	7.29	5.79	3.4	3.46E-05
500.00	212.00	7.3	8.69E-02	5.79	4.60	4.0	2.18E-05
212.00	106.00	8.6	1.84E-02	4.60	3.65	4.6	1.38E-05
106.00	97.16	1.0	8.45E-03	3.65	2.90	3.7	8.68E-06
97.16	77.18	0.3	6.15E-03	2.90	2.30	3.6	5.47E-06
77.18	61.31	0.4	3.88E-03	2.30	1.83	4.0	3.45E-06
61.31	48.70	0.3	2.45E-03	1.83	1.45	3.7	2.18E-06
48.70	38.68	0.5	1.54E-03	1.45	1.15	3.1	1.37E-06
38.68	30.73	1.2	9.75E-04	1.15	0.92	2.6	8.68E-07
30.73	24.41	1.9	6.15E-04	0.92	0.73	2.9	5.51E-07
24.41	19.39	2.5	3.88E-04	0.73	0.58	4.4	3.47E-07
19.39	15.40	2.9	2.45E-04	0.58	0.10	16.4	4.76E-08
15.40	12.23	3.0	1.54E-04		Total:	100.0	

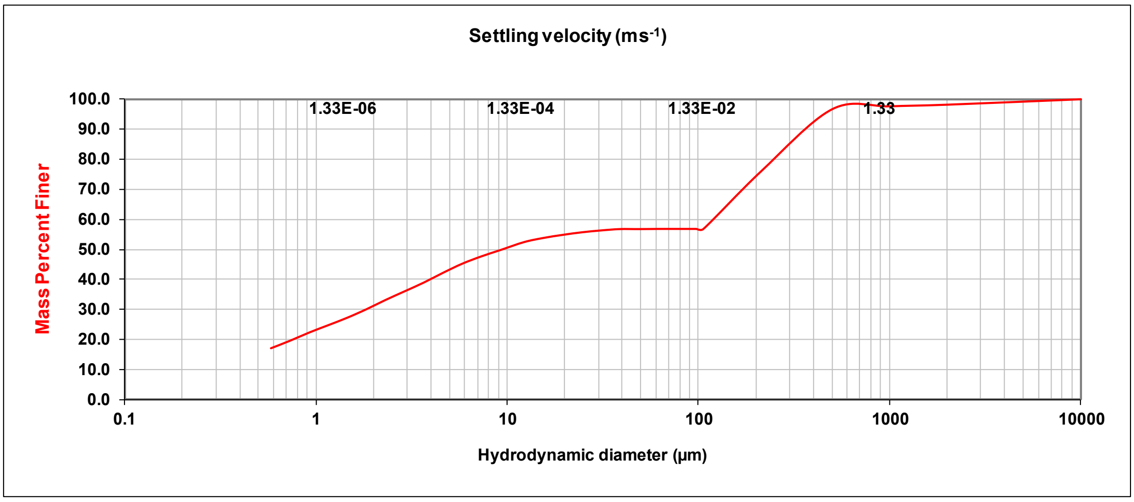
Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B8-1
Job No: 19_1531
Laboratory ID: 19_1531_30

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	1.8	1.64E+01	12.23	9.17	2.7	9.20E-05
2000.00	1000.00	0.5	1.64E+00	9.17	7.29	2.1	5.48E-05
1000.00	500.00	1.0	4.10E-01	7.29	5.79	2.4	3.46E-05
500.00	212.00	20.7	8.69E-02	5.79	4.60	3.0	2.18E-05
212.00	106.00	19.1	1.84E-02	4.60	3.65	3.2	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	2.9	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	2.9	5.47E-06
77.18	61.31	0.0	3.88E-03	2.30	1.83	3.1	3.45E-06
61.31	48.70	0.1	2.45E-03	1.83	1.45	2.8	2.18E-06
48.70	38.68	0.0	1.54E-03	1.45	1.15	2.5	1.37E-06
38.68	30.73	0.5	9.75E-04	1.15	0.92	2.4	8.68E-07
30.73	24.41	0.6	6.15E-04	0.92	0.73	2.7	5.51E-07
24.41	19.39	0.9	3.88E-04	0.73	0.58	2.5	3.47E-07
19.39	15.40	1.0	2.45E-04	0.58	0.10	17.2	4.76E-08
15.40	12.23	1.4	1.54E-04	Total:		100.0	

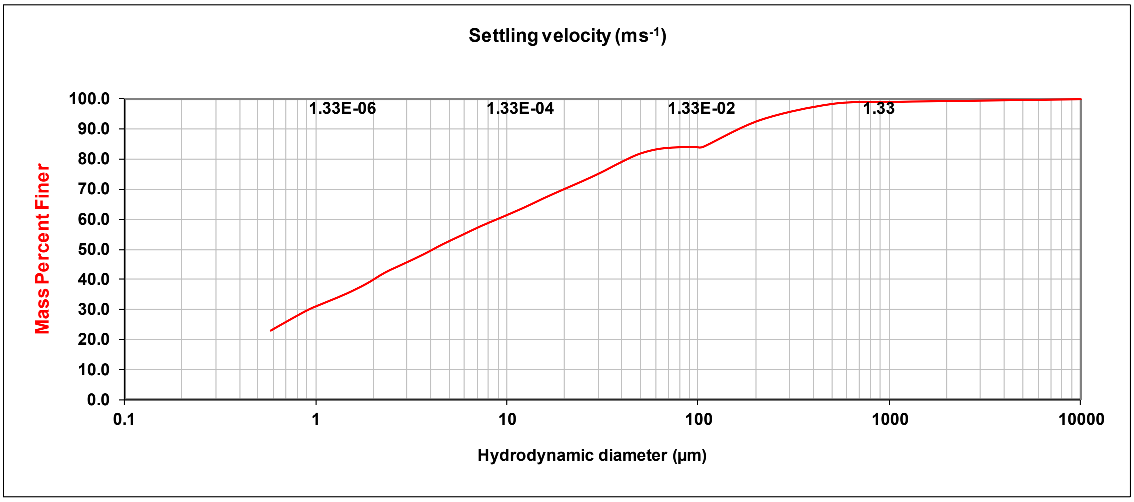
Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B8-3
Job No: 19_1531
Laboratory ID: 19_1531_14

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.6	1.64E+01	12.23	9.17	3.4	9.20E-05
2000.00	1000.00	0.3	1.64E+00	9.17	7.29	2.7	5.48E-05
1000.00	500.00	0.7	4.10E-01	7.29	5.79	3.0	3.46E-05
500.00	212.00	5.3	8.69E-02	5.79	4.60	3.0	2.18E-05
212.00	106.00	9.0	1.84E-02	4.60	3.65	3.4	1.38E-05
106.00	97.16	0.1	8.45E-03	3.65	2.90	3.0	8.68E-06
97.16	77.18	0.1	6.15E-03	2.90	2.30	3.0	5.47E-06
77.18	61.31	0.6	3.88E-03	2.30	1.83	3.8	3.45E-06
61.31	48.70	1.7	2.45E-03	1.83	1.45	3.2	2.18E-06
48.70	38.68	2.9	1.54E-03	1.45	1.15	2.7	1.37E-06
38.68	30.73	3.3	9.75E-04	1.15	0.92	2.6	8.68E-07
30.73	24.41	2.9	6.15E-04	0.92	0.73	3.4	5.51E-07
24.41	19.39	2.8	3.88E-04	0.73	0.58	3.6	3.47E-07
19.39	15.40	2.9	2.45E-04	0.58	0.10	22.9	4.76E-08
15.40	12.23	3.0	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

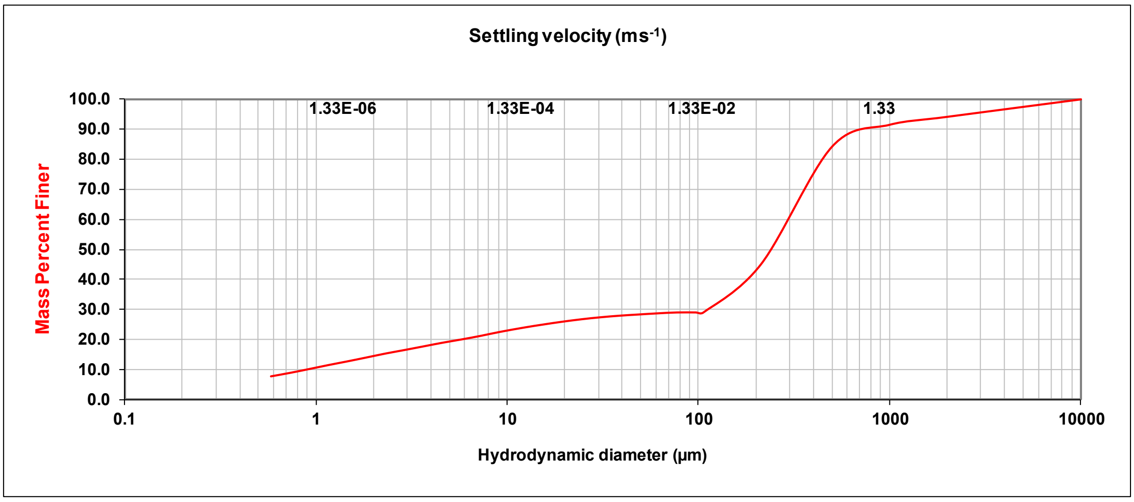
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B9-1
Job No: 19_1531
Laboratory ID: 19_1531_13

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	5.8	1.64E+01	12.23	9.17	1.4	9.20E-05
2000.00	1000.00	2.6	1.64E+00	9.17	7.29	1.3	5.48E-05
1000.00	500.00	7.2	4.10E-01	7.29	5.79	1.2	3.46E-05
500.00	212.00	39.2	8.69E-02	5.79	4.60	1.1	2.18E-05
212.00	106.00	16.0	1.84E-02	4.60	3.65	1.2	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	1.2	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	1.2	5.47E-06
77.18	61.31	0.3	3.88E-03	2.30	1.83	1.3	3.45E-06
61.31	48.70	0.4	2.45E-03	1.83	1.45	1.3	2.18E-06
48.70	38.68	0.4	1.54E-03	1.45	1.15	1.2	1.37E-06
38.68	30.73	0.5	9.75E-04	1.15	0.92	1.3	8.68E-07
30.73	24.41	0.7	6.15E-04	0.92	0.73	1.3	5.51E-07
24.41	19.39	0.8	3.88E-04	0.73	0.58	1.2	3.47E-07
19.39	15.40	0.9	2.45E-04	0.58	0.10	7.8	4.76E-08
15.40	12.23	1.0	1.54E-04		Total:	100.0	

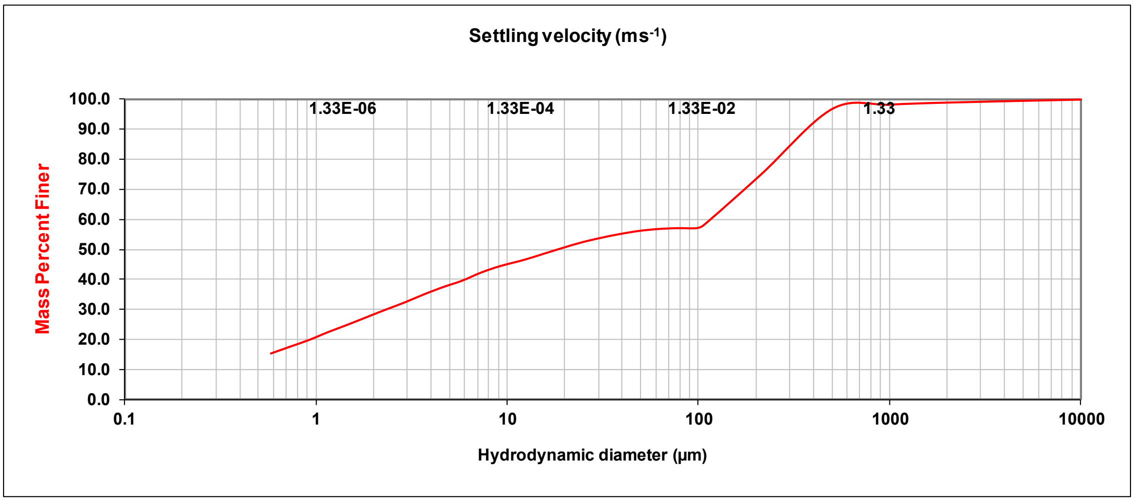
Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B10-5
Job No: 19_1531
Laboratory ID: 19_1531_12

Analysis: X-ray sedimentation by Sedigraph 5100 **Analysis temp.:** 35.7 °C
Dispersant: Water **Sonication:** 10 min
Additives: 10 mL sodium hexametaphosphate **Concentration:** ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3 **Critical diameter:** 54.34 µm
Liquid viscosity: 0.724 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	1.0	1.64E+01	12.23	9.17	2.1	9.20E-05
2000.00	1000.00	0.7	1.64E+00	9.17	7.29	2.1	5.48E-05
1000.00	500.00	1.4	4.10E-01	7.29	5.79	2.7	3.46E-05
500.00	212.00	21.9	8.69E-02	5.79	4.60	2.1	2.18E-05
212.00	106.00	17.0	1.84E-02	4.60	3.65	2.4	1.38E-05
106.00	97.16	0.9	8.45E-03	3.65	2.90	2.7	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	2.4	5.47E-06
77.18	61.31	0.3	3.88E-03	2.30	1.83	2.5	3.45E-06
61.31	48.70	0.6	2.45E-03	1.83	1.45	2.6	2.18E-06
48.70	38.68	1.0	1.54E-03	1.45	1.15	2.4	1.37E-06
38.68	30.73	1.3	9.75E-04	1.15	0.92	2.6	8.68E-07
30.73	24.41	1.5	6.15E-04	0.92	0.73	2.3	5.51E-07
24.41	19.39	1.9	3.88E-04	0.73	0.58	2.3	3.47E-07
19.39	15.40	2.0	2.45E-04	0.58	0.10	15.3	4.76E-08
15.40	12.23	2.0	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

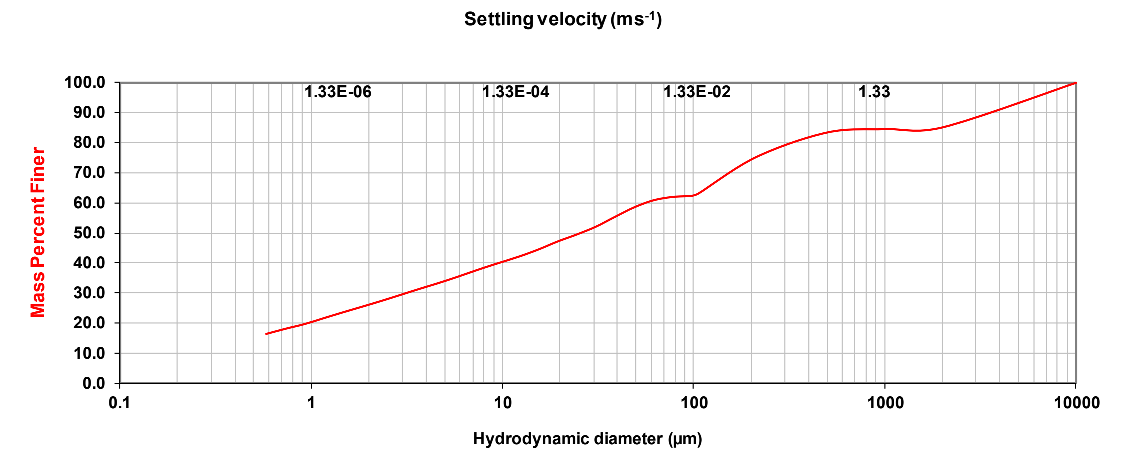
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B10-6
Job No: 19_1531
Laboratory ID: 19_1531_11

Analysis: X-ray sedimentation by Sedigraph 5100
Analysis temp.: 35.7 °C
Dispersant: Water
Sonication: 10 min
Additives: 10 mL sodium hexametaphosphate
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Critical diameter: 54.36 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	14.9	1.64E+01	12.23	9.17	2.5	9.20E-05
2000.00	1000.00	0.6	1.64E+00	9.17	7.29	2.1	5.48E-05
1000.00	500.00	1.1	4.10E-01	7.29	5.79	2.2	3.46E-05
500.00	212.00	8.2	8.69E-02	5.79	4.60	2.1	2.18E-05
212.00	106.00	12.1	1.84E-02	4.60	3.65	2.0	1.38E-05
106.00	97.16	0.8	8.45E-03	3.65	2.90	2.0	8.68E-06
97.16	77.18	0.4	6.15E-03	2.90	2.30	2.0	5.47E-06
77.18	61.31	1.1	3.88E-03	2.30	1.83	1.9	3.45E-06
61.31	48.70	2.3	2.45E-03	1.83	1.45	1.9	2.18E-06
48.70	38.68	3.2	1.54E-03	1.45	1.15	2.0	1.37E-06
38.68	30.73	3.3	9.75E-04	1.15	0.92	1.9	8.68E-07
30.73	24.41	2.6	6.15E-04	0.92	0.73	1.6	5.51E-07
24.41	19.39	2.3	3.88E-04	0.73	0.58	1.7	3.47E-07
19.39	15.40	2.7	2.45E-04	0.58	0.10	16.3	4.76E-08
15.40	12.23	2.3	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

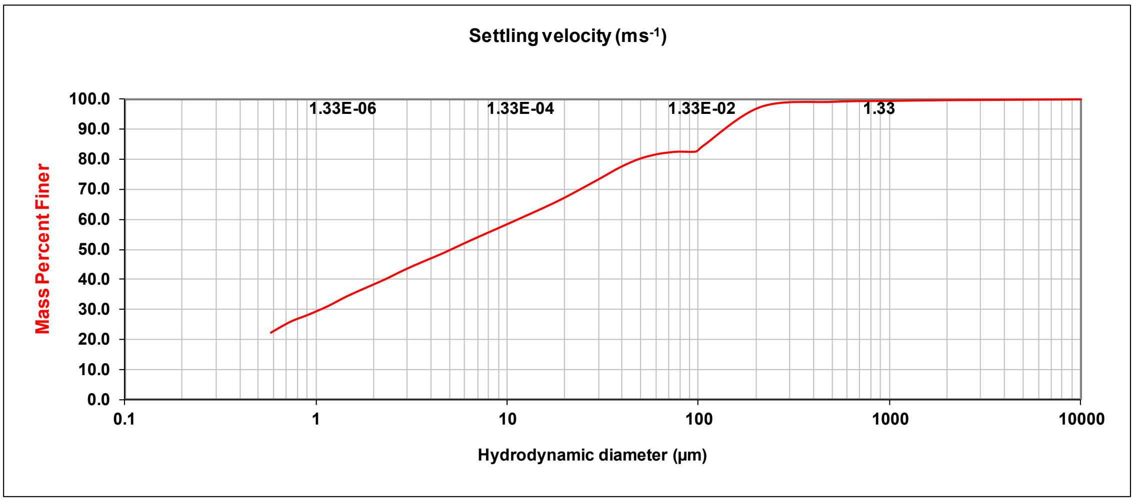
Characterisation from the micro to the macro www.microanalysis.com.au

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B10-8
Job No: 19_1531
Laboratory ID: 19_1531_29

Analysis: X-ray sedimentation by Sedigraph 5100 | **Analysis temp.:** 35.7 °C
Dispersant: Water | **Sonication:** 10 min
Additives: 10 mL sodium hexametaphosphate | **Concentration:** ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3 | **Critical diameter:** 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.3	1.64E+01	12.23	9.17	3.6	9.20E-05
2000.00	1000.00	0.2	1.64E+00	9.17	7.29	2.8	5.48E-05
1000.00	500.00	0.3	4.10E-01	7.29	5.79	2.9	3.46E-05
500.00	212.00	1.7	8.69E-02	5.79	4.60	3.0	2.18E-05
212.00	106.00	12.9	1.84E-02	4.60	3.65	2.7	1.38E-05
106.00	97.16	1.9	8.45E-03	3.65	2.90	2.8	8.68E-06
97.16	77.18	0.1	6.15E-03	2.90	2.30	3.1	5.47E-06
77.18	61.31	0.8	3.88E-03	2.30	1.83	2.8	3.45E-06
61.31	48.70	1.7	2.45E-03	1.83	1.45	2.9	2.18E-06
48.70	38.68	2.8	1.54E-03	1.45	1.15	3.3	1.37E-06
38.68	30.73	3.6	9.75E-04	1.15	0.92	2.7	8.68E-07
30.73	24.41	3.5	6.15E-04	0.92	0.73	2.5	5.51E-07
24.41	19.39	3.4	3.88E-04	0.73	0.58	3.6	3.47E-07
19.39	15.40	3.0	2.45E-04	0.58	0.10	22.4	4.76E-08
15.40	12.23	2.9	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

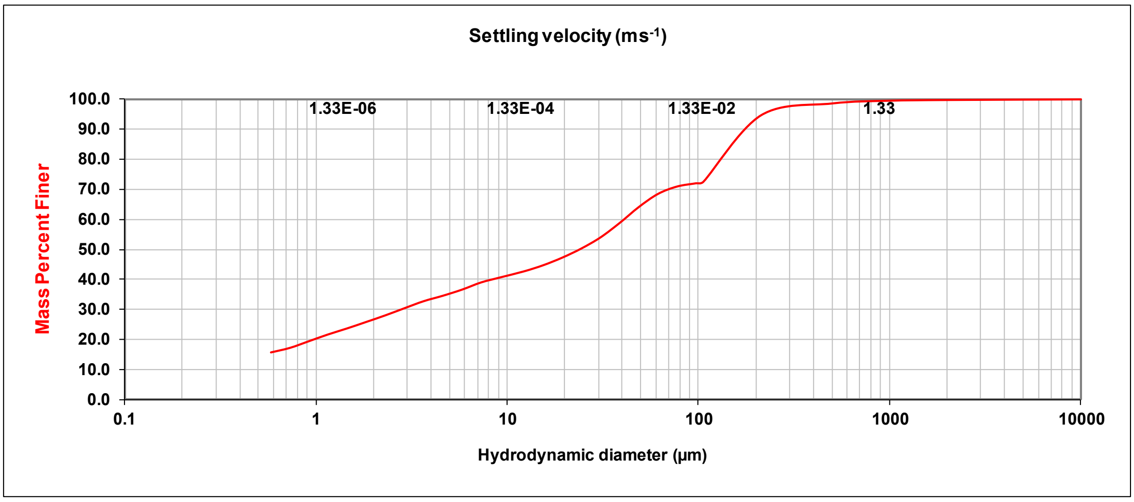
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B11-8
Job No: 19_1531
Laboratory ID: 19_1531_07

Analysis: X-ray sedimentation by Sedigraph 5100 **Analysis temp.:** 35.7 °C
Dispersant: Water **Sonication:** 10 min
Additives: 10 mL sodium hexametaphosphate **Concentration:** ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3 **Critical diameter:** 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.2	1.64E+01	12.23	9.17	2.0	9.20E-05
2000.00	1000.00	0.2	1.64E+00	9.17	7.29	1.7	5.48E-05
1000.00	500.00	0.9	4.10E-01	7.29	5.79	2.4	3.46E-05
500.00	212.00	4.0	8.69E-02	5.79	4.60	2.0	2.18E-05
212.00	106.00	22.1	1.84E-02	4.60	3.65	1.8	1.38E-05
106.00	97.16	0.5	8.45E-03	3.65	2.90	2.3	8.68E-06
97.16	77.18	1.1	6.15E-03	2.90	2.30	2.4	5.47E-06
77.18	61.31	2.5	3.88E-03	2.30	1.83	2.2	3.45E-06
61.31	48.70	4.4	2.45E-03	1.83	1.45	2.2	2.18E-06
48.70	38.68	5.3	1.54E-03	1.45	1.15	2.0	1.37E-06
38.68	30.73	4.8	9.75E-04	1.15	0.92	2.2	8.68E-07
30.73	24.41	3.7	6.15E-04	0.92	0.73	2.3	5.51E-07
24.41	19.39	3.0	3.88E-04	0.73	0.58	1.5	3.47E-07
19.39	15.40	2.5	2.45E-04	0.58	0.10	15.8	4.76E-08
15.40	12.23	2.0	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B11-9
Job No: 19_1531
Laboratory ID: 19_1531_08

Analysis: X-ray sedimentation by Sedigraph 5100 | **Analysis temp.:** 35.7 °C
Dispersant: Water | **Sonication:** 10 min
Additives: 10 mL sodium hexametaphosphate | **Concentration:** ~5 % w/w

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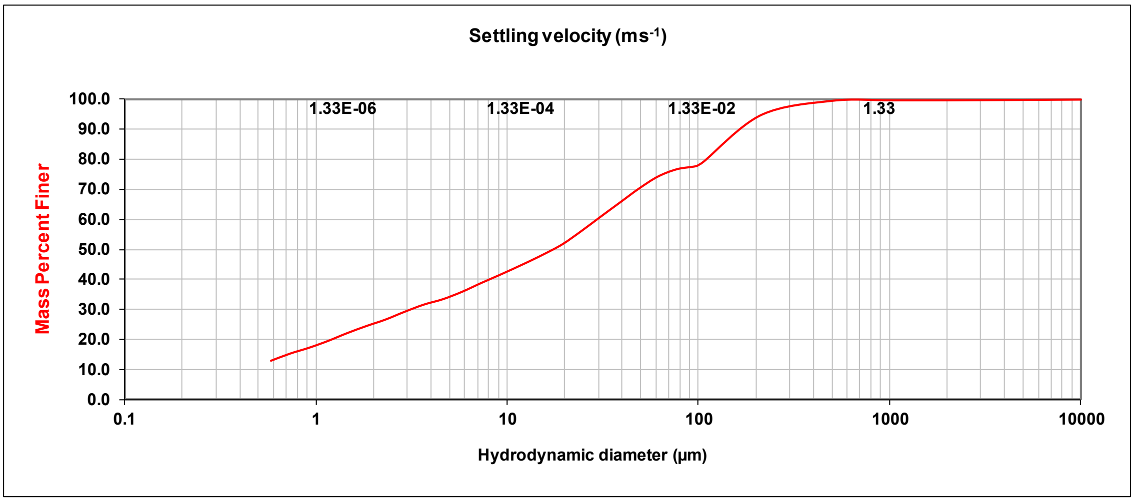
Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3 | **Critical diameter:** 54.35 µm
Liquid viscosity: 0.724 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.2	1.64E+01	12.23	9.17	3.6	9.20E-05
2000.00	1000.00	0.0	1.64E+00	9.17	7.29	2.8	5.48E-05
1000.00	500.00	0.2	4.10E-01	7.29	5.79	2.9	3.46E-05
500.00	212.00	4.8	8.69E-02	5.79	4.60	2.5	2.18E-05
212.00	106.00	15.6	1.84E-02	4.60	3.65	1.8	1.38E-05
106.00	97.16	1.4	8.45E-03	3.65	2.90	2.4	8.68E-06
97.16	77.18	1.0	6.15E-03	2.90	2.30	2.6	5.47E-06
77.18	61.31	2.5	3.88E-03	2.30	1.83	2.1	3.45E-06
61.31	48.70	4.0	2.45E-03	1.83	1.45	2.4	2.18E-06
48.70	38.68	4.7	1.54E-03	1.45	1.15	2.6	1.37E-06
38.68	30.73	4.7	9.75E-04	1.15	0.92	2.2	8.68E-07
30.73	24.41	4.8	6.15E-04	0.92	0.73	2.0	5.51E-07
24.41	19.39	4.4	3.88E-04	0.73	0.58	2.4	3.47E-07
19.39	15.40	3.4	2.45E-04	0.58	0.10	12.9	4.76E-08
15.40	12.23	3.1	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

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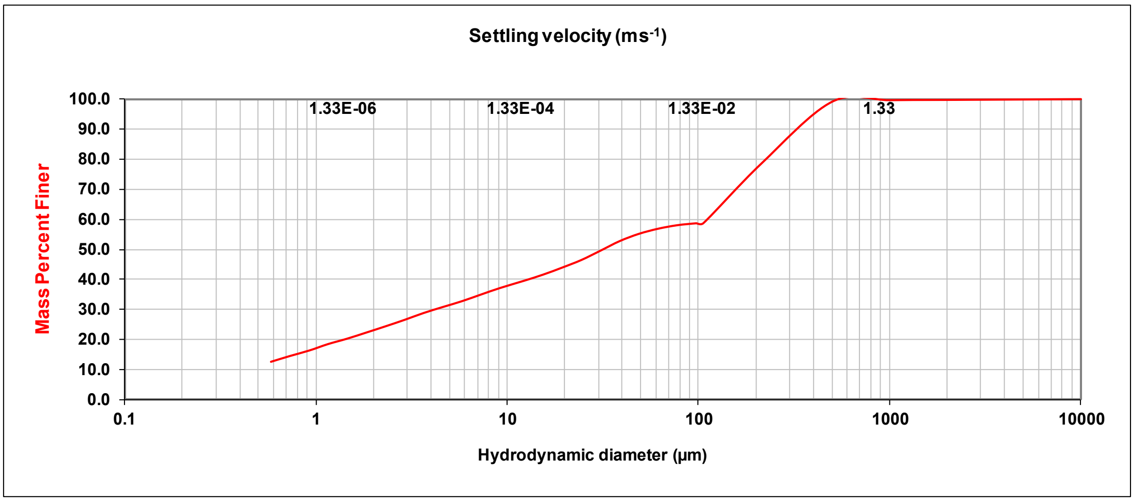
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B11-5
Job No: 19_1531
Laboratory ID: 19_1531_06

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.36 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.2	1.64E+01	12.23	9.17	2.4	9.20E-05
2000.00	1000.00	0.1	1.64E+00	9.17	7.29	2.2	5.48E-05
1000.00	500.00	0.5	4.10E-01	7.29	5.79	2.2	3.46E-05
500.00	212.00	20.7	8.69E-02	5.79	4.60	1.9	2.18E-05
212.00	106.00	19.7	1.84E-02	4.60	3.65	2.0	1.38E-05
106.00	97.16	0.1	8.45E-03	3.65	2.90	2.3	8.68E-06
97.16	77.18	0.6	6.15E-03	2.90	2.30	2.2	5.47E-06
77.18	61.31	1.2	3.88E-03	2.30	1.83	2.1	3.45E-06
61.31	48.70	1.7	2.45E-03	1.83	1.45	2.1	2.18E-06
48.70	38.68	2.4	1.54E-03	1.45	1.15	1.8	1.37E-06
38.68	30.73	3.2	9.75E-04	1.15	0.92	2.1	8.68E-07
30.73	24.41	3.1	6.15E-04	0.92	0.73	1.8	5.51E-07
24.41	19.39	2.5	3.88E-04	0.73	0.58	1.9	3.47E-07
19.39	15.40	2.3	2.45E-04	0.58	0.10	12.5	4.76E-08
15.40	12.23	2.1	1.54E-04	Total:		100.0	

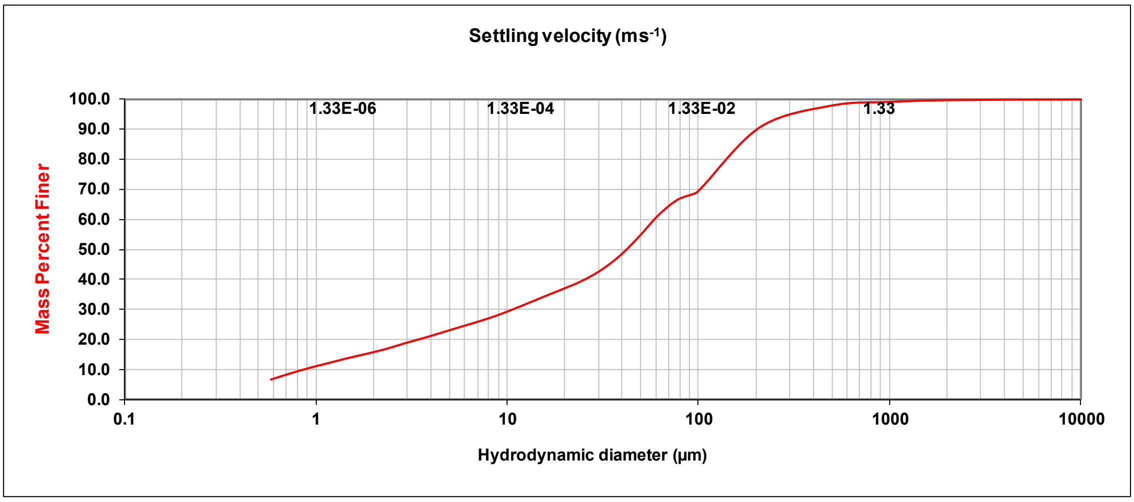
Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B12-1
Job No: 19_1531
Laboratory ID: 19_1531_05

Analysis: X-ray sedimentation by Sedigraph 5100
Analysis temp.: 35.7 °C
Dispersant: Water
Sonication: 10 min
Additives: 10 mL sodium hexametaphosphate
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Critical diameter: 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.2	1.64E+01	12.23	9.17	3.1	9.20E-05
2000.00	1000.00	0.6	1.64E+00	9.17	7.29	2.1	5.48E-05
1000.00	500.00	1.2	4.10E-01	7.29	5.79	1.9	3.46E-05
500.00	212.00	7.0	8.69E-02	5.79	4.60	1.9	2.18E-05
212.00	106.00	19.7	1.84E-02	4.60	3.65	1.9	1.38E-05
106.00	97.16	2.4	8.45E-03	3.65	2.90	1.8	8.68E-06
97.16	77.18	2.4	6.15E-03	2.90	2.30	1.9	5.47E-06
77.18	61.31	5.2	3.88E-03	2.30	1.83	1.6	3.45E-06
61.31	48.70	7.1	2.45E-03	1.83	1.45	1.5	2.18E-06
48.70	38.68	6.3	1.54E-03	1.45	1.15	1.6	1.37E-06
38.68	30.73	4.8	9.75E-04	1.15	0.92	1.6	8.68E-07
30.73	24.41	3.6	6.15E-04	0.92	0.73	1.9	5.51E-07
24.41	19.39	2.7	3.88E-04	0.73	0.58	2.0	3.47E-07
19.39	15.40	2.6	2.45E-04	0.58	0.10	6.7	4.76E-08
15.40	12.23	2.6	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia

37 Kensington Street
East Perth
WA 6004

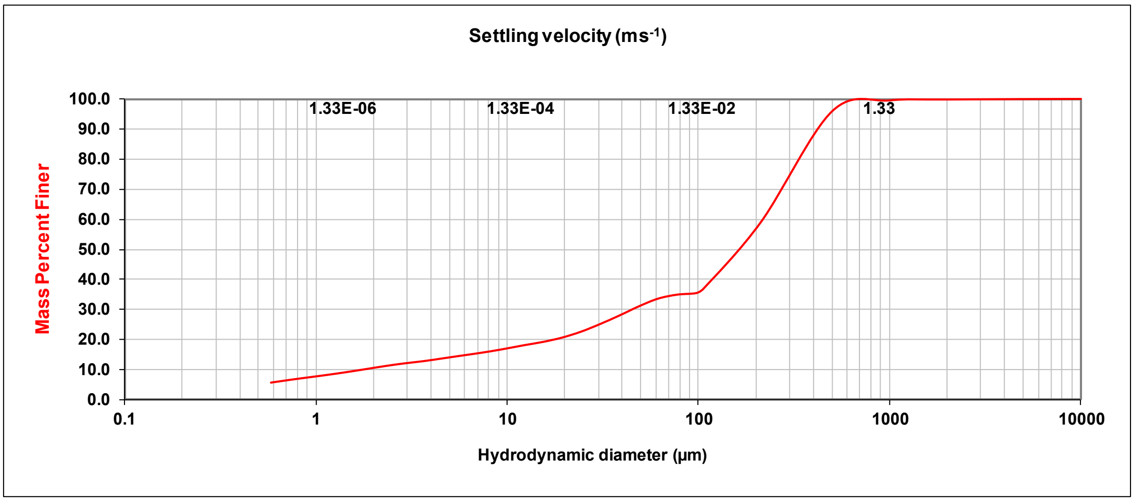
Client: BMT Eastern Australia Pty Ltd
Client ID: B12-2
Job No: 19_1531
Laboratory ID: 19_1531_04

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate

Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp

Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.2	1.64E+01	12.23	9.17	1.5	9.20E-05
2000.00	1000.00	0.3	1.64E+00	9.17	7.29	1.0	5.48E-05
1000.00	500.00	3.6	4.10E-01	7.29	5.79	0.9	3.46E-05
500.00	212.00	36.8	8.69E-02	5.79	4.60	0.9	2.18E-05
212.00	106.00	22.2	1.84E-02	4.60	3.65	0.9	1.38E-05
106.00	97.16	1.4	8.45E-03	3.65	2.90	0.7	8.68E-06
97.16	77.18	0.5	6.15E-03	2.90	2.30	0.9	5.47E-06
77.18	61.31	1.3	3.88E-03	2.30	1.83	1.0	3.45E-06
61.31	48.70	2.6	2.45E-03	1.83	1.45	1.0	2.18E-06
48.70	38.68	3.0	1.54E-03	1.45	1.15	0.9	1.37E-06
38.68	30.73	2.8	9.75E-04	1.15	0.92	0.8	8.68E-07
30.73	24.41	2.6	6.15E-04	0.92	0.73	0.9	5.51E-07
24.41	19.39	2.0	3.88E-04	0.73	0.58	0.9	3.47E-07
19.39	15.40	1.4	2.45E-04	0.58	0.10	5.8	4.76E-08
15.40	12.23	1.1	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

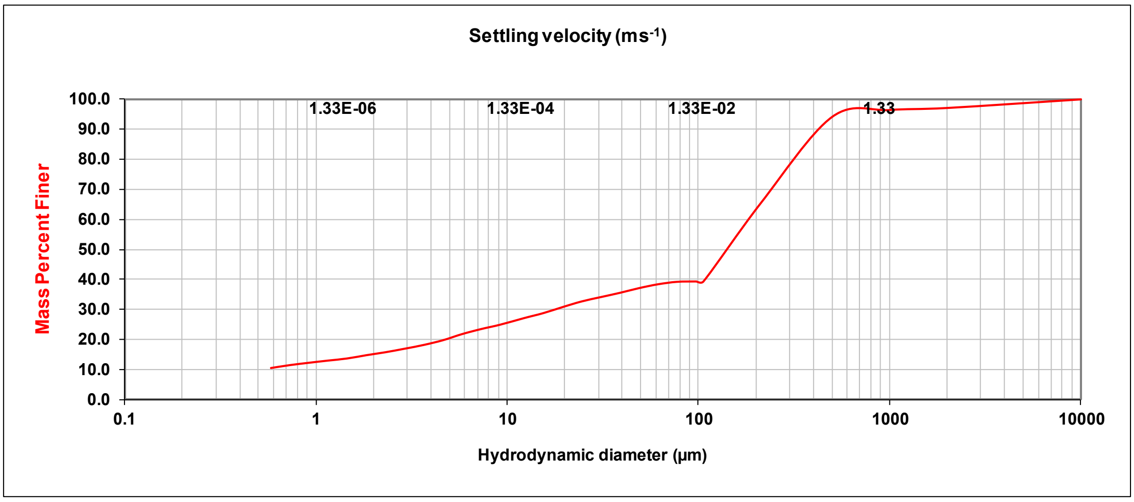
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B15-1
Job No: 19_1531
Laboratory ID: 19_1531_03

Analysis: X-ray sedimentation by Sedigraph 5100
Analysis temp.: 35.7 °C
Dispersant: Water
Sonication: 10 min
Additives: 10 mL sodium hexametaphosphate
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Critical diameter: 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	2.9	1.64E+01	12.23	9.17	2.2	9.20E-05
2000.00	1000.00	0.7	1.64E+00	9.17	7.29	1.5	5.48E-05
1000.00	500.00	2.3	4.10E-01	7.29	5.79	1.7	3.46E-05
500.00	212.00	28.7	8.69E-02	5.79	4.60	2.0	2.18E-05
212.00	106.00	26.2	1.84E-02	4.60	3.65	1.6	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	1.3	8.68E-06
97.16	77.18	0.1	6.15E-03	2.90	2.30	1.2	5.47E-06
77.18	61.31	0.8	3.88E-03	2.30	1.83	1.0	3.45E-06
61.31	48.70	1.3	2.45E-03	1.83	1.45	1.1	2.18E-06
48.70	38.68	1.6	1.54E-03	1.45	1.15	0.7	1.37E-06
38.68	30.73	1.4	9.75E-04	1.15	0.92	0.7	8.68E-07
30.73	24.41	1.5	6.15E-04	0.92	0.73	0.8	5.51E-07
24.41	19.39	1.9	3.88E-04	0.73	0.58	1.0	3.47E-07
19.39	15.40	2.0	2.45E-04	0.58	0.10	10.4	4.76E-08
15.40	12.23	1.6	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B15-2
Job No: 19_1531
Laboratory ID: 19_1531_02

Analysis:	X-ray sedimentation by Sedigraph 5100	**Analysis temp.:**	35.7 °C
Dispersant:	Water	**Sonication:**	10 min
Additives:	10 mL sodium hexametaphosphate	**Concentration:**	~5 % w/w

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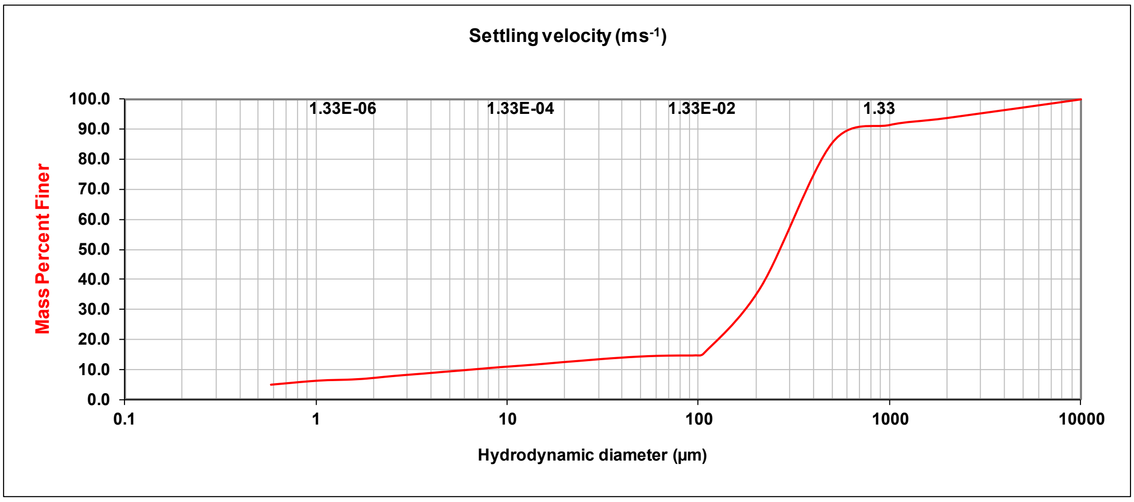
Sample density:	2.650	g/cm^3 (assumed)		
Liquid density:	0.994	g/cm^3	**Critical diameter:**	54.35 µm
Liquid viscosity:	0.724	cp		



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	6.2	1.64E+01	12.23	9.17	0.6	9.20E-05
2000.00	1000.00	2.3	1.64E+00	9.17	7.29	0.5	5.48E-05
1000.00	500.00	6.0	4.10E-01	7.29	5.79	0.5	3.46E-05
500.00	212.00	48.0	8.69E-02	5.79	4.60	0.5	2.18E-05
212.00	106.00	22.3	1.84E-02	4.60	3.65	0.5	1.38E-05
106.00	97.16	0.5	8.45E-03	3.65	2.90	0.5	8.68E-06
97.16	77.18	0.1	6.15E-03	2.90	2.30	0.6	5.47E-06
77.18	61.31	0.1	3.88E-03	2.30	1.83	0.6	3.45E-06
61.31	48.70	0.3	2.45E-03	1.83	1.45	0.4	2.18E-06
48.70	38.68	0.4	1.54E-03	1.45	1.15	0.2	1.37E-06
38.68	30.73	0.5	9.75E-04	1.15	0.92	0.4	8.68E-07
30.73	24.41	0.5	6.15E-04	0.92	0.73	0.6	5.51E-07
24.41	19.39	0.5	3.88E-04	0.73	0.58	0.6	3.47E-07
19.39	15.40	0.6	2.45E-04	0.58	0.10	4.8	4.76E-08
15.40	12.23	0.5	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

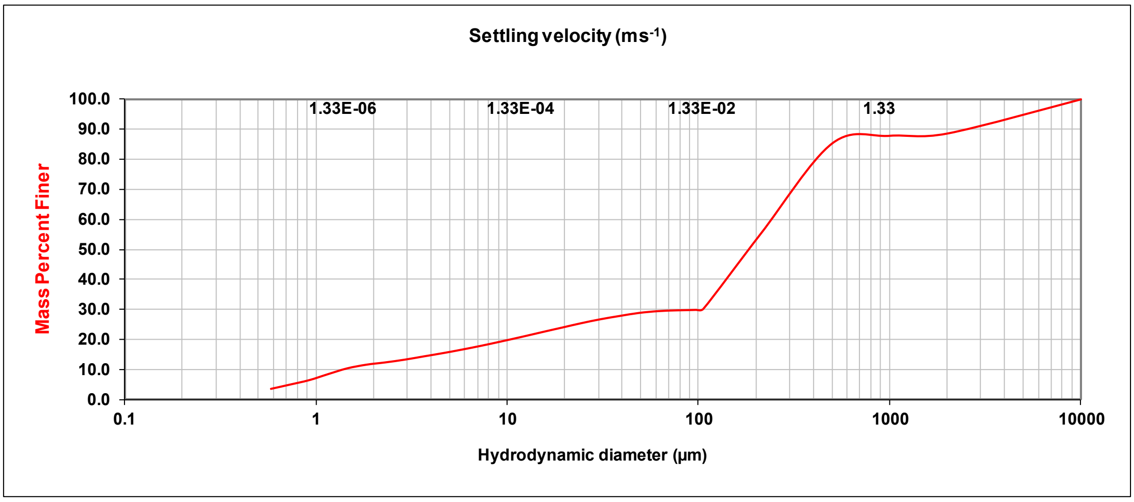
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B15-3
Job No: 19_1531
Laboratory ID: 19_1531_01

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.36 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	11.4	1.64E+01	12.23	9.17	1.8	9.20E-05
2000.00	1000.00	0.8	1.64E+00	9.17	7.29	1.4	5.48E-05
1000.00	500.00	2.5	4.10E-01	7.29	5.79	1.3	3.46E-05
500.00	212.00	30.0	8.69E-02	5.79	4.60	1.2	2.18E-05
212.00	106.00	25.1	1.84E-02	4.60	3.65	1.1	1.38E-05
106.00	97.16	0.4	8.45E-03	3.65	2.90	1.1	8.68E-06
97.16	77.18	0.2	6.15E-03	2.90	2.30	0.9	5.47E-06
77.18	61.31	0.3	3.88E-03	2.30	1.83	0.8	3.45E-06
61.31	48.70	0.6	2.45E-03	1.83	1.45	1.2	2.18E-06
48.70	38.68	1.0	1.54E-03	1.45	1.15	1.9	1.37E-06
38.68	30.73	1.1	9.75E-04	1.15	0.92	2.0	8.68E-07
30.73	24.41	1.3	6.15E-04	0.92	0.73	1.5	5.51E-07
24.41	19.39	1.5	3.88E-04	0.73	0.58	1.4	3.47E-07
19.39	15.40	1.5	2.45E-04	0.58	0.10	3.6	4.76E-08
15.40	12.23	1.5	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

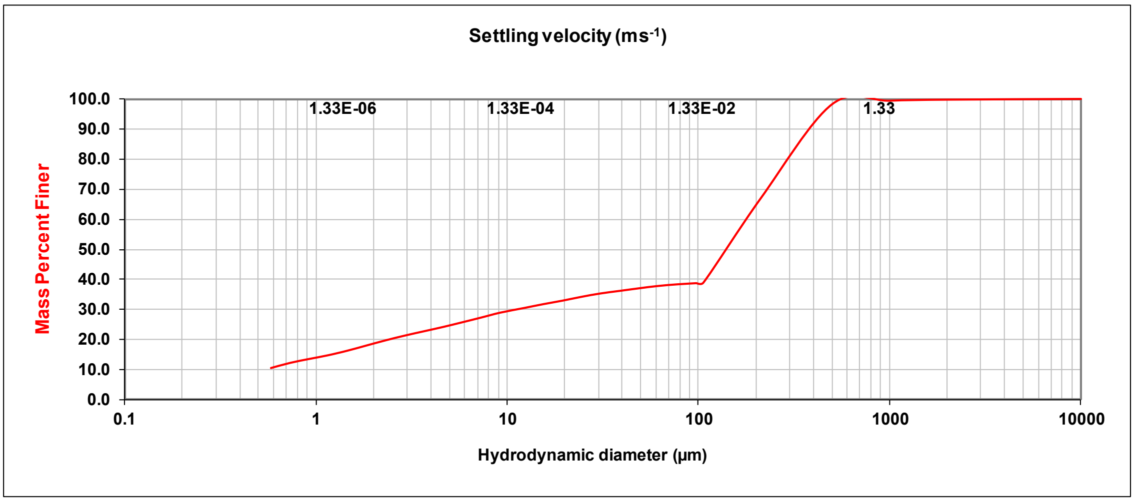
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B13-1
Job No: 19_1531
Laboratory ID: 19_1531_28

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 ºC
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.65 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.723 cp
Critical diameter: 54.31 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.2	1.64E+01	12.23	9.17	1.6	9.20E-05
2000.00	1000.00	0.3	1.64E+00	9.17	7.29	1.6	5.48E-05
1000.00	500.00	1.2	4.10E-01	7.29	5.79	1.6	3.46E-05
500.00	212.00	31.3	8.69E-02	5.79	4.60	1.6	2.18E-05
212.00	106.00	28.2	1.84E-02	4.60	3.65	1.4	1.38E-05
106.00	97.16	0.2	8.45E-03	3.65	2.90	1.4	8.68E-06
97.16	77.18	0.4	6.15E-03	2.90	2.30	1.6	5.47E-06
77.18	61.31	0.5	3.88E-03	2.30	1.83	1.7	3.45E-06
61.31	48.70	0.8	2.45E-03	1.83	1.45	1.7	2.18E-06
48.70	38.68	0.9	1.54E-03	1.45	1.15	1.5	1.37E-06
38.68	30.73	0.9	9.75E-04	1.15	0.92	1.2	8.68E-07
30.73	24.41	1.1	6.15E-04	0.92	0.73	1.3	5.51E-07
24.41	19.39	1.3	3.88E-04	0.73	0.58	1.7	3.47E-07
19.39	15.40	1.2	2.45E-04	0.58	0.10	10.4	4.76E-08
15.40	12.23	1.3	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

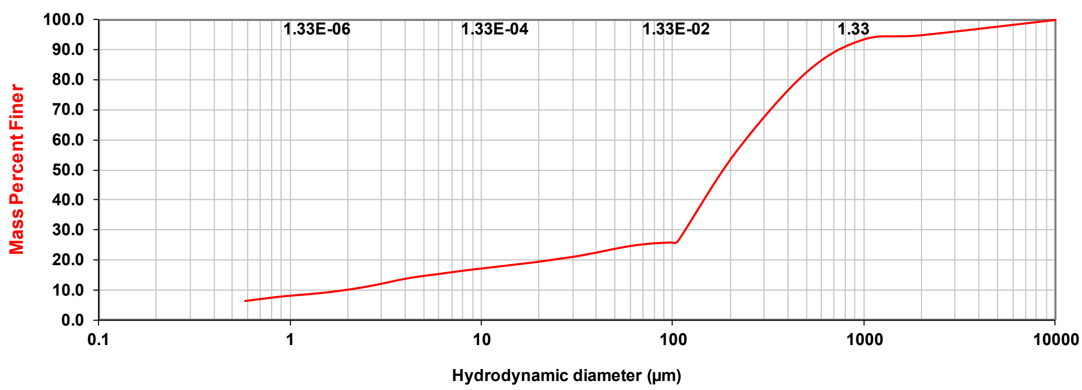
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B13-4
Job No: 19_1531
Laboratory ID: 19_1531_25

Analysis: X-ray sedimentation by Sedigraph 5100 **Analysis temp.:** 35.7 °C
Dispersant: Water **Sonication:** 10 min
Additives: 10 mL sodium hexametaphosphate **Concentration:** ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3 **Critical diameter:** 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	5.1	1.64E+01	12.23	9.17	0.9	9.20E-05
2000.00	1000.00	1.4	1.64E+00	9.17	7.29	0.8	5.48E-05
1000.00	500.00	11.0	4.10E-01	7.29	5.79	0.9	3.46E-05
500.00	212.00	26.9	8.69E-02	5.79	4.60	0.8	2.18E-05
212.00	106.00	29.5	1.84E-02	4.60	3.65	1.1	1.38E-05
106.00	97.16	0.4	8.45E-03	3.65	2.90	1.4	8.68E-06
97.16	77.18	0.4	6.15E-03	2.90	2.30	1.2	5.47E-06
77.18	61.31	0.7	3.88E-03	2.30	1.83	0.9	3.45E-06
61.31	48.70	1.1	2.45E-03	1.83	1.45	0.8	2.18E-06
48.70	38.68	1.3	1.54E-03	1.45	1.15	0.6	1.37E-06
38.68	30.73	1.1	9.75E-04	1.15	0.92	0.5	8.68E-07
30.73	24.41	0.9	6.15E-04	0.92	0.73	0.8	5.51E-07
24.41	19.39	0.9	3.88E-04	0.73	0.58	0.8	3.47E-07
19.39	15.40	0.8	2.45E-04	0.58	0.10	6.2	4.76E-08
15.40	12.23	0.8	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

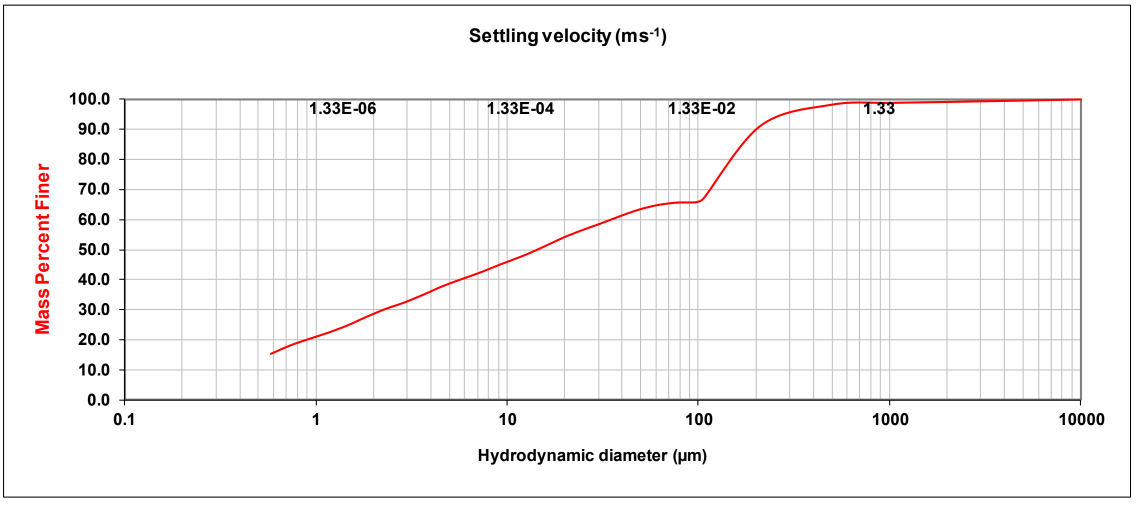
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B13-5
Job No: 19_1531
Laboratory ID: 19_1531_24

Analysis: X-ray sedimentation by Sedigraph 5100
Analysis temp.: 35.7 °C
Dispersant: Water
Sonication: 10 min
Additives: 10 mL sodium hexametaphosphate
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Critical diameter: 54.37 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.8	1.64E+01	12.23	9.17	3.0	9.20E-05
2000.00	1000.00	0.3	1.64E+00	9.17	7.29	2.5	5.48E-05
1000.00	500.00	0.6	4.10E-01	7.29	5.79	2.3	3.46E-05
500.00	212.00	6.9	8.69E-02	5.79	4.60	2.3	2.18E-05
212.00	106.00	24.3	1.84E-02	4.60	3.65	2.8	1.38E-05
106.00	97.16	1.2	8.45E-03	3.65	2.90	2.6	8.68E-06
97.16	77.18	0.1	6.15E-03	2.90	2.30	2.2	5.47E-06
77.18	61.31	0.8	3.88E-03	2.30	1.83	2.6	3.45E-06
61.31	48.70	1.5	2.45E-03	1.83	1.45	2.9	2.18E-06
48.70	38.68	2.2	1.54E-03	1.45	1.15	2.4	1.37E-06
38.68	30.73	2.4	9.75E-04	1.15	0.92	2.0	8.68E-07
30.73	24.41	2.3	6.15E-04	0.92	0.73	2.2	5.51E-07
24.41	19.39	2.5	3.88E-04	0.73	0.58	2.7	3.47E-07
19.39	15.40	2.9	2.45E-04	0.58	0.10	15.4	4.76E-08
15.40	12.23	2.8	1.54E-04	Total:		100.0	

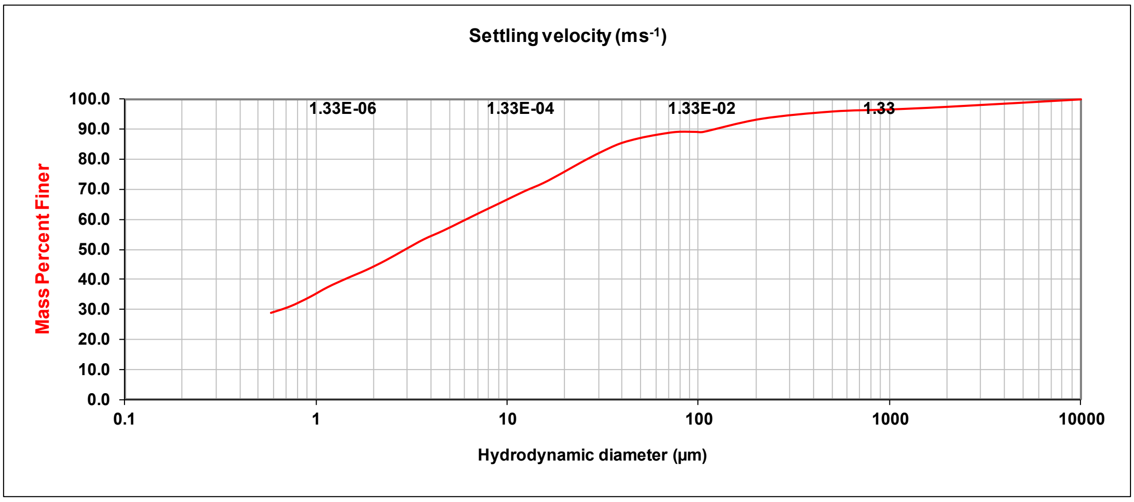
Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B13-8
Job No: 19_1531
Laboratory ID: 19_1531_21

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	2.5	1.64E+01	12.23	9.17	3.8	9.20E-05
2000.00	1000.00	0.9	1.64E+00	9.17	7.29	3.0	5.48E-05
1000.00	500.00	0.7	4.10E-01	7.29	5.79	3.1	3.46E-05
500.00	212.00	2.4	8.69E-02	5.79	4.60	3.1	2.18E-05
212.00	106.00	4.3	1.84E-02	4.60	3.65	2.9	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	3.5	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	3.6	5.47E-06
77.18	61.31	0.9	3.88E-03	2.30	1.83	3.1	3.45E-06
61.31	48.70	1.2	2.45E-03	1.83	1.45	2.8	2.18E-06
48.70	38.68	1.8	1.54E-03	1.45	1.15	2.9	1.37E-06
38.68	30.73	2.9	9.75E-04	1.15	0.92	3.4	8.68E-07
30.73	24.41	3.3	6.15E-04	0.92	0.73	3.0	5.51E-07
24.41	19.39	3.6	3.88E-04	0.73	0.58	2.1	3.47E-07
19.39	15.40	3.4	2.45E-04	0.58	0.10	29.0	4.76E-08
15.40	12.23	2.8	1.54E-04		Total:	100.0	

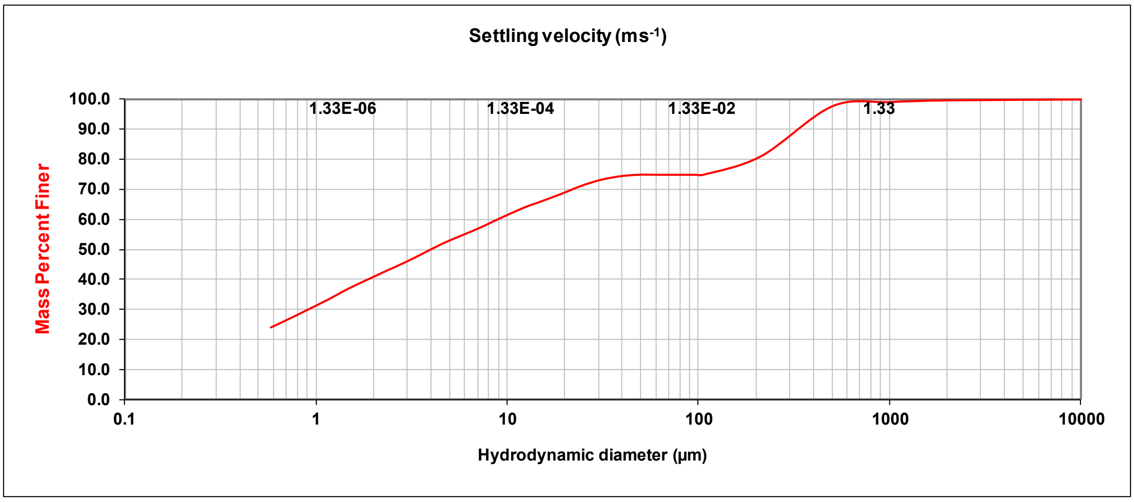
Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B13-9
Job No: 19_1531
Laboratory ID: 19_1531_20

Analysis: X-ray sedimentation by Sedigraph 5100 **Analysis temp.:** 35.7 °C
Dispersant: Water **Sonication:** 10 min
Additives: 10 mL sodium hexametaphosphate **Concentration:** ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3 **Critical diameter:** 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.3	1.64E+01	12.23	9.17	3.5	9.20E-05
2000.00	1000.00	0.6	1.64E+00	9.17	7.29	3.0	5.48E-05
1000.00	500.00	1.4	4.10E-01	7.29	5.79	2.7	3.46E-05
500.00	212.00	16.6	8.69E-02	5.79	4.60	2.7	2.18E-05
212.00	106.00	6.1	1.84E-02	4.60	3.65	3.2	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	3.1	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	2.9	5.47E-06
77.18	61.31	0.0	3.88E-03	2.30	1.83	2.9	3.45E-06
61.31	48.70	0.0	2.45E-03	1.83	1.45	3.1	2.18E-06
48.70	38.68	0.5	1.54E-03	1.45	1.15	3.4	1.37E-06
38.68	30.73	1.2	9.75E-04	1.15	0.92	3.1	8.68E-07
30.73	24.41	1.9	6.15E-04	0.92	0.73	3.1	5.51E-07
24.41	19.39	2.5	3.88E-04	0.73	0.58	3.0	3.47E-07
19.39	15.40	2.4	2.45E-04	0.58	0.10	24.1	4.76E-08
15.40	12.23	2.3	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

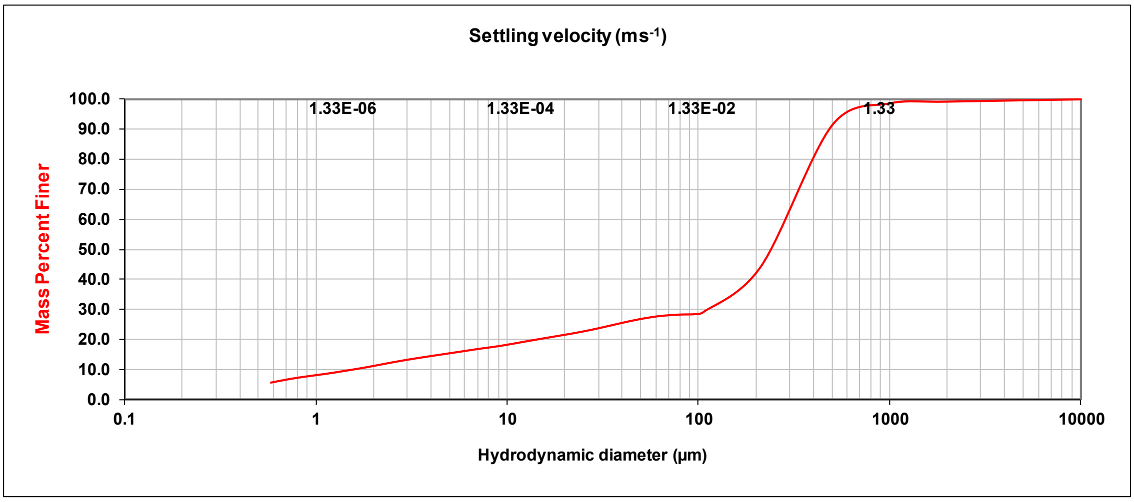
Characterisation from the micro to the macro www.microanalysis.com.au

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: B16-1
Job No: 19_1531
Laboratory ID: 19_1531_22

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.36 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.8	1.64E+01	12.23	9.17	1.4	9.20E-05
2000.00	1000.00	0.6	1.64E+00	9.17	7.29	0.9	5.48E-05
1000.00	500.00	7.3	4.10E-01	7.29	5.79	1.0	3.46E-05
500.00	212.00	47.1	8.69E-02	5.79	4.60	1.0	2.18E-05
212.00	106.00	15.2	1.84E-02	4.60	3.65	1.0	1.38E-05
106.00	97.16	0.7	8.45E-03	3.65	2.90	1.0	8.68E-06
97.16	77.18	0.2	6.15E-03	2.90	2.30	1.2	5.47E-06
77.18	61.31	0.5	3.88E-03	2.30	1.83	1.2	3.45E-06
61.31	48.70	1.0	2.45E-03	1.83	1.45	1.1	2.18E-06
48.70	38.68	1.4	1.54E-03	1.45	1.15	1.0	1.37E-06
38.68	30.73	1.5	9.75E-04	1.15	0.92	0.8	8.68E-07
30.73	24.41	1.3	6.15E-04	0.92	0.73	1.0	5.51E-07
24.41	19.39	1.1	3.88E-04	0.73	0.58	1.2	3.47E-07
19.39	15.40	1.1	2.45E-04	0.58	0.10	5.6	4.76E-08
15.40	12.23	1.1	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd

Client ID: RF2

Job No: 19_1531

Laboratory ID: 19_1531_15

Analysis: X-ray sedimentation by Sedigraph 5100

Analysis temp.: 35.7 °C

Dispersant: Water

Sonication: 10 min

Additives: 10 mL sodium hexametaphosphate

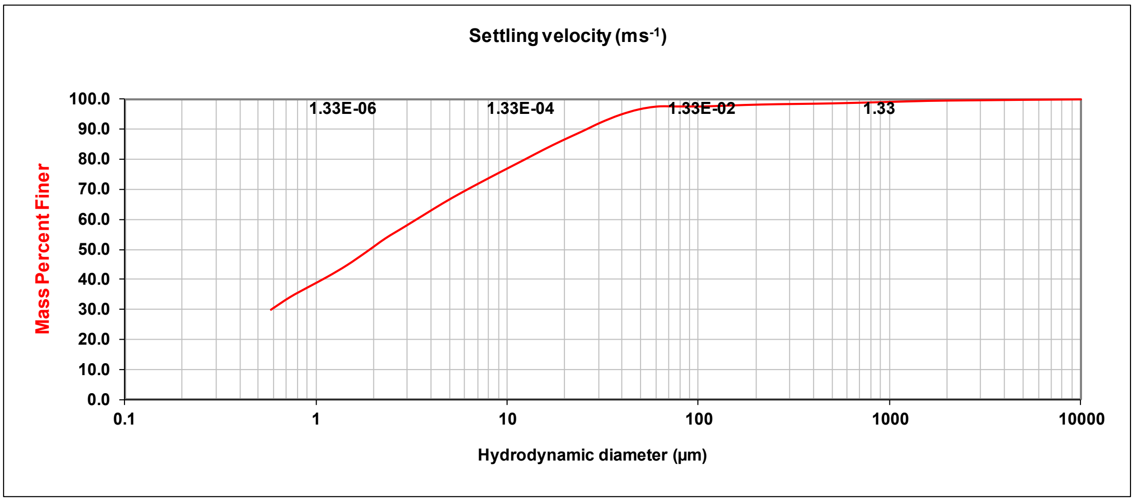
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)

Liquid density: 0.994 g/cm^3

Critical diameter: 54.33 µm

Liquid viscosity: 0.724 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.4	1.64E+01	12.23	9.17	4.1	9.20E-05
2000.00	1000.00	0.4	1.64E+00	9.17	7.29	3.3	5.48E-05
1000.00	500.00	0.5	4.10E-01	7.29	5.79	3.4	3.46E-05
500.00	212.00	0.4	8.69E-02	5.79	4.60	3.6	2.18E-05
212.00	106.00	0.6	1.84E-02	4.60	3.65	3.9	1.38E-05
106.00	97.16	0.0	8.45E-03	3.65	2.90	3.9	8.68E-06
97.16	77.18	0.0	6.15E-03	2.90	2.30	3.9	5.47E-06
77.18	61.31	0.0	3.88E-03	2.30	1.83	4.5	3.45E-06
61.31	48.70	1.0	2.45E-03	1.83	1.45	4.4	2.18E-06
48.70	38.68	1.9	1.54E-03	1.45	1.15	3.8	1.37E-06
38.68	30.73	2.5	9.75E-04	1.15	0.92	3.3	8.68E-07
30.73	24.41	3.0	6.15E-04	0.92	0.73	3.5	5.51E-07
24.41	19.39	2.9	3.88E-04	0.73	0.58	4.2	3.47E-07
19.39	15.40	3.1	2.45E-04	0.58	0.10	30.0	4.76E-08
15.40	12.23	3.3	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

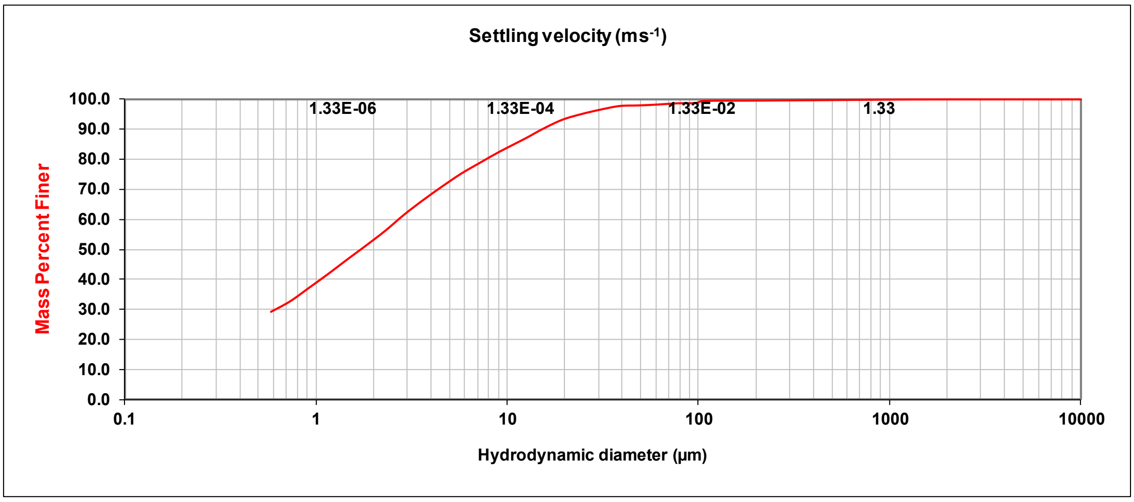
microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: RF3
Job No: 19_1531
Laboratory ID: 19_1531_17

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate

Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.725 cp
Critical diameter: 54.36 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	0.0	1.64E+01	12.23	9.17	4.1	9.20E-05
2000.00	1000.00	0.1	1.64E+00	9.17	7.29	3.6	5.48E-05
1000.00	500.00	0.2	4.10E-01	7.29	5.79	3.7	3.46E-05
500.00	212.00	0.2	8.69E-02	5.79	4.60	4.3	2.18E-05
212.00	106.00	0.1	1.84E-02	4.60	3.65	4.6	1.38E-05
106.00	97.16	0.7	8.45E-03	3.65	2.90	4.9	8.68E-06
97.16	77.18	0.1	6.15E-03	2.90	2.30	5.5	5.47E-06
77.18	61.31	0.4	3.88E-03	2.30	1.83	4.9	3.45E-06
61.31	48.70	0.3	2.45E-03	1.83	1.45	4.8	2.18E-06
48.70	38.68	0.2	1.54E-03	1.45	1.15	4.9	1.37E-06
38.68	30.73	1.2	9.75E-04	1.15	0.92	4.5	8.68E-07
30.73	24.41	1.5	6.15E-04	0.92	0.73	4.6	5.51E-07
24.41	19.39	1.9	3.88E-04	0.73	0.58	3.5	3.47E-07
19.39	15.40	3.0	2.45E-04	0.58	0.10	29.1	4.76E-08
15.40	12.23	3.5	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

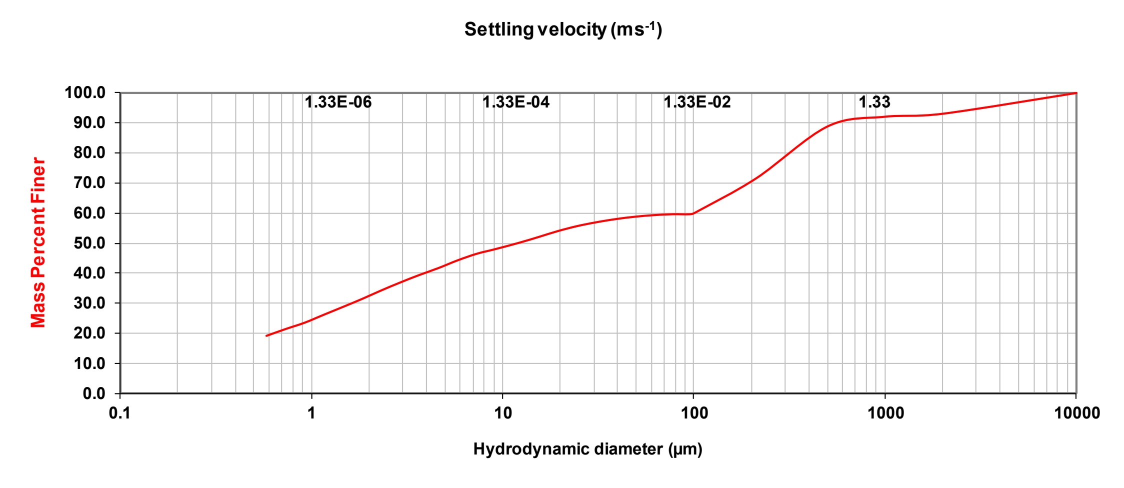
microanalysis australia

37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: RF4
Job No: 19_1531
Laboratory ID: 19_1531_19

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate
Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.724 cp
Critical diameter: 54.35 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	6.9	1.64E+01	12.23	9.17	2.1	9.20E-05
2000.00	1000.00	1.0	1.64E+00	9.17	7.29	1.6	5.48E-05
1000.00	500.00	3.2	4.10E-01	7.29	5.79	2.2	3.46E-05
500.00	212.00	17.2	8.69E-02	5.79	4.60	2.6	2.18E-05
212.00	106.00	10.8	1.84E-02	4.60	3.65	2.3	1.38E-05
106.00	97.16	1.2	8.45E-03	3.65	2.90	2.5	8.68E-06
97.16	77.18	0.1	6.15E-03	2.90	2.30	2.7	5.47E-06
77.18	61.31	0.3	3.88E-03	2.30	1.83	2.8	3.45E-06
61.31	48.70	0.5	2.45E-03	1.83	1.45	2.7	2.18E-06
48.70	38.68	0.8	1.54E-03	1.45	1.15	2.6	1.37E-06
38.68	30.73	1.0	9.75E-04	1.15	0.92	2.6	8.68E-07
30.73	24.41	1.3	6.15E-04	0.92	0.73	2.1	5.51E-07
24.41	19.39	1.6	3.88E-04	0.73	0.58	2.3	3.47E-07
19.39	15.40	1.9	2.45E-04	0.58	0.10	19.2	4.76E-08
15.40	12.23	1.9	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

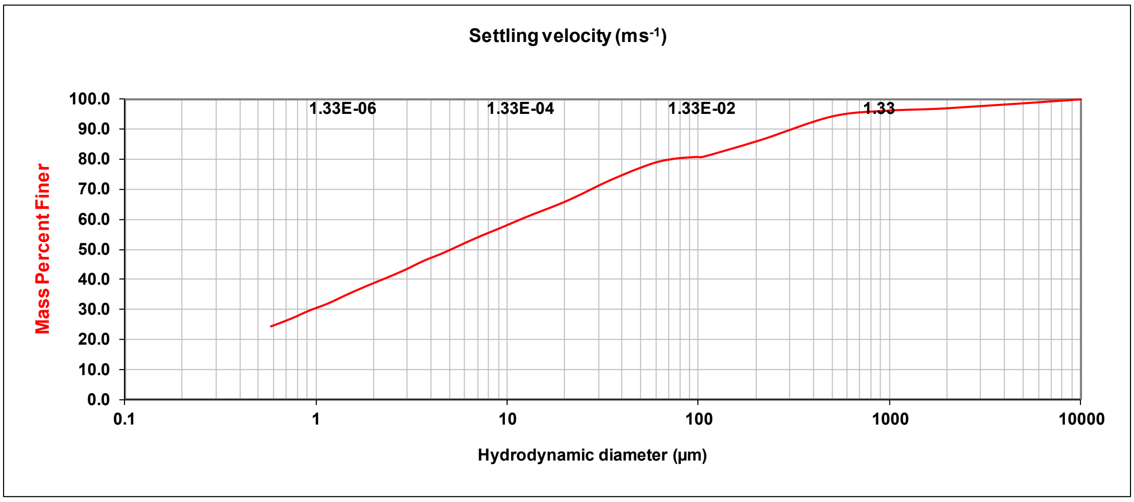
Characterisation from the micro to the macro www.microanalysis.com.au

microanalysis australia
37 Kensington Street
East Perth
WA 6004

Client: BMT Eastern Australia Pty Ltd
Client ID: RF6
Job No: 19_1531
Laboratory ID: 19_1531_16

Analysis: X-ray sedimentation by Sedigraph 5100
Analysis temp.: 35.7 °C
Dispersant: Water
Sonication: 10 min
Additives: 10 mL sodium hexametaphosphate
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Critical diameter: 54.35 µm
Liquid viscosity: 0.725 cp



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	3.0	1.64E+01	12.23	9.17	3.4	9.20E-05
2000.00	1000.00	0.8	1.64E+00	9.17	7.29	2.6	5.48E-05
1000.00	500.00	1.9	4.10E-01	7.29	5.79	2.8	3.46E-05
500.00	212.00	7.8	8.69E-02	5.79	4.60	2.9	2.18E-05
212.00	106.00	5.6	1.84E-02	4.60	3.65	2.6	1.38E-05
106.00	97.16	0.1	8.45E-03	3.65	2.90	3.1	8.68E-06
97.16	77.18	0.5	6.15E-03	2.90	2.30	2.8	5.47E-06
77.18	61.31	1.1	3.88E-03	2.30	1.83	2.6	3.45E-06
61.31	48.70	2.2	2.45E-03	1.83	1.45	2.8	2.18E-06
48.70	38.68	2.6	1.54E-03	1.45	1.15	3.0	1.37E-06
38.68	30.73	2.8	9.75E-04	1.15	0.92	2.3	8.68E-07
30.73	24.41	3.2	6.15E-04	0.92	0.73	2.8	5.51E-07
24.41	19.39	2.9	3.88E-04	0.73	0.58	2.4	3.47E-07
19.39	15.40	2.5	2.45E-04	0.58	0.10	24.3	4.76E-08
15.40	12.23	2.5	1.54E-04	Total:		100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

microanalysis australia
37 Kensington Street
East Perth
WA 6004

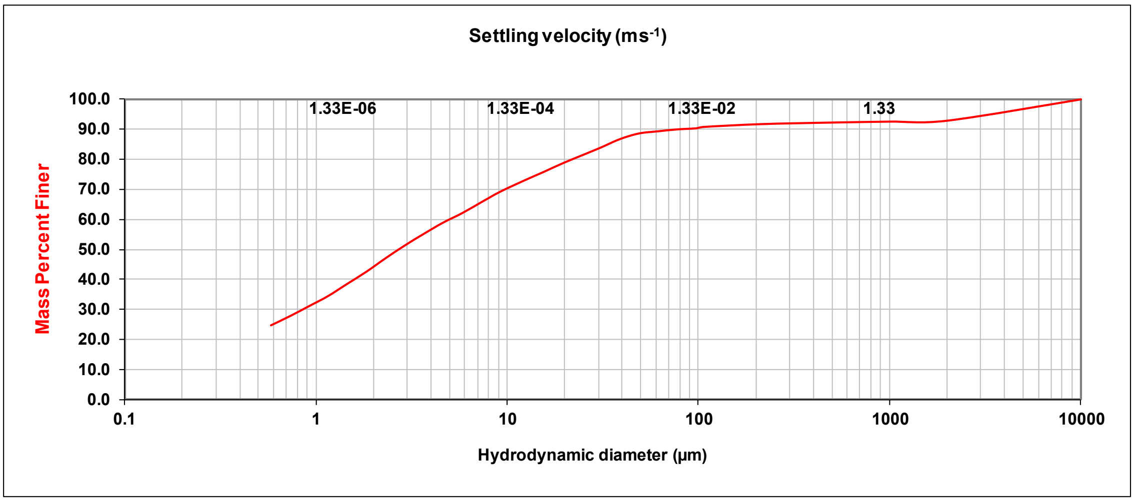
Client: BMT Eastern Australia Pty Ltd
Client ID: RF7
Job No: 19_1531
Laboratory ID: 19_1531_18

Analysis: X-ray sedimentation by Sedigraph 5100
Dispersant: Water
Additives: 10 mL sodium hexametaphosphate

Analysis temp.: 35.7 °C
Sonication: 10 min
Concentration: ~5 % w/w

Sample density: 2.650 g/cm^3 (assumed)
Liquid density: 0.994 g/cm^3
Liquid viscosity: 0.723 cp

Critical diameter: 54.31 µm



Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})	Max size (µm)	Min size (µm)	In %	Mean settling velocity* (ms^{-1})
10000.00	2000.00	7.1	1.64E+01	12.23	9.17	3.7	9.20E-05
2000.00	1000.00	0.3	1.64E+00	9.17	7.29	3.5	5.48E-05
1000.00	500.00	0.3	4.10E-01	7.29	5.79	3.6	3.46E-05
500.00	212.00	0.5	8.69E-02	5.79	4.60	3.2	2.18E-05
212.00	106.00	0.9	1.84E-02	4.60	3.65	3.7	1.38E-05
106.00	97.16	0.5	8.45E-03	3.65	2.90	3.9	8.68E-06
97.16	77.18	0.4	6.15E-03	2.90	2.30	4.3	5.47E-06
77.18	61.31	0.6	3.88E-03	2.30	1.83	4.4	3.45E-06
61.31	48.70	0.7	2.45E-03	1.83	1.45	4.1	2.18E-06
48.70	38.68	1.9	1.54E-03	1.45	1.15	4.1	1.37E-06
38.68	30.73	2.8	9.75E-04	1.15	0.92	3.3	8.68E-07
30.73	24.41	2.6	6.15E-04	0.92	0.73	3.4	5.51E-07
24.41	19.39	2.6	3.88E-04	0.73	0.58	3.1	3.47E-07
19.39	15.40	2.9	2.45E-04	0.58	0.10	24.6	4.76E-08
15.40	12.23	2.8	1.54E-04		Total:	100.0	

Note : Data from 106 µm to 10,000 µm by wet screening , from 0.3µm to 106 µm by Sedimentation.
* based on the mean of the size interval and on the the calculations and variables in the 'settling velocity worksheet

Appendix D Sediment Quality Results – Secondary Laboratory

GRAIN SIZE ANALYSIS (hydrometer and sieving techniques)

5 soil samples supplied by Symbio Laboratories Pty Ltd on 13 October, 2020 - Lab Job No. J9353.
Analysis requested by Clem Koon
PO Box 4312 EIGHT MILE PLAINS QLD 4113

SAMPLE ID	Lab Code	MOISTURE CONTENT (% of water in air-dry sample)	TOTAL GRAVEL > 2 mm (% of total oven-dry equivalent)	COARSE SAND 200-2000 µm (0.2-2.0 mm) (% of total oven-dry equivalent)	FINE SAND 20-200 µm (0.02-0.2 mm) (% of total oven-dry equivalent)	SILT 2-20 µm ISSS (% of total oven-dry equivalent)	CLAY < 2 µm (% of total oven-dry equivalent)	Total soil fractions (incl. Gravel)
B955262-A1	J9353/1	48.6%	1.7%	39.4%	12.7%	14.2%	32.1%	100.0%
B955262-A2	J9353/2	57.3%	0.8%	5.7%	34.4%	22.4%	36.7%	100.0%
B955262-A3	J9353/3	57.0%	0.1%	9.0%	26.6%	19.2%	45.1%	100.0%
B955262-A4	J9353/4	57.4%	0.0%	1.0%	43.9%	19.8%	35.2%	100.0%
B955262-A5	J9353/5	57.3%	0.4%	6.7%	23.0%	22.6%	47.4%	100.0%

Note:

1: The Hydrometer Analysis method was used to determine the percentage sand, silt and clay, modified from SOP meth004 (California Dept of Pesticide Regulation), using method of Gee & Bauder (1986), in *Methods of Soil Analysis. Part 1* Agron. Monogr. 9 (2nd Ed). Klute, A., American Soc. of Agronomy Inc., Soil Sci. Soc. America Inc., Madison WI: 383-411.

2: Australian Standard 1289.3.8.1-1997 (see attached)

3. Analysis conducted between sample arrival date and reporting date.

4. This report is not to be reproduced except in full. Results only relate to the item tested.

5. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal).

5. This report was issued on 16/10/2020.

checked: ....
Graham Lancaster (Nata signatory)
Laboratory Manager

Symbio LABORATORIES

QUALITY CONTROL REPORT

Certificate Number	B955262-A	Page	1 of 4
Client	BMT Commercial Australia Pty Ltd	Laboratory	Brisbane
Contact	Darren Richardson	Contact	Customer Service Team
Address	Level 8 200 Creek Street Brisbane, QLD 4000	Address	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone	07 3831 6744	Telephone	1300 703 166
Order Number	---	Date Samples Received	09/10/2020 16:30
Project ID	Sediment - Brisbane River	Date Analysis Commenced	09/10/2020
Sampler	Customer	Issue Date	29/10/2020
Client Job Reference	---	Receipt Temperature (°C)	1.0°C
Number of Samples Received	5	Storage Temperature (°C)	4°C
Number of Samples Analysed	5	Quote Number	---

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:

1. Method Blank (MB) Report; Limit of Detection and QC Result
2. Method Laboratory Control Sample (LCS) Report; QC Result and Acceptance Criteria
3. Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits

General Comments

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

Where a reported less than (<) result is higher than the LOD, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOD of a reported result differs from standard LOD, this may be due to high moisture content

Abbreviation:

QC Sample = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CRM = Certified Referenced Material; Used to verify in-house LCS

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOD = Limit of detection

RPD = Relative Percentage Difference

Client	BMT Commercial Australia Pty Ltd
Contact	Darren Richardson
Certificate Number	B955262-A
Page	

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Method Blank 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.

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Result
Lab Method: BE6042_0B (BatchID - 0063685)				
Method Blank - 0063685	Total Organic Carbon	0.05	%w/w	<0.05

Client	BMT Commercial Australia Pty Ltd
Contact	Darren Richardson
Certificate Number	B955262-A
Page	3 of 4

Method Laboratory Control Sample Report

The quality control term Laboratory Control Sample (LCS) refers to a certified reference material (CRM) or a sample with known parameters that have been verified against a CRM. The quality control term Spike (SPK) refers to a known interference free matrix spiked with target analytes. The purpose of these QC parameters is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Method : Compound / QC Sample ID	Analyte	LOD	Units	QC Test Results	Expected Value	QC Recovery	QC Criteria
Lab Method: BE6042_0B (BatchID - 0063685 - LCS_EBNE00173)							
LCS_EBNE00173	Total Organic Carbon	0.05	%w/w	4.0	4.06	98%	90% - 110%

Client	BMT Commercial Australia Pty Ltd
Contact	Darren Richardson
Certificate Number	B955262-A
Page	4 of 4

Laboratory Duplicate 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 the relavant technical method manuals and are dependent on the magnitude of results in comparison to the level of reporting.

Method : Compound / QC Sample ID	Analyte	LOD	Units	Original Result	Dup Result	RPD	RPD Acceptance Criteria
Lab Method: BE6042_0B (BatchID - 0063685)							
Laboratory Duplicate Sample - 0063685	Total Organic Carbon	0.05	%w/w	0.97	0.93	4.2%	<30%

Symbio LABORATORIES

Symbio LABORATORIES Proudly AUSTRALIAN
ABN: 82 079 645 015

CERTIFICATE OF ANALYSIS

Certificate Number	B955262-A [R00]	**Page**	1/5
Client	BMT Commercial Australia Pty Ltd	**Registering Laboratory**	Brisbane
Contact	Darren Richardson	**Contact**	Customer Service Team
Address	Level 8 200 Creek Street Brisbane QLD 4000	**Address**	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone	07 3831 6744	**Telephone**	1300 703 166
Order Number	---	**Date Samples Received**	09/10/2020
Project ID	Sediment - Brisbane River	**Date Analysis Commenced**	09/10/2020
Sampler	Customer	**Issue Date**	29/10/2020
Client Job Reference	---	**Receipt Temperature (°C)**	1.0
No. of Samples Registered	5 | Sampler: Customer	**Storage Temperature (°C)**	4
Priority	Normal	**Quote Number**	---

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Water results are reported on an 'as is' basis. Soil and sediment results are reported on a 'dry weight' basis. For other matrices the basis of reporting will be confirmed in the 'Report Comments' section. Measurement Uncertainty is available upon request or via www.symbiolabs.com.au/login. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | NA: Not Applicable | ND: Not Detected | LOR: Limit of Reporting | [NT]: Not Tested |
| ~: Estimated | ^ Subcontracted Analysis | TBA: To Be Advised | ** Potential Holding Time Concern | * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR

Authorised By

Name	Position	Accreditation Category
Glen Rangott	Environmental Laboratory Manager, Brisbane	Environmental Chemistry

Sample Information *- Client/Sampler Supplied*

Sample ID	B955262-A/1	B955262-A/2	B955262-A/3	B955262-A/4	B955262-A/5
Sample Description	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
Sample Matrix	Sediments	Sediments	Sediments	Sediments	Sediments

Client	BMT Commercial Australia Pty Ltd	**Project ID**	Sediment - Brisbane River
Certificate Number	B955262-A [R00]	**Sampler**	Customer
Page	3/5	**Order Number**	---

Analytical Results

Compound/Analyte	LOR	Units	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
Client Sample Description			B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
Client Sampling date/time			---	---	---	---	---
			B955262-A/1	B955262-A/2	B955262-A/3	B955262-A/4	B955262-A/5
			Results	Results	Results	Results	Results
Total Organic Carbonin Soil							
BE6042-B - Total Organic Carbon in Soil and Sediment							
Total Organic Carbon(TOC)*	0.1	%w/w	1	1.6	1.3	1.3	0.9
Particle Size Distribution							
S023.03 - Particle Size Distribution by Hydrometer							
Particle Size Distribution	0.1	%	See attached	See attached	See attached	See attached	See attached
Acid Sulphate Soil - Cr Reduci							
ENV274 - Acid Sulphate Soil - Cr Reducible Sulphur Suite							
Chromium Reducible Sulphur	0.005	% S	---	0.290	0.280	---	---
pHkcl TAA	0.1	pH Units	---	8.7	8.8	---	---
ANCE (Acid Neutralising Capacity)	0.01	% CaCO3	---	2.80	3.40	---	---
Net Acid Soluble Sulpur	0.02	% S	---	N/A	N/A	---	---
Acid trail Titratable Actual Acidity	2	mol H+/t	---	<2.00	<2.00	---	---
Sulfidic - TAA equiv	0.02	% pyrite S	---	<0.00	<0.00	---	---
Chromium Reducible Sulfur Acidity Units	3	mol H+/t	---	180.00	180.00	---	---
Sulfur - KCl Extractable	0.02	% S	---	N/A	N/A	---	---
HCl Extractable Sulfur	0.02	% S	---	N/A	N/A	---	---
Net Acid Soluble Sulfur Acidity Units	10	mol H+/t	---	N/A	N/A	---	---
Net Acid Soluble Sulfur Equiv S% Pyrite	0.02	% S	---	N/A	N/A	---	---

Analytical Results

Compound/Analyte	LOR	Units	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
		Client Sample Description	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
		Client Sampling date/time	---	---	---	---	---
			B955262-A/1	B955262-A/2	B955262-A/3	B955262-A/4	B955262-A/5
			Results	Results	Results	Results	Results
Acid Sulphate Soil - Cr Reduci - Continued							
ENV274 - Acid Sulphate Soil - Cr Reducible Sulphur Suite - Continued							
Acid Neutralising Capacity Acid (ANCbt)	2	mol H+/t	---	560.00	680.00	---	---
Acid Neutralising Capacity Equiv S%	0.02	% S	---	0.90	1.10	---	---
ANC Fineness Factor	---	factor	---	1.50	1.50	---	---
Net Acidity (Sulfur Units)	0.02	% S	---	<0.02	<0.02	---	---
Net Acidity (Acidity Units)	10	mol H+/t	---	<10.00	<10.00	---	---
Liming Rate	1	kg CaCO3/t	---	<1.00	<1.00	---	---
S004.09A Total Phosphorus							
S004.09 - Determination of Total Phosphorus							
Total Phosphorus^	1	mg/kg	---	1100	1000	---	---
S004.03A Total Nitrogen							
S004.03 - Determination of Total Nitrogen							
Total Nitrogen^	20	mg/kg	---	1100	1100	---	---
S004.08A NOx as N							
S004.08 - Determination of NOx as N							
NOx as N^	0.1	mg/kg	---	<0.50	<0.50	---	---
S004.04A TKN							
S004.04 - Determination of Total Kjeldahl Nitrogen							
Total Kjeldahl Nitrogen^	20	mg/kg	---	1100	1100	---	---

Analysis Location

The following analysis was completed by Symbio Laboratories - Brisbane: BE6042_0B.
The following analysis was completed by a subcontract laboratory : ENV274;S004_03;S004_04;S004_08;S004_09;S023_03B.

Report Comments

Please note: Cr Reducible Sulphur Suite testing performed by an external subcontracted NATA certified Laboratory.Accreditation No.: 1261 Report No: 750056-SPlease note: Particle Size Dist. testing via Hydrometer and sieving performed by an external subcontracted Laboratory. Report No: J9353Please note: Total Phosphorus, Total Nitrogen, NOx as N and Total Kjeldahl Nitrogen testing performed by an external subcontracted NATA certified Laboratory.Accreditation No.: 1884 Report No: SAL27748

Symbio LABORATORIES

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ABN: 82 079 645 015

CERTIFICATE OF ANALYSIS

Certificate Number	B955262-B [R00]	**Page**	1/3
Client	BMT Commercial Australia Pty Ltd	**Registering Laboratory**	Brisbane
Contact	Darren Richardson	**Contact**	Customer Service Team
Address	Level 8 200 Creek Street Brisbane QLD 4000	**Address**	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone	07 3831 6744	**Telephone**	1300 703 166
Order Number	---	**Date Samples Received**	09/10/2020
Project ID	Sediment - Brisbane River	**Date Analysis Commenced**	09/10/2020
Sampler	Customer	**Issue Date**	30/10/2020
Client Job Reference	---	**Receipt Temperature (°C)**	1.0
No. of Samples Registered	2 | Sampler: Customer	**Storage Temperature (°C)**	4
Priority	Normal	**Quote Number**	---

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Water results are reported on an 'as is' basis. Soil and sediment results are reported on a 'dry weight' basis. For other matrices the basis of reporting will be confirmed in the 'Report Comments' section. Measurement Uncertainty is available upon request or via www.symbiolabs.com.au/login. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | NA: Not Applicable | ND: Not Detected | LOR: Limit of Reporting | [NT]: Not Tested |
| ~: Estimated | ^ Subcontracted Analysis | TBA: To Be Advised | ** Potential Holding Time Concern | * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR

Authorised By

Name	Position	Accreditation Category
Glen Rangott	Environmental Laboratory Manager, Brisbane	Environmental Chemistry

Sample Information - *Client/Sampler Supplied*

Sample ID	B955262-B/2	B955262-B/3
Sample Description	B5-1C	B10-6C
Sample Matrix	Sediments	Sediments

Client	BMT Commercial Australia Pty Ltd	**Project ID**	Sediment - Brisbane River
Certificate Number	B955262-B [R00]	**Sampler**	Customer
Page	3/3	**Order Number**	---

Analytical Results

Client Sample Description			**B5-1C**	**B10-6C**
Client Sampling date/time			---	---
Compound/Analyte	**LOR**	**Units**	**B955262-B/2**	**B955262-B/3**
			Results	**Results**
Radiation Analysis*				
S014.00 - Determination of Gross Alpha and Beta				
Gross Alpha* (including K-40 correction)	0.08	Bq/g	0.180	0.099
Gross Beta* (including K-40 correction)	0.25	Bq/g	0.55	0.51

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Subcontract Laboratory.

Report Comments

Please note: Testing performed by an external subcontracted Laboratory.Report No: ME316925

Symbio LABORATORIES

QUALITY CONTROL REPORT

Certificate Number	B955262-C	**Page**	1 of 16
Client	BMT Commercial Australia Pty Ltd	**Laboratory**	Brisbane
Contact	Darren Richardson	**Contact**	Customer Service Team
Address	Level 8 200 Creek Street Brisbane, QLD 4000	**Address**	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone	07 3831 6744	**Telephone**	1300 703 166
Order Number	---	**Date Samples Received**	13/10/2020 08:15
Project ID	Sediment - Brisbane River	**Date Analysis Commenced**	13/10/2020
Sampler	Customer	**Issue Date**	22/10/2020
Client Job Reference	---	**Receipt Temperature (°C)**	10.0°C
Number of Samples Received	5	**Storage Temperature (°C)**	4.0°C
Number of Samples Analysed	5	**Quote Number**	---

This Quality Control Report contains the following information:

1. Method Blank (MB) Report; Limit of Detection and QC Result
2. Method Laboratory Control Sample (LCS) Report; QC Result and Acceptance Criteria
3. Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits

General Comments

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

Where a reported less than (<) result is higher than the LOD, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOD of a reported result differs from standard LOD, this may be due to high moisture content

Abbreviation:

QC Sample = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CRM = Certified Referenced Material; Used to verify in-house LCS

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOD = Limit of detection

RPD = Relative Percentage Difference

Method Blank 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.

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Result
Lab Method: 04_001S (BatchID - 0063669)				
Method Blank - 0063669	Aluminium	1	mg/kg	**1.1**
Method Blank - 0063669	Antimony	2	mg/kg	<2
Method Blank - 0063669	Arsenic	5	mg/kg	<5
Method Blank - 0063669	Cadmium	0.5	mg/kg	<0.5
Method Blank - 0063669	Chromium	1	mg/kg	<1
Method Blank - 0063669	Cobalt	0.5	mg/kg	<0.5
Method Blank - 0063669	Copper	1	mg/kg	<1
Method Blank - 0063669	Iron	2	mg/kg	<2
Method Blank - 0063669	Lead	2	mg/kg	<2
Method Blank - 0063669	Manganese	1	mg/kg	<1
Method Blank - 0063669	Nickel	1	mg/kg	<1
Method Blank - 0063669	Phosphorus	5	mg/kg	<5
Method Blank - 0063669	Selenium	5	mg/kg	<5
Method Blank - 0063669	Silver	1	mg/kg	<1
Method Blank - 0063669	Vanadium	0.5	mg/kg	<0.5
Method Blank - 0063669	Zinc	5	mg/kg	<5
Lab Method: 04_002SED (BatchID - 0063567)				
Method Blank - 0063567	Mercury	2	µg/kg	<2
Lab Method: 04_004S (BatchID - 0063703)				
Method Blank - 0063703	Moisture	0.1	%	<0.1
Lab Method: 04_029S (BatchID - 0063787)				
Method Blank - 0063787	PCB-001	1	µg/kg	<1
Method Blank - 0063787	PCB-008	1	µg/kg	<1
Method Blank - 0063787	PCB-015	1	µg/kg	<1

Method Blank Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Result
Lab Method: 04_029S (BatchID - 0063787) - Continued				
Method Blank - 0063787	PCB-018	1	µg/kg	<1
Method Blank - 0063787	PCB-022	1	µg/kg	<1
Method Blank - 0063787	PCB-028	1	µg/kg	<1
Method Blank - 0063787	PCB-044	1	µg/kg	<1
Method Blank - 0063787	PCB-052	1	µg/kg	<1
Method Blank - 0063787	PCB-066	1	µg/kg	<1
Method Blank - 0063787	PCB-077	1	µg/kg	<1
Method Blank - 0063787	PCB-101	1	µg/kg	<1
Method Blank - 0063787	PCB-105	1	µg/kg	<1
Method Blank - 0063787	PCB-118	1	µg/kg	<1
Method Blank - 0063787	PCB-126	1	µg/kg	<1
Method Blank - 0063787	PCB-128	1	µg/kg	<1
Method Blank - 0063787	PCB-138	1	µg/kg	<1
Method Blank - 0063787	PCB-153	1	µg/kg	<1
Method Blank - 0063787	PCB-169	1	µg/kg	<1
Method Blank - 0063787	PCB-170	1	µg/kg	<1
Method Blank - 0063787	PCB-180	1	µg/kg	<1
Method Blank - 0063787	PCB-187	1	µg/kg	<1
Method Blank - 0063787	PCB-195	1	µg/kg	<1
Method Blank - 0063787	PCB-206	1	µg/kg	<1
Method Blank - 0063787	PCB-209	1	µg/kg	<1
Lab Method: E061_0C (BatchID - 0063770)				
Method Blank - 0063770	Dibutyltin dichloride	0.5	µgSn/kg	<0.5
Method Blank - 0063770	Monobutyltin trichloride	0.5	µgSn/kg	<0.5
Method Blank - 0063770	Tributyltin chloride	0.5	µgSn/kg	<0.5
Lab Method: SE102_0C (BatchID - 0063793)				
Method Blank - 0063793	>C10-C16 Fraction	10	mg/kg	<10

Method Blank Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Result
Lab Method: SE102_0C (BatchID - 0063793) - Continued				
Method Blank - 0063793	>C16-C34 Fraction	50	mg/kg	<50
Method Blank - 0063793	>C34-C40 Fraction	50	mg/kg	<50
Method Blank - 0063793	C10-C14 Fraction	10	mg/kg	<10
Method Blank - 0063793	C15-C28 Fraction	50	mg/kg	<50
Method Blank - 0063793	C29-C36 Fraction	50	mg/kg	<50
Lab Method: SE103_0C (BatchID - 0063776)				
Method Blank - 0063776	1-Methylnaphthalene	0.5	µg/kg	<0.5
Method Blank - 0063776	2-Methylnaphthalene	0.5	µg/kg	<0.5
Method Blank - 0063776	Acenaphthene	0.5	µg/kg	<0.5
Method Blank - 0063776	Acenaphthylene	0.5	µg/kg	<0.5
Method Blank - 0063776	Anthracene	0.5	µg/kg	<0.5
Method Blank - 0063776	Benzo(a)anthracene	0.5	µg/kg	<0.5
Method Blank - 0063776	Benzo(a)pyrene	0.5	µg/kg	<0.5
Method Blank - 0063776	Benzo(b+k)fluoranthene	1	µg/kg	<1
Method Blank - 0063776	Benzo(e)pyrene	0.5	µg/kg	<0.5
Method Blank - 0063776	Benzo(g.h.i)perylene	0.5	µg/kg	<0.5
Method Blank - 0063776	Chrysene	0.5	µg/kg	<0.5
Method Blank - 0063776	Coronene	0.5	µg/kg	<0.5
Method Blank - 0063776	Dibenz(a.h)anthracene	0.5	µg/kg	<0.5
Method Blank - 0063776	Fluoranthene	0.5	µg/kg	<0.5
Method Blank - 0063776	Fluorene	0.5	µg/kg	<0.5
Method Blank - 0063776	Indeno(c.d)pyrene	0.5	µg/kg	<0.5
Method Blank - 0063776	Naphthalene	0.5	µg/kg	<0.5
Method Blank - 0063776	Perylene	0.5	µg/kg	<0.5
Method Blank - 0063776	Phenanthrene	0.5	µg/kg	<0.5
Method Blank - 0063776	Pyrene	0.5	µg/kg	<0.5

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Method Blank Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Result
Lab Method: SE104_0C (BatchID - 0063784)				
Method Blank - 0063784	Aldrin	1	µg/L	<1
Method Blank - 0063784	alpha-Endosulfan	1	µg/L	<1
Method Blank - 0063784	alpha-Hexachlorocyclohexane	1	µg/L	<1
Method Blank - 0063784	beta-Endosulfan	1	µg/L	<1
Method Blank - 0063784	beta-Hexachlorocyclohexane	1	µg/L	<1
Method Blank - 0063784	cis-Chlordane	1	µg/L	<1
Method Blank - 0063784	delta-Hexachlorocyclohexane	1	µg/L	<1
Method Blank - 0063784	Dieldrin	1	µg/L	<1
Method Blank - 0063784	Endosulfan Sulphate	1	µg/L	<1
Method Blank - 0063784	Endrin	1	µg/L	<1
Method Blank - 0063784	Endrin Aldehyde	1	µg/L	<1
Method Blank - 0063784	Endrin Ketone	1	µg/L	<1
Method Blank - 0063784	gamma-Hexachlorocyclohexane	1	µg/L	<1
Method Blank - 0063784	Heptachlor	1	µg/L	<1
Method Blank - 0063784	Heptachlor epoxide	1	µg/L	<1
Method Blank - 0063784	Hexachlorobenzene	1	µg/L	<1
Method Blank - 0063784	Methoxychlor	1	µg/L	<1
Method Blank - 0063784	Oxychlordane	1	µg/L	<1
Method Blank - 0063784	pp-Dichlorodiphenyldichloroethane	1	µg/L	<1
Method Blank - 0063784	pp-Dichlorodiphenyldichloroethylene	1	µg/L	<1
Method Blank - 0063784	pp-Dichlorodiphenyltrichloroethane	1	µg/L	<1
Method Blank - 0063784	trans-Chlordane	1	µg/L	<1
Lab Method: SE105_0B (BatchID - 0063794)				
Method Blank - 0063794	Benzene	200	µg/kg	<200
Method Blank - 0063794	C6-C10 Fraction	2000	µg/kg	<2000
Method Blank - 0063794	C6-C9 Fraction	2000	µg/kg	<2000

Method Blank Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Result
Lab Method: SE105_0B (BatchID - 0063794) - Continued				
Method Blank - 0063794	Ethylbenzene	200	µg/kg	<200
Method Blank - 0063794	meta- and para-Xylenes	400	µg/kg	<400
Method Blank - 0063794	Naphthalene	200	µg/kg	<200
Method Blank - 0063794	ortho-Xylene	200	µg/kg	<200
Method Blank - 0063794	Toluene	200	µg/kg	<200

Method Laboratory Control Sample Report

The quality control term Laboratory Control Sample (LCS) refers to a certified reference material (CRM) or a sample with known parameters that have been verified against a CRM. The quality control term Spike (SPK) refers to a known interference free matrix spiked with target analytes. The purpose of these QC parameters is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Method : Compound / QC Sample ID	Analyte	LOD	Units	QC Test Results	Expected Value	QC Recovery	QC Criteria
Lab Method: 04_001S (BatchID - 0063669 - CRM_ESYD00004)							
CRM_ESYD00004	Aluminium	1	mg/kg	6640	8950	74%	70% - 130%
CRM_ESYD00004	Antimony	2	mg/kg	6.8	7.3	93%	70% - 130%
CRM_ESYD00004	Arsenic	5	mg/kg	18.5	17.2	107%	70% - 130%
CRM_ESYD00004	Cadmium	0.5	mg/kg	9.5	9.33	101%	70% - 130%
CRM_ESYD00004	Chromium	1	mg/kg	86.0	82	104%	70% - 130%
CRM_ESYD00004	Cobalt	0.5	mg/kg	9.1	9.16	99%	70% - 130%
CRM_ESYD00004	Copper	1	mg/kg	23.9	23.2	103%	70% - 130%
CRM_ESYD00004	Iron	2	mg/kg	18340	20000	91%	70% - 130%
CRM_ESYD00004	Lead	2	mg/kg	40.9	40.4	101%	70% - 130%
CRM_ESYD00004	Manganese	1	mg/kg	238.4	241	98%	70% - 130%
CRM_ESYD00004	Nickel	1	mg/kg	18.2	17.8	102%	70% - 130%
CRM_ESYD00004	Phosphorus	5	mg/kg	344.5	350	98%	70% - 130%
CRM_ESYD00004	Selenium	5	mg/kg	10.1	11	91%	70% - 130%
CRM_ESYD00004	Vanadium	0.5	mg/kg	25.4	25.3	100%	70% - 130%
CRM_ESYD00004	Zinc	5	mg/kg	54.3	57	95%	70% - 130%
Lab Method: 04_002SED (BatchID - 0063567 - CRM_ESYD00004)							
CRM_ESYD00004	Mercury	2	µg/kg	10500	11600	90%	70% - 130%
Lab Method: 04_002SED (BatchID - 0063567 - SPK_ESYD00002)							
SPK_ESYD00002	Mercury	2	µg/kg	48.5	50	97%	70% - 130%
Lab Method: 04_004S (BatchID - 0063703 - SPK_ESYD00001)							
SPK_ESYD00001	Moisture	0.1	%	100.1	100	100%	80% - 120%
Lab Method: 04_029S (BatchID - 0063787 - LCS_ESYD00047)							
LCS_ESYD00047	PCB-001	1	µg/kg	52.3	48	108%	50% - 150%
LCS_ESYD00047	PCB-008	1	µg/kg	53.7	48	111%	50% - 150%

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Method Laboratory Control Sample Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Test Result	Expected Value	QC Recovery	QC Criteria
Lab Method: 04_029S (BatchID - 0063787 - LCS_ESYD00047) - Continued							
LCS_ESYD00047	PCB-015	1	µg/kg	51.3	48	106%	50% - 150%
LCS_ESYD00047	PCB-018	1	µg/kg	51.9	48	108%	50% - 150%
LCS_ESYD00047	PCB-022	1	µg/kg	53.5	48	111%	50% - 150%
LCS_ESYD00047	PCB-028	1	µg/kg	55.1	48	114%	50% - 150%
LCS_ESYD00047	PCB-044	1	µg/kg	51.8	48	107%	50% - 150%
LCS_ESYD00047	PCB-052	1	µg/kg	52.5	48	109%	50% - 150%
LCS_ESYD00047	PCB-066	1	µg/kg	53.0	48	110%	50% - 150%
LCS_ESYD00047	PCB-077	1	µg/kg	47.6	48	99%	50% - 150%
LCS_ESYD00047	PCB-101	1	µg/kg	51.3	48	106%	50% - 150%
LCS_ESYD00047	PCB-105	1	µg/kg	46.9	48	97%	50% - 150%
LCS_ESYD00047	PCB-118	1	µg/kg	48.6	48	101%	50% - 150%
LCS_ESYD00047	PCB-126	1	µg/kg	52.0	48	108%	50% - 150%
LCS_ESYD00047	PCB-128	1	µg/kg	45.7	48	95%	50% - 150%
LCS_ESYD00047	PCB-138	1	µg/kg	47.1	48	98%	50% - 150%
LCS_ESYD00047	PCB-153	1	µg/kg	46.9	48	97%	50% - 150%
LCS_ESYD00047	PCB-169	1	µg/kg	53.3	48	111%	50% - 150%
LCS_ESYD00047	PCB-170	1	µg/kg	49.8	48	103%	50% - 150%
LCS_ESYD00047	PCB-180	1	µg/kg	46.7	48	97%	50% - 150%
LCS_ESYD00047	PCB-187	1	µg/kg	47.0	48	97%	50% - 150%
LCS_ESYD00047	PCB-195	1	µg/kg	53.4	48	111%	50% - 150%
LCS_ESYD00047	PCB-206	1	µg/kg	50.9	48	106%	50% - 150%
LCS_ESYD00047	PCB-209	1	µg/kg	46.0	48	95%	50% - 150%
Lab Method: E061_0C (BatchID - 0063770 - LCS_ESYD00015)							
LCS_ESYD00015	Dibutyltin dichloride	0.5	µgSn/kg	42.4	40	106%	50% - 150%
LCS_ESYD00015	Monobutyltin trichloride	0.5	µgSn/kg	40.5	40	101%	50% - 150%
LCS_ESYD00015	Tributyltin chloride	0.5	µgSn/kg	43.1	40	107%	50% - 150%

Client	BMT Commercial Australia Pty Ltd
Contact	Darren Richardson
Certificate Number	B955262-C
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Method Laboratory Control Sample Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Test Result	Expected Value	QC Recovery	QC Criteria
Lab Method: E061_0C (BatchID - 0063770 - LCS_ESYD00019)							
LCS_ESYD00019	Dibutyltin dichloride	0.5	µgSn/kg	4.3	4	107%	50% - 150%
LCS_ESYD00019	Monobutyltin trichloride	0.5	µgSn/kg	3.7	4	92%	50% - 150%
LCS_ESYD00019	Tributyltin chloride	0.5	µgSn/kg	4.9	4	122%	50% - 150%
Lab Method: SE102_0C (BatchID - 0063793 - LCS_ESYD00054)							
LCS_ESYD00054	>C10-C16 Fraction	10	mg/kg	28.0	34	82%	50% - 150%
LCS_ESYD00054	>C16-C34 Fraction	50	mg/kg	105.8	115	92%	50% - 150%
LCS_ESYD00054	>C34-C40 Fraction	50	mg/kg	59.9	82	73%	50% - 150%
LCS_ESYD00054	C10-C14 Fraction	10	mg/kg	18.8	19	98%	50% - 150%
LCS_ESYD00054	C15-C28 Fraction	50	mg/kg	73.0	72	101%	50% - 150%
LCS_ESYD00054	C29-C36 Fraction	50	mg/kg	78.2	79	98%	50% - 150%
Lab Method: SE103_0C (BatchID - 0063776 - LCS_ESYD00028)							
LCS_ESYD00028	1-Methylnaphthalene	0.5	µg/kg	51.5	48	107%	50% - 150%
LCS_ESYD00028	2-Methylnaphthalene	0.5	µg/kg	52.9	48	110%	50% - 150%
LCS_ESYD00028	Acenaphthene	0.5	µg/kg	48.3	48	100%	50% - 150%
LCS_ESYD00028	Acenaphthylene	0.5	µg/kg	48.6	48	101%	50% - 150%
LCS_ESYD00028	Anthracene	0.5	µg/kg	42.0	48	87%	50% - 150%
LCS_ESYD00028	Benzo(a)anthracene	0.5	µg/kg	47.9	48	99%	50% - 150%
LCS_ESYD00028	Benzo(a)pyrene	0.5	µg/kg	41.2	48	85%	50% - 150%
LCS_ESYD00028	Benzo(b+k)fluoranthene	1	µg/kg	96.9	96	100%	50% - 150%
LCS_ESYD00028	Benzo(e)pyrene	0.5	µg/kg	37.0	48	77%	50% - 150%
LCS_ESYD00028	Benzo(g.h.i)perylene	0.5	µg/kg	39.9	48	83%	50% - 150%
LCS_ESYD00028	Chrysene	0.5	µg/kg	48.6	48	101%	50% - 150%
LCS_ESYD00028	Coronene	0.5	µg/kg	52.4	48	109%	50% - 150%
LCS_ESYD00028	Dibenz(a.h)anthracene	0.5	µg/kg	40.0	48	83%	50% - 150%
LCS_ESYD00028	Fluoranthene	0.5	µg/kg	46.5	48	96%	50% - 150%
LCS_ESYD00028	Fluorene	0.5	µg/kg	53.1	48	110%	50% - 150%

Client	BMT Commercial Australia Pty Ltd
Contact	Darren Richardson
Certificate Number	B955262-C
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Method Laboratory Control Sample Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Test Result	Expected Value	QC Recovery	QC Criteria
Lab Method: SE103_0C (BatchID - 0063776 - LCS_ESYD00028) - Continued							
LCS_ESYD00028	Indeno(c.d)pyrene	0.5	µg/kg	46.9	48	97%	50% - 150%
LCS_ESYD00028	Naphthalene	0.5	µg/kg	45.1	48	93%	50% - 150%
LCS_ESYD00028	Perylene	0.5	µg/kg	42.3	48	88%	50% - 150%
LCS_ESYD00028	Phenanthrene	0.5	µg/kg	44.0	48	91%	50% - 150%
LCS_ESYD00028	Pyrene	0.5	µg/kg	44.6	48	92%	50% - 150%
Lab Method: SE104_0C (BatchID - 0063784 - LCS_ESYD00035)							
LCS_ESYD00035	Aldrin	1	µg/L	45.3	48	94%	50% - 150%
LCS_ESYD00035	alpha-Endosulfan	1	µg/L	45.1	48	93%	50% - 150%
LCS_ESYD00035	alpha-Hexachlorocyclohexane	1	µg/L	47.3	48	98%	50% - 150%
LCS_ESYD00035	beta-Endosulfan	1	µg/L	50.7	48	105%	50% - 150%
LCS_ESYD00035	beta-Hexachlorocyclohexane	1	µg/L	45.5	48	94%	50% - 150%
LCS_ESYD00035	cis-Chlordane	1	µg/L	43.2	48	90%	50% - 150%
LCS_ESYD00035	delta-Hexachlorocyclohexane	1	µg/L	46.0	48	95%	50% - 150%
LCS_ESYD00035	Dieldrin	1	µg/L	63.3	48	131%	50% - 150%
LCS_ESYD00035	Endosulfan Sulphate	1	µg/L	46.6	48	97%	50% - 150%
LCS_ESYD00035	Endrin	1	µg/L	46.2	48	96%	50% - 150%
LCS_ESYD00035	Endrin Aldehyde	1	µg/L	57.7	48	120%	50% - 150%
LCS_ESYD00035	Endrin Ketone	1	µg/L	47.0	48	97%	50% - 150%
LCS_ESYD00035	gamma-Hexachlorocyclohexane	1	µg/L	45.9	48	95%	50% - 150%
LCS_ESYD00035	Heptachlor	1	µg/L	52.7	48	109%	50% - 150%
LCS_ESYD00035	Heptachlor epoxide	1	µg/L	48.8	48	101%	50% - 150%
LCS_ESYD00035	Hexachlorobenzene	1	µg/L	42.6	48	88%	50% - 150%
LCS_ESYD00035	Methoxychlor	1	µg/L	56.3	48	117%	50% - 150%
LCS_ESYD00035	Oxychlordane	1	µg/L	40.7	48	84%	50% - 150%
LCS_ESYD00035	pp-Dichlorodiphenyldichloroethane	1	µg/L	51.5	48	107%	50% - 150%
LCS_ESYD00035	pp-Dichlorodiphenyldichloroethylene	1	µg/L	52.1	48	108%	50% - 150%

Method Laboratory Control Sample Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	QC Test Result	Expected Value	QC Recovery	QC Criteria
Lab Method: SE104_0C (BatchID - 0063784 - LCS_ESYD00035) - Continued							
LCS_ESYD00035	pp-Dichlorodiphenyltrichloroethane	1	µg/L	50.5	48	105%	50% - 150%
LCS_ESYD00035	trans-Chlordane	1	µg/L	48.2	48	100%	50% - 150%
Lab Method: SE105_0B (BatchID - 0063794 - LCS_ESYD00049)							
LCS_ESYD00049	Benzene	200	µg/kg	1294	1000	129%	50% - 150%
LCS_ESYD00049	C6-C10 Fraction	2000	µg/kg	8676	11000	78%	50% - 150%
LCS_ESYD00049	C6-C9 Fraction	2000	µg/kg	7647	10000	76%	50% - 150%
LCS_ESYD00049	Ethylbenzene	200	µg/kg	1164	1000	116%	50% - 150%
LCS_ESYD00049	meta- and para-Xylenes	400	µg/kg	1832	2000	91%	50% - 150%
LCS_ESYD00049	Naphthalene	200	µg/kg	1081	1000	108%	50% - 150%
LCS_ESYD00049	ortho-Xylene	200	µg/kg	1174	1000	117%	50% - 150%
LCS_ESYD00049	Toluene	200	µg/kg	965.6	1000	96%	50% - 150%

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Laboratory Duplicate 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 the relavant technical method manuals and are dependent on the magnitude of results in comparison to the level of reporting.

Method : Compound / QC Sample ID	Analyte	LOD	Units	Original Result	Dup Result	RPD	RPD Acceptance Criteria
Lab Method: 04_001S (BatchID - 0063669)							
Laboratory Duplicate Sample - 0063669	Aluminium	1	mg/kg	15960	15910	0.3%	<30%
Laboratory Duplicate Sample - 0063669	Antimony	2	mg/kg	<2	<2	-	N/A
Laboratory Duplicate Sample - 0063669	Arsenic	5	mg/kg	6.6	6.0	9.5%	No Limit
Laboratory Duplicate Sample - 0063669	Cadmium	0.5	mg/kg	<0.5	<0.5	-	N/A
Laboratory Duplicate Sample - 0063669	Chromium	1	mg/kg	34.8	33.5	3.8%	<30%
Laboratory Duplicate Sample - 0063669	Cobalt	0.5	mg/kg	13.2	12.8	3.1%	<30%
Laboratory Duplicate Sample - 0063669	Copper	1	mg/kg	229.3	199.9	13.7%	<30%
Laboratory Duplicate Sample - 0063669	Iron	2	mg/kg	42520	42850	0.8%	<30%
Laboratory Duplicate Sample - 0063669	Lead	2	mg/kg	16.1	16.8	4.3%	No Limit
Laboratory Duplicate Sample - 0063669	Manganese	1	mg/kg	350.6	346.5	1.2%	<30%
Laboratory Duplicate Sample - 0063669	Nickel	1	mg/kg	24.2	23.1	4.7%	<30%
Laboratory Duplicate Sample - 0063669	Phosphorus	5	mg/kg	1350	1441	6.5%	<30%
Laboratory Duplicate Sample - 0063669	Selenium	5	mg/kg	<5	<5	-	N/A
Laboratory Duplicate Sample - 0063669	Silver	1	mg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063669	Vanadium	0.5	mg/kg	41.8	41.7	0.2%	<30%
Laboratory Duplicate Sample - 0063669	Zinc	5	mg/kg	136.3	120.3	12.5%	<30%
Lab Method: 04_002SED (BatchID - 0063567)							
Laboratory Duplicate Sample - 0063567	Mercury	2	µg/kg	58.9	59.2	0.5%	<30%
Lab Method: 04_004S (BatchID - 0063703)							
Laboratory Duplicate Sample - 0063703	Moisture	0.1	%	47.7	48.3	1.2%	<30%
Lab Method: 04_029S (BatchID - 0063787)							
Laboratory Duplicate Sample - 0063787	PCB-001	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-008	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-015	1	µg/kg	<1	<1	-	N/A

Laboratory Duplicate Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	Original Result	DUP Result	RPD	RPD Acceptance Criteria
Lab Method: 04_029S (BatchID - 0063787) - Continued							
Laboratory Duplicate Sample - 0063787	PCB-018	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-022	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-028	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-044	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-052	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-066	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-077	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-101	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-105	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-118	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-126	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-128	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-138	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-153	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-169	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-170	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-180	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-187	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-195	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-206	1	µg/kg	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063787	PCB-209	1	µg/kg	<1	<1	-	N/A
Lab Method: E061_0C (BatchID - 0063770)							
Laboratory Duplicate Sample - 0063770	Dibutyltin dichloride	0.5	µgSn/kg	<0.5	<0.5	-	N/A
Laboratory Duplicate Sample - 0063770	Monobutyltin trichloride	0.5	µgSn/kg	15.3	13.4	13.2%	<30%
Laboratory Duplicate Sample - 0063770	Tributyltin chloride	0.5	µgSn/kg	1.2	1.1	8.7%	No Limit
Lab Method: SE102_0C (BatchID - 0063793)							
Laboratory Duplicate Sample - 0063793	>C10-C16 Fraction	10	mg/kg	<10	<10	-	N/A

Laboratory Duplicate Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	Original Result	DUP Result	RPD	RPD Acceptance Criteria
Lab Method: SE102_0C (BatchID - 0063793) - Continued							
Laboratory Duplicate Sample - 0063793	>C16-C34 Fraction	50	mg/kg	61.5	72.9	17.0%	<30%
Laboratory Duplicate Sample - 0063793	>C34-C40 Fraction	50	mg/kg	<50	<50	-	N/A
Laboratory Duplicate Sample - 0063793	C10-C14 Fraction	10	mg/kg	10.1	<10	1.0%	<30%
Laboratory Duplicate Sample - 0063793	C15-C28 Fraction	50	mg/kg	<50	50.6	1.2%	<30%
Laboratory Duplicate Sample - 0063793	C29-C36 Fraction	50	mg/kg	50.4	60.7	18.5%	<30%
Lab Method: SE103_0C (BatchID - 0063776)							
Laboratory Duplicate Sample - 0063776	1-Methylnaphthalene	0.5	µg/kg	<0.5	<0.5	-	N/A
Laboratory Duplicate Sample - 0063776	2-Methylnaphthalene	0.5	µg/kg	8.1	7.2	11.8%	<30%
Laboratory Duplicate Sample - 0063776	Acenaphthene	0.5	µg/kg	6.4	5.7	11.6%	<30%
Laboratory Duplicate Sample - 0063776	Acenaphthylene	0.5	µg/kg	12.2	12.1	0.8%	<30%
Laboratory Duplicate Sample - 0063776	Anthracene	0.5	µg/kg	11.0	10.7	2.8%	<30%
Laboratory Duplicate Sample - 0063776	Benzo(a)anthracene	0.5	µg/kg	66.4	60.4	9.5%	<30%
Laboratory Duplicate Sample - 0063776	Benzo(a)pyrene	0.5	µg/kg	29.8	28.5	4.5%	<30%
Laboratory Duplicate Sample - 0063776	Benzo(b+k)fluoranthene	1	µg/kg	96.6	93.2	3.6%	<30%
Laboratory Duplicate Sample - 0063776	Benzo(e)pyrene	0.5	µg/kg	30.4	31.4	3.2%	<30%
Laboratory Duplicate Sample - 0063776	Benzo(g.h.i)perylene	0.5	µg/kg	37.8	37.4	1.1%	<30%
Laboratory Duplicate Sample - 0063776	Chrysene	0.5	µg/kg	24.2	24.2	0.0%	<30%
Laboratory Duplicate Sample - 0063776	Coronene	0.5	µg/kg	<0.5	<0.5	-	N/A
Laboratory Duplicate Sample - 0063776	Dibenz(a.h)anthracene	0.5	µg/kg	<0.5	<0.5	-	N/A
Laboratory Duplicate Sample - 0063776	Fluoranthene	0.5	µg/kg	47.5	37.7	23.0%	<30%
Laboratory Duplicate Sample - 0063776	Fluorene	0.5	µg/kg	10.3	9.9	4.0%	<30%
Laboratory Duplicate Sample - 0063776	Indeno(c.d)pyrene	0.5	µg/kg	120.0	112.9	6.1%	<30%
Laboratory Duplicate Sample - 0063776	Naphthalene	0.5	µg/kg	<0.5	<0.5	-	N/A
Laboratory Duplicate Sample - 0063776	Perylene	0.5	µg/kg	61.0	58.7	3.8%	<30%
Laboratory Duplicate Sample - 0063776	Phenanthrene	0.5	µg/kg	34.5	22.2	**43.4%**	<30%
Laboratory Duplicate Sample - 0063776	Pyrene	0.5	µg/kg	46.1	38.7	17.5%	<30%

Laboratory Duplicate Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	Original Result	DUP Result	RPD	RPD Acceptance Criteria
Lab Method: SE104_0C (BatchID - 0063784)							
Laboratory Duplicate Sample - 0063784	Aldrin	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	alpha-Endosulfan	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	alpha-Hexachlorocyclohexane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	beta-Endosulfan	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	beta-Hexachlorocyclohexane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	cis-Chlordane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	delta-Hexachlorocyclohexane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Dieldrin	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Endosulfan Sulphate	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Endrin	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Endrin Aldehyde	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Endrin Ketone	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	gamma-Hexachlorocyclohexane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Heptachlor	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Heptachlor epoxide	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Hexachlorobenzene	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Methoxychlor	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	Oxychlordane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	pp-Dichlorodiphenyldichloroethane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	pp-Dichlorodiphenyldichloroethylene	1	µg/L	84.7	84.7	0.0%	<30%
Laboratory Duplicate Sample - 0063784	pp-Dichlorodiphenyltrichloroethane	1	µg/L	<1	<1	-	N/A
Laboratory Duplicate Sample - 0063784	trans-Chlordane	1	µg/L	<1	<1	-	N/A
Lab Method: SE105_0B (BatchID - 0063794)							
Laboratory Duplicate Sample - 0063794	Benzene	200	µg/kg	<200	<200	-	N/A
Laboratory Duplicate Sample - 0063794	C6-C10 Fraction	2000	µg/kg	<2000	<2000	-	N/A
Laboratory Duplicate Sample - 0063794	C6-C9 Fraction	2000	µg/kg	<2000	<2000	-	N/A

Laboratory Duplicate Report - Continued

Method:Compound / QC Sample ID	Analyte	LOD	Units	Original Result	DUP Result	RPD	RPD Acceptance Criteria
Lab Method: SE105_0B (BatchID - 0063794) - Continued							
Laboratory Duplicate Sample - 0063794	Ethylbenzene	200	µg/kg	<200	<200	-	N/A
Laboratory Duplicate Sample - 0063794	meta- and para-Xylenes	400	µg/kg	<400	<400	-	N/A
Laboratory Duplicate Sample - 0063794	Naphthalene	200	µg/kg	<200	<200	-	N/A
Laboratory Duplicate Sample - 0063794	ortho-Xylene	200	µg/kg	<200	<200	-	N/A
Laboratory Duplicate Sample - 0063794	Toluene	200	µg/kg	<200	<200	-	N/A

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CERTIFICATE OF ANALYSIS

Certificate Number	B955262-C [R00]	**Page**	1/8
Client	BMT Commercial Australia Pty Ltd	**Registering Laboratory**	Brisbane
Contact	Darren Richardson	**Contact**	Customer Service Team
Address	Level 8 200 Creek Street Brisbane QLD 4000	**Address**	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone	07 3831 6744	**Telephone**	1300 703 166
Order Number	---	**Date Samples Received**	13/10/2020
Project ID	Sediment - Brisbane River	**Date Analysis Commenced**	13/10/2020
Sampler	Customer	**Issue Date**	22/10/2020
Client Job Reference	---	**Receipt Temperature (°C)**	10.0
No. of Samples Registered	5 | Sampler: Customer	**Storage Temperature (°C)**	4.0
Priority	Normal	**Quote Number**	---

NATA
Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Water results are reported on an ‘as is’ basis. Soil and sediment results are reported on a ‘dry weight’ basis. For other matrices the basis of reporting will be confirmed in the ‘Report Comments’ section. Measurement Uncertainty is available upon request or via www.symbiolabs.com.au/login. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | NA: Not Applicable | ND: Not Detected | LOR: Limit of Reporting | [NT]: Not Tested |
| ~: Estimated | ^ Subcontracted Analysis | TBA: To Be Advised | ** Potential Holding Time Concern | * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR

Authorised By

Name	Position	Accreditation Category
Katie Lee	Laboratory Supervisor, Sydney	Environmental and Food Chemistry

Sample Information *- Client/Sampler Supplied*

Sample ID	B955262-C/1	B955262-C/2	B955262-C/3	B955262-C/4	B955262-C/5
Sample Description	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
Sample Date/Time	2020-10-09 08:32	2020-10-09 09:40	2020-10-08 07:50	2020-10-08 11:40	2020-10-07 13:56
Sample Matrix	Sediments	Sediments	Sediments	Sediments	Sediments

Client	BMT Commercial Australia Pty Ltd	Project ID	Sediment - Brisbane River
Certificate Number	B955262-C [R00]	Sampler	Customer
Page	3/8	Order Number	---

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Analytical Results

		Client Sample Description	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
		Client Sampling date/time	09/10/2020 08:32	09/10/2020 09:40	08/10/2020 07:50	08/10/2020 11:40	07/10/2020 13:56
Compound/Analyte	LOR	Units	B955262-C/1	B955262-C/2	B955262-C/3	B955262-C/4	B955262-C/5
			Results	Results	Results	Results	Results
Moisture Content							
04-004 - Moisture by gravimetric, %							
Moisture Content	0.1	%	48	57	55	57	51
Trace Elements							
04-001 - Metals by ICP-OES							
Aluminium	5	mg/kg	16000	18000	20000	18000	16000
Antimony	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	0.4	mg/kg	6.6	7.1	5.4	7.4	7.3
Cadmium	0.1	mg/kg	0.38	0.11	<0.1	<0.1	<0.1
Chromium	0.1	mg/kg	35	41	39	39	36
Cobalt	0.5	mg/kg	13	14	15	14	13
Copper	0.1	mg/kg	230	46	27	24	16
Iron	5	mg/kg	43000	37000	37000	35000	34000
Lead	0.5	mg/kg	16	20	15	15	14
Manganese	0.5	mg/kg	350	510	340	440	320
Nickel	0.1	mg/kg	24	22	27	22	19
Phosphorus*	1	mg/kg	1400	810	660	660	540
Silver	0.1	mg/kg	0.31	0.29	0.20	0.18	0.13
Selenium	0.5	mg/kg	<0.5	<0.5	0.87	0.58	<0.5
Vanadium	0.1	mg/kg	42	53	53	50	48
Zinc	0.5	mg/kg	140	110	86	84	64
04-002 - Mercury in sediment by CVAAS							
Mercury	0.01	mg/kg	0.059	0.10	0.12	0.073	0.060
BTEX							
04-021 - C6-C10 Hydrocarbons & BTEXN in soil, sed & solid P&T GCMS							
Benzene	0.2	mg/kg	---	<0.20	<0.20	---	---

Analytical Results

Compound/Analyte	LOR	Units	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
Client Sampling date/time			09/10/2020 08:32	09/10/2020 09:40	08/10/2020 07:50	08/10/2020 11:40	07/10/2020 13:56
			B955262-C/1	B955262-C/2	B955262-C/3	B955262-C/4	B955262-C/5
			Results	Results	Results	Results	Results
BTEX - Continued							
04-021 - C6-C10 Hydrocarbons & BTEXN in soil, sed & solid P&T GCMS - Continued							
Ethylbenzene	0.2	mg/kg	---	<0.20	<0.20	---	---
meta- & para-Xylene	0.4	mg/kg	---	<0.40	<0.40	---	---
ortho-Xylene	0.2	mg/kg	---	<0.20	<0.20	---	---
Toluene	0.2	mg/kg	---	<0.20	<0.20	---	---
Total Xylene	0.6	mg/kg	---	<0.60	<0.60	---	---
Total BTEX	1.2	mg/kg	---	<1.2	<1.2	---	---
Surrogate 1,2-DE (50-150%)*	-	%	---	96	89	---	---
Surrogate 4-BFB (50-150%)*	-	%	---	96	89	---	---
Surrogate Toluene-D8 (50-150%)	-	%	---	80	77	---	---
Organochlorine Pesticides							
04-024 - OC & OP Pesticides in sediment by GCMS							
Aldrin	1	µg/kg	<1	<1	<1	<1	<1
BHC-alpha	1	µg/kg	<1	<1	<1	<1	<1
BHC-beta	1	µg/kg	<1	<1	<1	<1	<1
BHC-gamma	1	µg/kg	<1	<1	<1	<1	<1
BHC-delta	1	µg/kg	<1	<1	<1	<1	<1
Chlordane-cis	1	µg/kg	<1	<1	<1	<1	<1
Chlordane-trans	1	µg/kg	<1	<1	<1	<1	<1
DDD-p,p	1	µg/kg	<1	<1	<1	<1	<1
DDE-p,p	1	µg/kg	83	85	100	44	34
DDT-p,p	1	µg/kg	<1	<1	<1	<1	<1

Client	BMT Commercial Australia Pty Ltd	Project ID	Sediment - Brisbane River
Certificate Number	B955262-C [R00]	Sampler	Customer
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Analytical Results

Compound/Analyte	LOR	Units	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
		Client Sampling date/time	09/10/2020 08:32	09/10/2020 09:40	08/10/2020 07:50	08/10/2020 11:40	07/10/2020 13:56
			B955262-C/1	B955262-C/2	B955262-C/3	B955262-C/4	B955262-C/5
			Results	Results	Results	Results	Results
Organochlorine Pesticides - Continued							
04-024 - OC & OP Pesticides in sediment by GCMS - Continued							
Dieldrin	1	µg/kg	<1	<1	<1	<1	<1
Endosulfan-alpha	1	µg/kg	<1	<1	<1	<1	<1
Endosulfan-beta	1	µg/kg	<1	<1	<1	<1	<1
Endosulfan-sulfate	1	µg/kg	<1	<1	<1	<1	<1
Endrin	1	µg/kg	<1	<1	<1	<1	<1
Endrin-ketone	1	µg/kg	<1	<1	<1	<1	<1
Endrin-aldehyde	1	µg/kg	<1	<1	<1	<1	<1
Heptachlor	1	µg/kg	<1	<1	<1	<1	<1
Heptachlor-epoxide	1	µg/kg	<1	<1	<1	<1	<1
Hexachlorobenzene	1	µg/kg	<1	<1	<1	<1	<1
Methoxychlor	1	µg/kg	<1	<1	<1	<1	<1
Oxychlordane*	1	µg/kg	<1	<1	<1	<1	<1
Surrogate Recovery	-	%	79	74	74	69	68
Organotins in Soil & Sediment							
04-026 - Determination of Organotins in Sediment/Soil by GCMS							
Monobutyltin (MBT)	4	µgSn/kg	15.3	10.5	17.5	16.8	13.7
Dibutyltin (DBT)	2	µgSn/kg	<2.0	6.4	<2.0	5.1	<2.0
Tributyltin (TBT)	0.5	µgSn/kg	1.2	18.2	<0.5	7.1	<0.5
Tripropyltin (SUR) *	---	%	75.0	78.0	74.0	74.0	73.0
Poly Aromatic Hydrocarbons							
04-022 - PAH in Sediment by GCMS (NAGD2009)							
Naphthalene	5	µg/kg	---	<5	<5	---	---
1-Methylnaphthalene	5	µg/kg	---	<5	<5	---	---

Analytical Results

		Client Sample Description	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
		Client Sampling date/time	09/10/2020 08:32	09/10/2020 09:40	08/10/2020 07:50	08/10/2020 11:40	07/10/2020 13:56
Compound/Analyte	LOR	Units	B955262-C/1	B955262-C/2	B955262-C/3	B955262-C/4	B955262-C/5
			Results	Results	Results	Results	Results
Poly Aromatic Hydrocarbons - Continued							
04-022 - PAH in Sediment by GCMS (NAGD2009) - Continued							
2-Methylnaphthalene	5	µg/kg	---	8.1	6.1	---	---
Acenaphthylene	5	µg/kg	---	12	8.8	---	---
Acenaphthene	5	µg/kg	---	6.4	<5	---	---
Fluorene	5	µg/kg	---	10	7.8	---	---
Phenanthrene	5	µg/kg	---	34	9.8	---	---
Anthracene	5	µg/kg	---	11	6.7	---	---
Fluoranthene	5	µg/kg	---	48	8.0	---	---
Pyrene	5	µg/kg	---	46	10	---	---
Benz(a)anthracene	5	µg/kg	---	66	23	---	---
Chrysene	5	µg/kg	---	24	<5	---	---
Benzo(b)&(k)fluoranthene	10	µg/kg	---	97	35	---	---
Benzo(a)pyrene	5	µg/kg	---	30	5.8	---	---
Indeno(1,2,3-cd)pyrene	5	µg/kg	---	120	28	---	---
Dibenz(a,h)anthracene	5	µg/kg	---	<5	<5	---	---
Benzo(g,h,i)perylene	5	µg/kg	---	38	16	---	---
Coronene	10	µg/kg	---	<10	<10	---	---
Benzo(e)pyrene	5	µg/kg	---	30	11	---	---
Perylene	5	µg/kg	---	61	8.5	---	---
Total PAHs	5	µg/kg	---	640	180	---	---
Surrogate 1 Recovery	-	%	---	71	76	---	---
Surrogate 2 Recovery	-	%	---	102	104	---	---

Client	BMT Commercial Australia Pty Ltd	Project ID	Sediment - Brisbane River
Certificate Number	B955262-C [R00]	Sampler	Customer
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Symbio LABORATORIES Proudly AUSTRALIAN

Analytical Results

		Client Sample Description	B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
		Client Sampling date/time	09/10/2020 08:32	09/10/2020 09:40	08/10/2020 07:50	08/10/2020 11:40	07/10/2020 13:56
Compound/Analyte	LOR	Units	B955262-C/1	B955262-C/2	B955262-C/3	B955262-C/4	B955262-C/5
			Results	Results	Results	Results	Results
Poly Aromatic Hydrocarbons - Continued							
04-022 - PAH in Sediment by GCMS (NAGD2009) - Continued							
Surrogate 3 Recovery	-	%	---	70	79	---	---
TPH (C6-36)+TRH (C6-40)							
04-020 - TRH (C10-C40) & TPH (C10-C36) in Sediment by GC-FID							
TRH >C10-C16 Fraction	10	mg/kg	---	<10	<10	---	---
TRH >C16-C34 Fraction	50	mg/kg	---	61	<50	---	---
TRH >C36-C40 Fraction	50	mg/kg	---	<50	<50	---	---
TRH >C10-C40 Fraction (Sum)	50	mg/kg	---	61	<50	---	---
TPH C10-C14 Fraction	10	mg/kg	---	10	<10	---	---
TPH C15-C25 Fraction	50	mg/kg	---	<50	<50	---	---
TPH C29-C36 Fraction	50	mg/kg	---	50	<50	---	---
TPH C10-C36 Fraction (Sum)	50	mg/kg	---	60	<50	---	---
Surrogate Pentacosane (50-150%)	-	%	---	93	92	---	---
04-021 - C6-C10 Hydrocarbons & BTEXN in soil, sed & solid P&T GCMS							
TRH C6-C10 Fraction	25	mg/kg	---	<25	<25	---	---
TPH C6-C9 Fraction	25	mg/kg	---	<25	<25	---	---
Surrogate 1,2-DE (50-150%)*	-	%	---	96	89	---	---
Surrogate 4-BFB (50-150%)*	-	%	---	96	89	---	---
Surrogate Toluene-D8 (50-150%)	-	%	---	80	77	---	---
Polychlorinated Biphenyls							
04-029 - PCBS (as congeners) by GMCS							
Mono-PCB congeners	5	µg/kg	---	<5	<5	---	---

Client	BMT Commercial Australia Pty Ltd	Project ID	Sediment - Brisbane River
Certificate Number	B955262-C [R00]	Sampler	Customer
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Symbio LABORATORIES Proudly AUSTRALIAN

Analytical Results

Client Sample Description			B6-2C	B5-1C	B10-6C	B11-9C	B13-4C
Client Sampling date/time			09/10/2020 08:32	09/10/2020 09:40	08/10/2020 07:50	08/10/2020 11:40	07/10/2020 13:56
Compound/Analyte	LOR	Units	B955262-C/1	B955262-C/2	B955262-C/3	B955262-C/4	B955262-C/5
			Results	Results	Results	Results	Results
Polychlorinated Biphenyls - Continued							
04-029 - PCBS (as congeners) by GMCS - Continued							
Di-PCB congeners	5	µg/kg	---	<5	<5	---	---
Tri-PCB congeners	5	µg/kg	---	<5	<5	---	---
Tetra-PCB congeners	5	µg/kg	---	<5	<5	---	---
Penta-PCB congeners	5	µg/kg	---	<5	<5	---	---
Hexa-PCB congeners	5	µg/kg	---	<5	<5	---	---
Hepta-PCB congeners	5	µg/kg	---	<5	<5	---	---
Octa-PCB congeners	5	µg/kg	---	<5	<5	---	---
Nona-PCB congeners	5	µg/kg	---	<5	<5	---	---
Deca-PCB congeners	5	µg/kg	---	<5	<5	---	---
Total PCB congeners	5	µg/kg	---	<5	<5	---	---
Surrogate 1 Recovery	-	%	---	110	110	---	---
Surrogate 2 Recovery	-	%	---	110	110	---	---
Surrogate 3 Recovery	---	%	---	93	93	---	---

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Sydney.

Symbio LABORATORIES

Symbio LABORATORIES Proudly AUSTRALIAN
ABN: 82 079 645 015

CERTIFICATE OF ANALYSIS

Certificate Number	B824050-B [R00]	**Page**	1/3
Client	BMT WBM - QLD	**Registering Laboratory**	Brisbane
Contact	Grace Bourke	**Contact**	Customer Service Team
Address	Level 8 200 Creek Street QLD 4000	**Address**	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone	07 3831 6744	**Telephone**	1300 703 166
Order Number	---	**Date Samples Received**	06/09/2019
Project ID	Sediment - B23621 Brisbane River	**Date Analysis Commenced**	06/09/2019
Sampler	---	**Issue Date**	01/10/2019
Client Job Reference	---	**Receipt Temperature (°C)**	9.3
Number of Samples Received	1	**Storage Temperature (°C)**	4
Number of Samples Analysed	Normal	**Quote Number**	---

NATA
Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. Water results are reported on an 'as received' basis. Soil and sediment results are reported on a 'dry weight' basis. For other matrices the basis of reporting will be confirmed in the 'Report Comments' section. Sampling was conducted by the customer and results pertain only to the samples submitted. Responsibility for representative sampling rests with the customer. Measurement Uncertainty is available upon request or via www.symbiolabs.com.au/login. If the laboratory was authorised to conduct testing on samples received outside specified conditions, results may be impacted depending on the nature of the deviation.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | NA: Not Applicable | ND: Not Detected | LOR: Level of Reporting | [NT]: Not Tested |

| ~: Estimated | ^ Subcontracted Analysis | TBA: To Be Advised | ** Potential Holding Time Concern | * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR |

Authorised By

Name	Position	Accreditation Category
QA Department	Symbio Laboratories QA Department	Subcontracted Analytical Testing

Client	BMT WBM - QLD	Project ID	Sediment - B23621 Brisbane River
Certificate Number	B824050-B [R00]	Sampler	---
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Sample Information *- Client Supplied*

Sample ID	B824050-B/2
Sample Description	B10_6C
Sample Date/Time	02/09/2019 12:40
Sample Matrix	Sediment

Analytical Results

Compound/Analyte	LOR	Units	B10_6C
Client Sample Description			B10_6C
Client Sampling date/time			02/09/2019 12:40
			B824050-B/2
			Results
Radiation Analysis*			
S014.00 - Determination of Gross Alpha and Beta			
Gross Alpha* (including K-40 correction)^	0.08	Bq/g	0.20
Gross Beta* (including K-40 correction)^	0.25	Bq/g	0.55

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Subcontract Laboratory.

Report Comments

Please note: Testing performed by an external subcontracted Laboratory.
Report No:ME311854

BMT has a proven record in addressing today's engineering and environmental issues.

Our dedication to developing innovative approaches and solutions enhances our ability to meet our client's most challenging needs.

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