

# PIPELINE BENTHIC SURVEY REPORT

Barossa DPD



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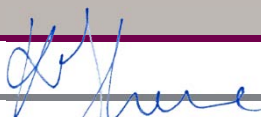
## REPORT

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18 January 2023

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## EXECUTIVE SUMMARY

Santos is exploring options for the Darwin Pipeline Duplication (DPD) Project associated with development of the Barossa gas field in northern Australia. The pipeline would run from the point where the Barossa gas export pipeline (GEP) intersects the existing Bayu-Undan (BU) pipeline (kilometre point (KP) 0), running alongside the existing BU GEP into Darwin LNG plant at Wickham Point in Darwin Harbour (KP122.5). The pipeline would be trenched using a dredge in areas within the harbour and then laid on the seabed offshore outside of the harbour. Dredge spoil will be placed at an offshore dredge spoil disposal site adjacent the existing INPEX spoil ground outside the harbour in Northern Territory waters. As such, baseline information on the benthic habitats, sediment composition (including contaminant concentrations), macroinvertebrate (infaunal) assemblages, and water quality was required along the pipeline route and in the proposed spoil ground. The surveys were undertaken between 14–22 October 2022, 6–10 January 2022 and 6–10 June 2022.

During the surveys, 99 × 0.1 m<sup>2</sup> van Veen grab samples (in October 2021), 111 subsea video deployments (69 in October 2021 and 42 in June 2022), 34 water samples (in October 2021) and 27 core samples (in January 2022) were collected. The pipeline survey area extended from approximately 3 km west of KP0 to KP120.6 (near the KP122.5 Darwin Harbour shore crossing) and included a potential spoil ground outside of Darwin Harbour port limits.

Key conclusions from the surveys are:

- Eight overarching benthic habitat types were identified from subsea video surveys of the offshore pipeline route, spoil ground and pipeline route in Darwin Harbour. Benthic habitats comprised soft sediment habitat types outside of Darwin Harbour, and a mosaic of hard and soft substrate habitats within the harbour. Highest densities of epibiota were associated with hard substrates (consolidated rocky seabed and low-profile reef).
- Sediments in the survey area were represented by slightly gravelly muddy sands to gravelly sands.
- Infaunal analysis indicated that the number of species (S), abundance (N), species richness (d) and diversity (H') indices varied between different sampled areas. Comparison with historic data (INPEX Browse Ltd, 2010) indicated that the lowest values of these indices were likely to be within Darwin Harbour, with highest values recorded for the offshore pipeline section (~KP-3 to KP90). Infaunal assemblages were characteristic of soft sediment habitat.
- Macroinvertebrate assemblages were dominated by crustaceans (mainly amphipods, tanaids and isopods) and annelid polychaetes (mainly deposit-feeding tube worms and free-living taxa), with crustacea (mainly amphipods). Characteristic taxa included Anthuridae (elongate isopods), polychaetes (*Lumbrineris* sp., spionids, *Nephtys* sp., *Axiothella* sp. and *Eunice* sp.), brittlestars (Ophiuroidea) and other echinoderms, sipunculids, molluscs and chordates were also represented.
- Multivariate analysis identified that the sampled areas (offshore pipeline and spoil ground) were significantly different.
- The silt/clay and gravel components indicated a transition in benthic sediments from the tie-in point at KP0 to the shore crossing at KP122.5. Sampled areas (the offshore pipeline, the spoil ground, the sand wave dredge area in the northern part of Darwin Harbour and the pipeline route in southern Darwin Harbour (near the shore crossing)) were all significantly different in terms of particle size distribution, with clay/silt and gravel per cent contributions highest in Darwin Harbour. Similar transitional patterns were observed for infaunal biological assemblage composition along the offshore pipeline route and at the spoil ground. It is likely that other unmeasured factors, e.g. current speeds/site energy, riverine input into Darwin Harbour (e.g. freshwater, silt), salinity profiles up the river and sediment chemistry, also contribute, and that there is likely to be seasonal variability in the distribution and composition of benthic faunal assemblages.



- Sediment sampling and analysis was conducted in line with the National Assessment Guidelines for Dredging. Analysis of metals and metalloids in sediments along the pipeline route and at the spoil ground indicated elevated concentrations of arsenic greater than the relevant National Assessment Guidelines for Dredging screening levels. Elevated levels of arsenic were found both along the pipeline route and at the proposed dredge spoil disposal ground indicating a naturally high background concentration and have been previously recorded in Darwin Harbour sediments. This is expected as arsenic is considered to have become concentrated in sedimentary rocks through sedimentation processes in this region. The fine-grained clastic sediments have higher arsenic concentrations than the coarse-grained sediments.
- Total petroleum hydrocarbons (TPH), total recoverable hydrocarbons (TRH) and benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN) were detected at 35 of the Darwin Harbour sites, at low levels. Normalised TPH and TRH concentrations met the relevant guidelines across all sites. PAH concentrations at these 35 sites were below the laboratory limit of reporting.
- Concentrations of naturally occurring radioactive materials, pesticides and tributyl tin (TBT) were all below limits of detection in harbour sediments. There is low potential for acid sulfate soils as, although inorganic sulfur is present in the sediments, there is significant acid neutralising capacity kinetically available to neutralise the oxidation products from the inorganic sulfur.
- No contaminants of concern were found in the sediments along the pipeline route or at the potential spoil disposal ground, with elevated levels of arsenic considered to be naturally occurring. Therefore the sediments along the pipeline route are considered to be suitable for unconfined ocean disposal, as per the National Assessment Guidelines for Dredging and Guidelines for the Environmental Assessment of Marine Dredging in the Northern Territory.
- Water column profiles at sites along the offshore pipeline and at the spoil ground showed no indications of stratification of the water column.
- Analysis of contaminants in water quality samples identified several exceedances of the relevant guideline values:
  - Three copper samples from the surface waters
  - One lead sample from surface waters
  - A total of 35 total nitrogen and total phosphorous samples.

In summary, the results of the Barossa DPD surveys contributed to the understanding of seabed habitat chemico-physical and biological composition in the study area. The Barossa DPD pipeline route is a transitional environment, with soft sediment habitats along the offshore pipeline route and spoil ground, and with areas of both soft and hard substrate habitat within Darwin Harbour.

# 1 INTRODUCTION

Santos is exploring options for the Darwin Pipeline Duplication (DPD) Project associated with development of the Barossa gas field in northern Australia. The pipeline would run from the point where the existing approved Barossa gas export pipeline (GEP) reaches the existing approved Bayu-Undan pipeline (kilometre point (KP) 0), running alongside the existing Bayu-Undan GEP into Darwin LNG plant at Wickham Point in Darwin Harbour (KP122.5). The pipeline will be trenched using a dredge in areas within the harbour, where required, and then laid on the seabed further offshore outside of the harbour. Dredge spoil will be placed at an offshore dredge spoil disposal site adjacent the existing INPEX spoil ground outside the harbour in Northern Territory waters. Rock sourced from a local quarry will be used to backfill the trench once the pipeline has been laid. These activities have potential to cause environmental impacts that must be identified, quantified, mitigated, and managed to acceptable levels.

In support of environmental approvals for the DPD project, Santos has engaged RPS to conduct a baseline environmental survey for the project, designed to fill gaps in the existing dataset. Sampling sites have been selected to ensure representation of the different sections of the pipeline route and to investigate features identified from interpretation of geophysical data, stakeholder consultation and existing marine habitat mapping.

The baseline survey included the following areas:

- The pipeline route from KP0 (equivalent to Bayu-Undan pipeline kilometre point (KP) 380) to ~KP91 (Darwin Harbour port boundary)
- The proposed spoil ground
- The pipeline route within Darwin Harbour (KP91 to KP122.5)
- The proposed pipeline trenching areas within Darwin Harbour
- Habitat areas identified from existing Darwin Harbour habitat mapping
- The Charles Point Wide Reef Fish Protection Area.

## 1.1 Objectives

The Barossa DPD offshore survey objectives were to:

- Undertake water quality, sediment quality and benthic habitat and communities assessments along the proposed pipeline route and at the spoil ground.
- Identify any areas of higher environmental value or sensitivity to inform the Environmental Impact Assessment (EIA) for the project.
- Collect additional samples and benthic habitat imagery during other surveys to augment the benthic dataset.

## 1.2 Purpose

- The purpose of this field survey report is to provide a summary of the field survey activities and results from the field surveys, including a brief description of the key features and benthic habitats along the pipeline route and at the spoil ground area.

## 2 METHODS

### 2.1 Surveys

#### 2.1.1 October 2021 survey

##### 2.1.1.1 Sampling sites

The sediment grab and video surveys were carried out between 14 and 22 October 2021. The survey design was supplemented in the field with additional sites based on any potential features identified during the Fugro geophysical scope. The survey was divided into three sampling areas and the samples coded accordingly; the offshore pipeline (OP; KP0 to ~KP91), Darwin Harbour pipeline (HS; ~KP91 to KP122, including the sand wave dredge areas), and the spoil ground (SG; Figure 2-1). The sampling sites were based on historical geophysical data (see Figure 2-1, Figure 2-2, Figure 2-3 and Figure 2-4) and therefore considered representative of the full pipeline corridor, including the anchoring areas either side of the proposed pipeline route. The sampling was conducted as per requirements of NAGD and NT EPA dredging guidelines, ensuring sufficient sites were sampled in a standard method. Further details about the survey sites, including the relative KP Points are in Appendix A.

**Table 2-1: Sample naming conventions for the Barossa DPD survey**

Sample location	Sample type	Sample ID	Number of sites
Offshore pipeline	Sediment (grabs)	OP	33
	Drop video	OP	9
	Video transect	V	17
	Surface water	OP S	10
	Bottom water	OP B	10
Spoil ground	Sediment (grabs)	SG	13
	Drop video	SG	13
	Surface water	SG S	7
	Bottom water	SG B	7
Darwin Harbour	Sediment (grabs)	HS	53
	Sediment (cores)	KP	17
	Video transect	HS	30

#### 2.1.2 January 2022 sediment survey

A sediment survey was undertaken between 6–10 January 2022. The sediment survey was undertaken during a geotechnical survey conducted by Fugro, which collected the cores and positional data, and CDM Smith, which processed the core samples aboard the survey vessel.

#### 2.1.3 Sediment sampling and analysis

The sampling and analysis was conducted as per requirements of National Assessment Guidelines for Dredging (NAGD; CoA, 2009) and Guidelines for the Environmental Assessment of Marine Dredging in the Northern Territory (NT EPA, 2013). This ensured sufficient sites were sampled and appropriate analytes were identified. Further details about the survey sites, including the relative KP locations are in Appendix A.

##### 2.1.3.1 Sampling sites

Sediment cores were collected at pre-determined sites, with samples separated into 0–50 cm and >50 cm core depth intervals (below sediment surface) for processing and laboratory analysis. A total of 29 sediment core samples were collected from 17 sampling locations inside Darwin Harbour (Figure 2-1).

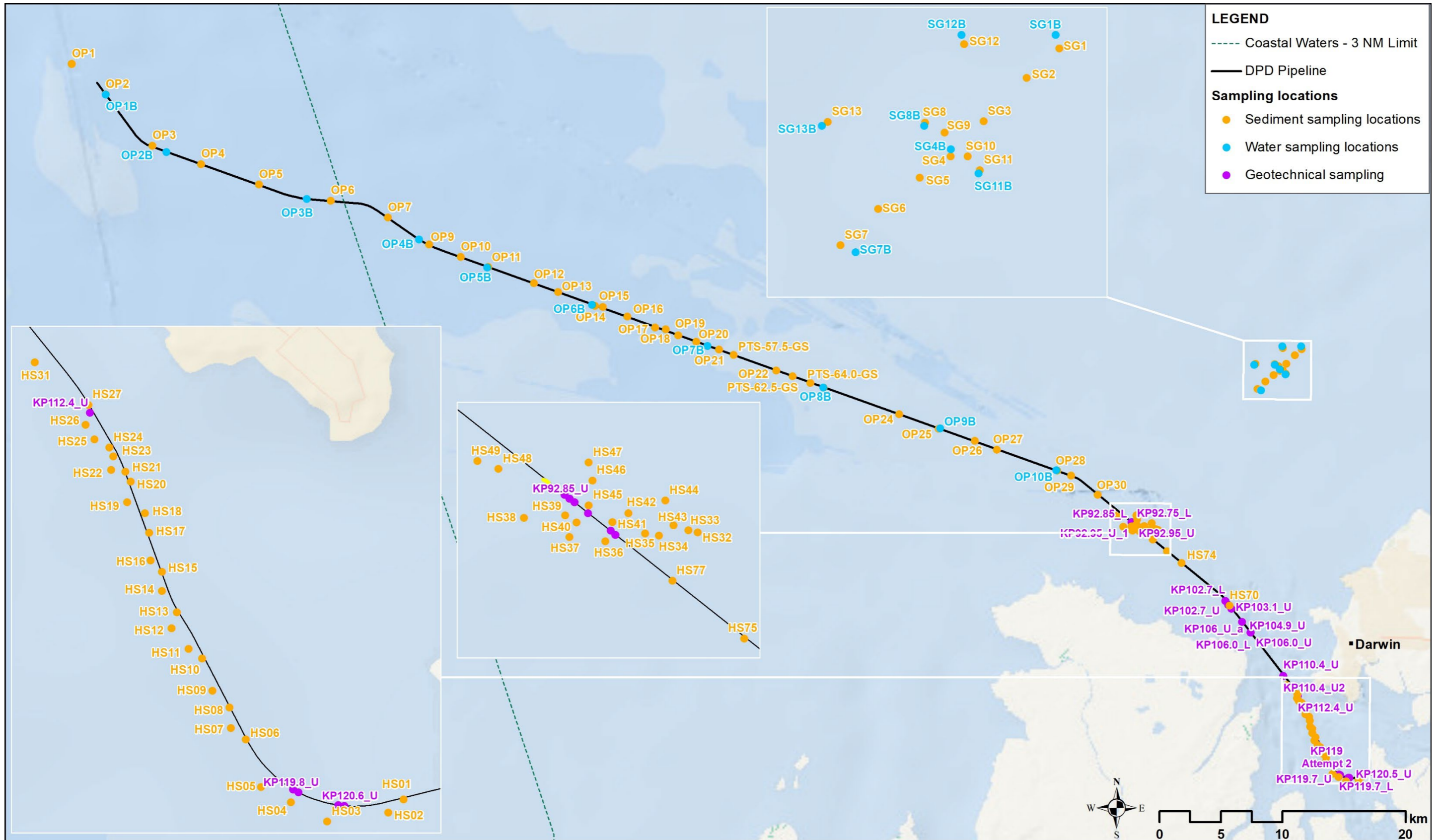


Figure 2-1: Sediment and water quality sampling sites (November 2021) and sediment core sampling sites collected during geotechnical sampling sites (January 2022) along the proposed Barossa pipeline route and at the proposed spoil ground (SG)

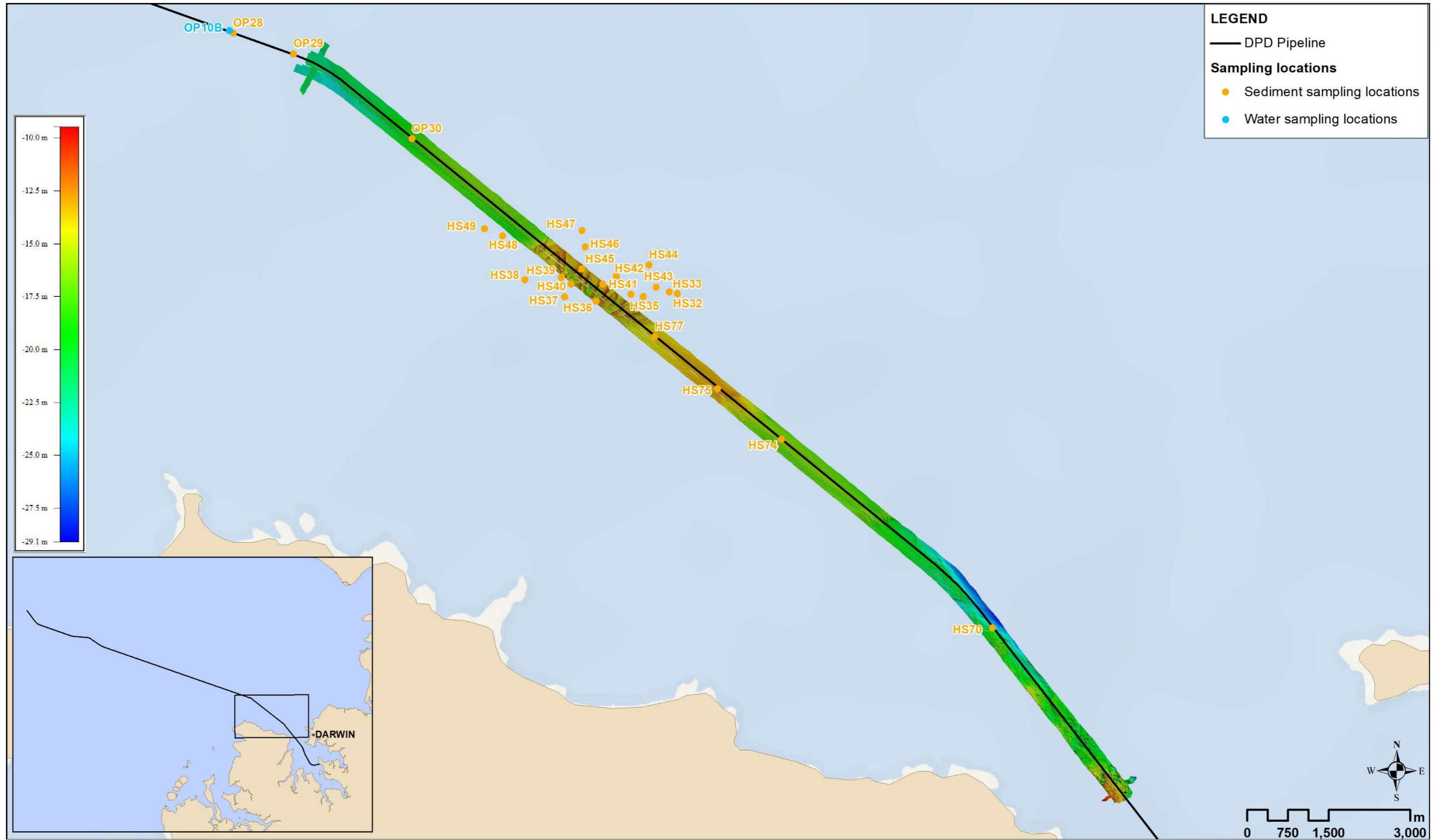


Figure 2-2: Sediment and water quality sampling sites from outer Darwin Harbour to sand wave area, showing with 2021 multi-beam bathymetric data

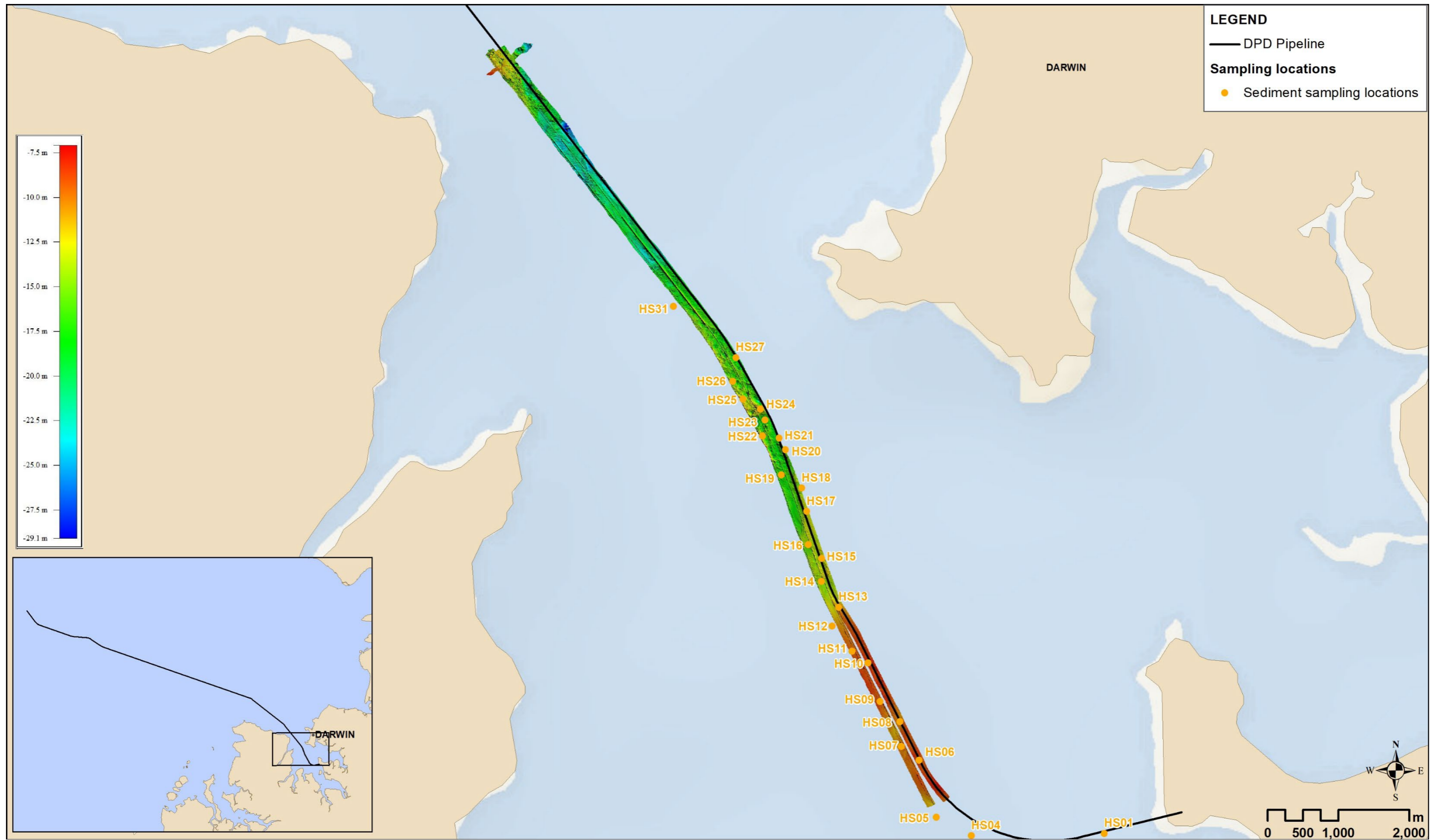


Figure 2-3: Sediment quality sampling sites in inner Darwin Harbour, with 2021 multi-beam bathymetric data

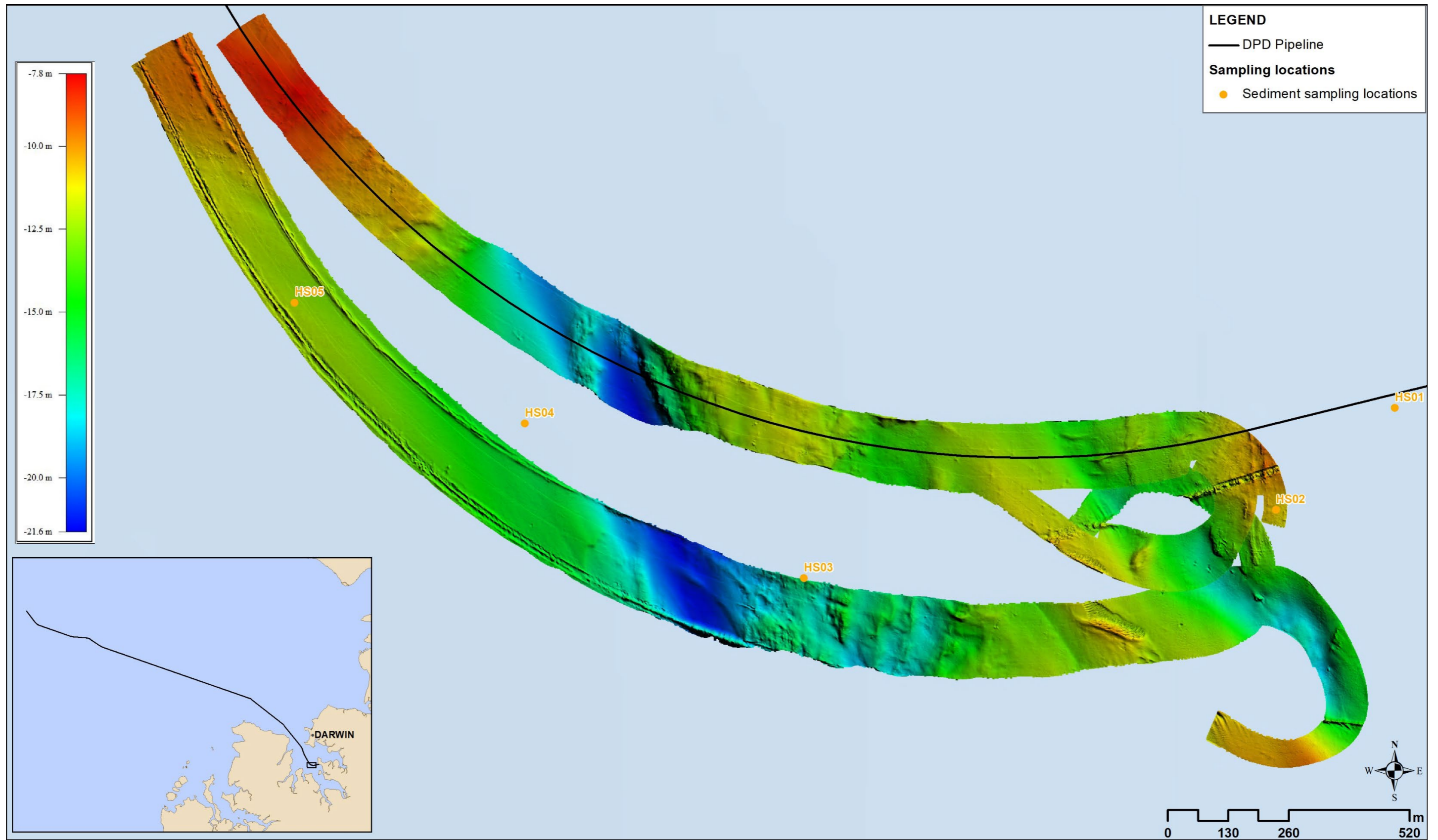


Figure 2-4: Darwin Harbour sediment quality sampling sites near the shore crossing, with 2021 multi-beam bathymetric data

## 2.1.4 June 2022 survey

An additional video transect survey was conducted between 6 and 10 June 2022. RPS designed and conducted the remote operated vehicle (ROV) benthic imagery. The objective for this survey was to further ground truth the 2019 and 2021 AIMS benthic habitat data around the pipeline route offshore and in Darwin Harbour (including the sand wave dredge areas). The survey was undertaken in conjunction with a marine archaeological survey.

### 2.1.4.1 Sampling sites

The video transect survey was divided into three general sampling areas: the offshore pipeline, outer Darwin Harbour pipeline and inner Darwin Harbour (Figure 2-5). The sampling sites were based on historical AIMS 2019 and 2021 benthic surveys and the proposed location of the DPD, including key ecological and historical locations. A total of 42 transects were analysed during the survey; 12 at the offshore pipeline, 15 near at outer Darwin Harbour and the remaining 15 at inner Darwin Harbour. Further details about the survey sites are included in Appendix A.



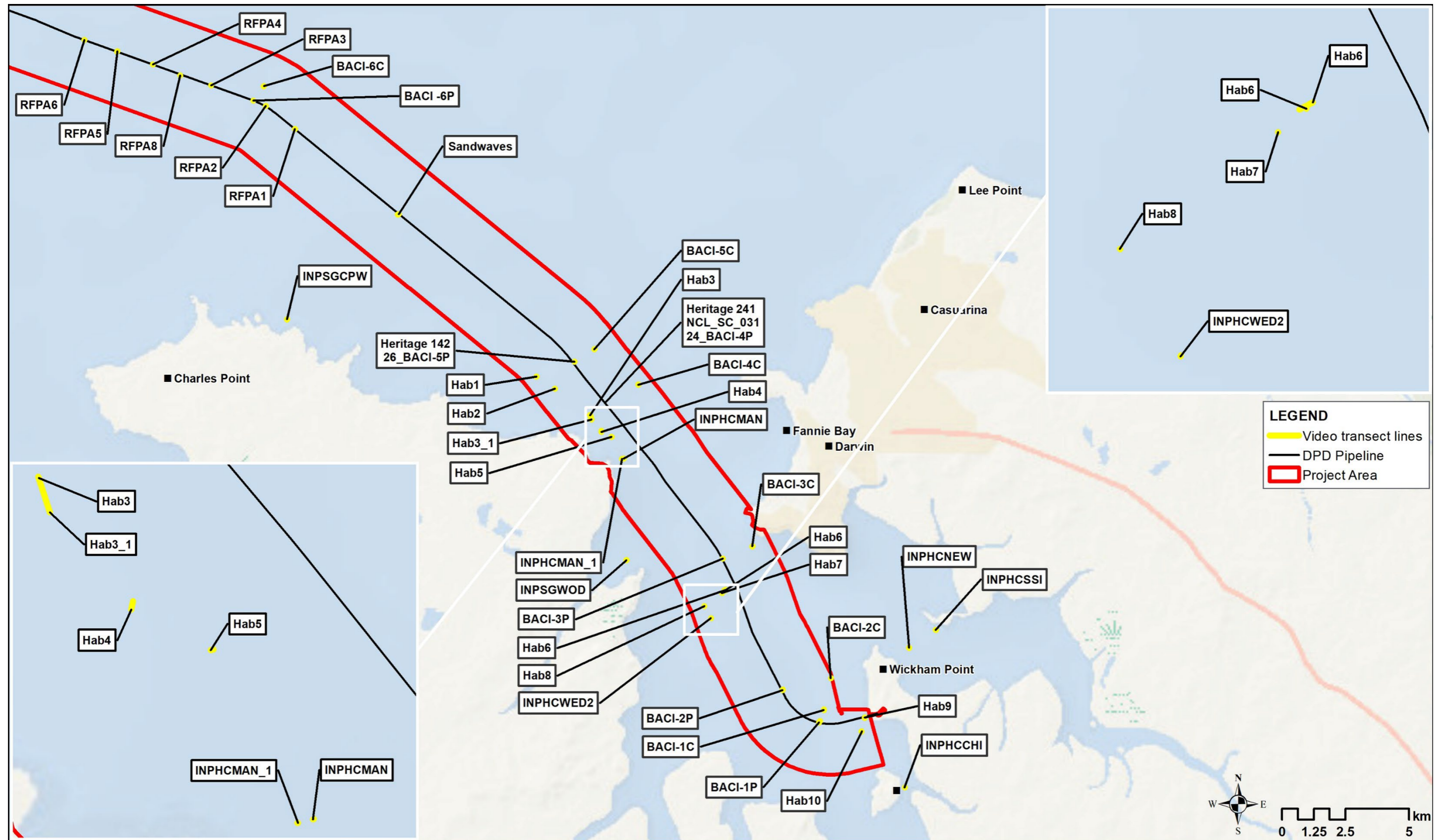


Figure 2-5: Darwin Harbour benthic habitat survey video transect sites (June 2022)

## 2.2 Subsea video

A SeaSpyder subsea video system mounted on a drop camera frame was used to collect digital video and stills imagery (Plate 2-1). The colour video camera was fitted with a zoom lens controllable from the surface control unit and live imagery was transmitted to the control room on the vessel via a load-bearing umbilical. Imagery was also recorded for subsequent analysis. The system also comprised a stills camera, lighting system and lasers (spaced 20 cm apart).

The benthic habitats observed and recorded during each camera drop were described by RPS' marine scientists during the survey. ESRI's ArcPad software was used to record the positional data for the tracklog of the towed video transect and the spot-point positions for each still image taken. During the video deployments, vessel speed did not exceed ~1.5 knots. The imagery collected was subsequently analysed in detail by RPS' marine scientists to characterise topographic features, benthic habitats and macrofaunal communities.

The video system was deployed at sites across the pipeline route and spoil ground (October 2021 and June 2022). Video site locations were initially based on positions of seabed features derived from the original Bayu-Undan geophysical survey data. Areas of interest were then identified in the field, using the 2021 Fugro geophysical survey data, and the video site locations and transects were adjusted accordingly.



Plate 2-1: SeaSpyder camera system

## 2.3 Sediment quality

### 2.3.1 Sample collection

During the October 2021 survey, sediments were sampled via van Veen grab sampler at 30 offshore pipeline locations, an additional three offshore pipeline locations for particle size distribution only (at the request of Santos), 13 spoil ground locations and 53 Darwin Harbour locations. During the January 2022 survey, sediment cores were collected from 17 Darwin Harbour core sample locations. The sampling and analysis sediments was conducted as per the NAGD (CoA, 2009) and NT EPA (2013) dredging guidelines.

Grab samples were collected using a double van Veen grab mounted in a single frame (with a sampled surface area of each grab of 0.1 m<sup>2</sup>), which was deployed and retrieved by Fugro's personnel. An optimal sample processing area was identified as part of strict contamination risk management protocols. GPS position, depth, time and date were recorded every time the grab reached the seabed. Upon retrieval to deck, each sample was photographed with a video slate showing the project name, site, sample number and date (see Appendix B and Appendix C). Each sample was then characterised to document any conspicuous biota, sediment type, presence of visible anoxic layers, hydrocarbons or anthropogenic material. If samples could not be obtained at the site (after three attempts), then the site was moved and sampled nearby (within 50 m).

Core samples were collected using a gravity piston corer with plastic liners. The level of sediment penetration was estimated from sediment smears on the outside of the liner. Where no smear was present, the depth of recovery was given as the penetration depth.

Samples were taken for laboratory analysis of the following:

- Particle size distribution (PSD)
- Infauna (offshore pipeline and spoil ground only)
- total Organic Carbon (TOC)
- Metals and metalloids (Al, Sb, As, Ca, Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni, Ag, Zn)
- Nutrients (total phosphorous (TP), total Kjeldahl nitrogen (TKN))
- Total recoverable hydrocarbons (TRH) and benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN)
- Polycyclic aromatic hydrocarbons (PAH), where TRHs are above limits of detection)
- Naturally occurring radioactive materials (NORMs; radium<sup>226</sup>, radium<sup>228</sup> and thorium<sup>228</sup>).

The following additional analytes were included in laboratory analysis for Darwin Harbour grab and core samples:

- Tributyltin (TBT)
- Acid sulphate soils (ASS)
- Organochlorine pesticides
- Polychlorinated biphenyls (PCBs).

### 2.3.1.1 Subsampling – sediment contaminants

Subsamples for contaminants were taken from the top 2–5 cm of grab samples, excluding the surficial sediments within 5–10 mm of the sides of the grab (to reduce the risk of contamination). Cores were separated into 0–50 cm and (where at least 1 m of sediment was collected) >50 cm horizons. The entire sediment sample for one horizon was processed for laboratory analysis.

Sediment was removed from the grab or core sleeve using a stainless-steel scoop and placed in a glass bowl for mixing. All implements had been pre-cleaned with Decon-90 prior to each site.

Once homogenised, samples were placed in the appropriate laboratory-supplied sample containers. The PSD sample was also taken from surficial sediments / relevant core horizons to allow direct comparison between contaminants and sediment grain sizes.

For all samples:

- Sterile gloves were always worn when collecting and processing samples. These were changed between samples.
- The insides of sample lids did not come into contact with anything potentially contaminated.
- Jars and bags were sealed, correct labelling confirmed, and then stored in an esky with ice blocks.

At the end of each shift, samples were stored as identified in Table 2-2.

### 2.3.1.2 Sampling – infauna

A full 0.1 m<sup>2</sup> van Veen grab sample was collected for infaunal assessment at offshore pipeline (OP) and spoil ground (SG) sites. The infauna sample was carefully emptied into a fish tray and then placed into the infauna processing table (Plate 2-2). The sample was carefully washed using sea water from the deck hose, with the washings flowing out through the sluice gate and draining through a 1 mm mesh sieve. The rate of flow through the sluice was managed by controlling the volume of water within the table and by using the sluice door to control the amount of water flowing through the sluice gate. The sieve was rotated and shuffled to prevent clogging. When the sieve was almost full, the sluice gate was shut to stop the flow, and the full sieve swapped out for a replacement empty sieve. A puddling bin was used to remove as much remaining sediment as possible through the sieve. Samples were then carefully washed out into a plastic Ziplock bag and preserved with 100% ethanol (to a final concentration of ~80% in seawater).

Infauna were picked from the sediment retained on the sieves by Benthic Australia. They were then analysed to the lowest practicable taxonomic level, with the abundance of each taxa recorded from each sample.



Plate 2-2: Infauna filtering table and puddling bin set up on the *Lauri-J*

### 2.3.2 Offshore pipeline and spoil ground

Sediment samples for contaminants, particle size distribution and infauna were collected from 29 offshore pipeline sites (with an additional three PSD sites were added during the survey) and 13 spoil ground sites (Table 2-2).

## REPORT

**Table 2-2: Sediment quality sampling summary for offshore pipeline and spoil ground sites**

Sample	Total samples (spoil ground)*	Total samples (offshore pipeline)*	Total samples	Laboratory	Lab LOR†	Container	Volume	Storage method	Holding time
PSD	13	29	42	MAFRL	NA	Ziplock bag	250 ml	Freeze	Five years
Infauna	13	29	42	Benthic Australia	NA	Bucket	0.1 m <sup>2</sup>	Ethanol	
TOC	13	29	42	MAFRL	<0.1%	2 × plastic jars	70 ml	Freeze	One month
Metals and metalloids (Ag, Al, As, Ca, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Zn)	13	29	42	MAFRL	Depends on metal, 0.01–2				
Nutrients TP	13	29	42	MAFRL	<0.05				
Nutrients TKN	13	29	42	MAFRL	<0.1				
TRH and BTEXN	13	29	42	ALS	0.2–5 mg/kg, 1%	Glass jar	150 ml	Cold	Fourteen days
PAHs (where TRHs are above LoRs)	0	0	0	ALS	4–5 µg/kg			Cold	Fourteen days
NORMS (Ra <sup>226</sup> , Ra <sup>228</sup> , Th <sup>228</sup> )	13	29	42	SGS	3, 5, 3 Bq/kg	Ziplock	250 ml	Freeze	One month

\*Sample numbers do not include quality assurance/quality control samples

†LoR = limit of reporting.

### 2.3.3 Darwin Harbour pipeline

Sediment samples for contaminants and PSD were collected from 50 sites along the pipeline route in Darwin Harbour (Table 2-3). Of these, TRHs were at or above limits of detection in 35 sites, and so PAH analysis was undertaken on these samples.

**Table 2-3: Sediment quality sampling summary for Darwin Harbour pipeline sites**

Sample	Total samples*	Laboratory	Lab LOR†	Container	Volume	Storage method	Holding time
PSD	50	MAFRL	NA	Ziplock bag	250 ml	Freeze	Five years
TBT	50	ALS	NA	Glass jar	250 ml	Cold	Fourteen days
TOC	50	ALS	0.02%	Glass jar	250 ml	Cold	Fourteen days
Metals and metalloids (Ag, Al, As, Ca, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Zn)			Depends on metal, 0.01–50				
Nutrients (TP)			2 mg/kg				
Nutrients (TKN)			20 mg/kg				

## REPORT

Sample	Total samples*	Laboratory	Lab LOR <sup>†</sup>	Container	Volume	Storage method	Holding time
TRH and BTEXN			0.2–5 mg/kg, 1%				
PAHs (where TRH is above limits of reporting)	35		4–5 µg/k				
Acid Sulphate Soils (ASS)	50	ALS	0.1 pH Unit	Zip-lock	250 ml	Freeze	Fourteen days
Organochlorine pesticides	50	ALS	0.25–0.5 µg/kg	Glass jar	250 ml	Cold	Fourteen days
Polychlorinated biphenyls	50	ALS	5 µg/kg				
NORMS (Ra226, Ra228, Th228)	50	SGS	3, 5, 3 Bq/kg	Ziplock	250 ml	Freeze	1 month

\*Sample numbers do not include quality assurance/quality control samples

<sup>†</sup>LoR = limit of reporting.

### 2.3.4 Darwin Harbour pipeline sediment survey

A total of 24 sediment core samples were collected from 17 sites along the Darwin Harbour pipeline route (Table 2-4).

**Table 2-4: Sediment quality sampling summary for Darwin Harbour DPD sediment core samples**

Sample	Total samples*	Laboratory	Lab LOR <sup>†</sup>	Container	Volume	Storage method	Holding time
PSD	24	MAFRL	NA	Ziplock bag	250 ml	Freeze	Five years
TBT	24	ALS	NA	Glass jar	250 ml	Cold	Fourteen days
TOC	24	ALS	0.02%	Glass jar	250 ml	Cold	Fourteen days
Metals and metalloids (Ag, Al, As, Ca, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Zn)			Depends on metal; 0.01–50 mg/kg				
Nutrients (TP)			2 mg/kg				
Nutrients (TKN)			20 mg/kg				
TRH and BTEXN			0.2–5 mg/kg, 1%				
PAH (where TRHs are above LORs)	18		4–5 µg/kg				
ASS	24	ALS	0.1 pH Uni	Zip-lock	250 ml	Freeze	Fourteen days
Organochlorine pesticides	24	ALS	0.25–0.5 µg/kg	Glass jar	250 ml	Cold	Fourteen days
Polychlorinated biphenyls	24	ALS	5 µg/kg				

\*Sample numbers do not include quality assurance/quality control samples

<sup>†</sup>LoR = limit of reporting.

## 2.4 Water quality

### 2.4.1.1 Water column profiling

Water column profiling was undertaken using a calibrated SeaBird SBE19plusV2 conductivity, temperature depth (CTD) profiler lowered through the water column at a rate of half a metre per second at each of the 17 water quality sampling locations. The maximum deployment depth (the position of the profiler above the seabed) was determined from the vessel echosounder prior to deployment. The following parameters were recorded in each profile:

- Pressure (to derive depth)
- Conductivity (to derive salinity)
- Temperature
- pH
- Dissolved oxygen
- Turbidity
- The data was downloaded off the SeaBird after each profile.

### 2.4.1.2 Sample collection

Water samples were collected at the sea surface (1–5 m below sea level (BSL)) and near the seabed (5 m above seabed (ASB)) using ten-litre Niskin bottles.

Phytoplankton and total suspended solids (TSS) samples were collected by filtering a 3 L sample of water through a filter tower (Plate 2-3). Phytoplankton samples were collected through a 0.8–1.2  $\mu\text{m}$  filter, whilst TSS samples were filtered through a pre-weighed filter (stored in an envelope until used). Each filter paper was folded into quarters and wrapped in a dry piece of filter paper and placed back in the envelope for storage. Filtered metal samples were drawn through filter using a syringe. These samples were then transferred to a small pre-labelled sample jar. All other samples were placed in pre-labelled containers.

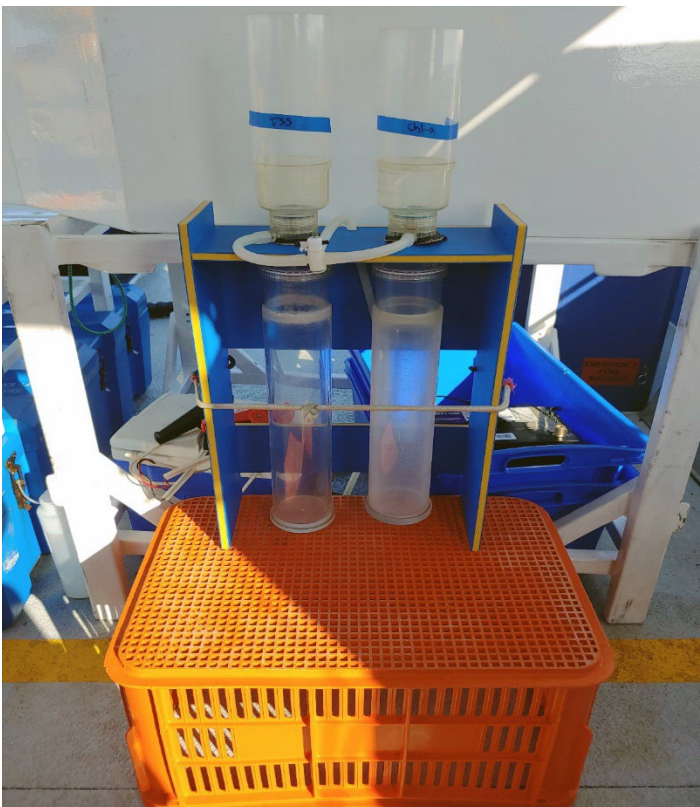


Plate 2-3: Water quality filtering station set up on the *Lauri-J*

REPORT

Table 2-5: Water quality sampling summary for offshore pipeline and spoil ground sites

Analyte	Total samples (spoil ground)	Total samples (offshore pipeline)	Total samples	Laboratory	Lab LOR	Container	Volume	Storage method	Holding time
TSS	14	20	34	MAFRL	1 mg/L	Filter paper placed in Ziplock bag	NA	Cold	Seven days
Nutrients (TP and TN)	14	20	34	MAFRL	5 µg.P/L/50 µg.N/L	PP container	125 ml	Freeze	One month
Orthophosphate	14	20	34	MAFRL	2 µg.P/L	PP tubes	10 ml		
Nitrite and nitrate (NO <sub>2</sub> and NO <sub>3</sub> )	14	20	34		2 µg.N/L				
Ammonium (NH <sub>4</sub> <sup>+</sup> )	14	20	34		3 µg.N/L				
Phytoplankton pigments (Chlorophyll-a and Phaeophytin-a)	14	20	34	MAFRL	0.1 mg/L	Filter paper placed in Ziplock bag	NA	Freeze (in dark)	One month
Unfiltered metals and metalloids (As, Ca, Cr, Co, Cu, Pb, Ni, Zn)	14	20	34	MAFRL	0.05–1 µg/L	PP tube	10 ml	Cold	Two weeks
Unfiltered Hg	14	20	34	MAFRL	0.1 µg/L	Dark bottles	125 ml	Cold	Two weeks
Filtered metals and metalloids (As, Ca, Cr, Co, Cu, Hg, Pb, Ni, Zn)	14	20	34	MAFRL	0.05–1 µg/L	PP container	125 ml	Cold	Two weeks
Filtered Hg	14	20	34	MAFRL	0.1 µg/L	Dark bottles	125 ml	Cold	Two weeks
TRH and BTEXN	14	20	34	ALS	1–100 µg/L	Purple glass vials (sulfuric acid)	2 × 40 ml	Cold	One week
PAH (where TRH above LORs)	0	0	0	ALS	0.5–1 µg/L	Orange glass bottle	100 ml	Cold	One week
NORMS (Ra <sup>226</sup> , Ra <sup>228</sup> , Th <sup>228</sup> )	7	10	17	SGS	0.05, 0.1, 0.03 Bq/L	Plastic container	1000 ml	Nitric acid	Six months



## 2.5 Quality assurance and quality control

Prior to sampling, the deck area was assessed for potential sources of contamination. Where there had been clear wash-out of the surficial sediments in grab samples (e.g. due to a shell or rock caught in the jaws of the grab) the sample was discarded and classed as a failed attempt. Similarly, if water from the winch wire was observed dripping into the sample, the sample was discarded as it was potentially contaminated by hydrocarbons from the winch.

RPS requires that laboratories use NATA-accredited methods and have a Quality Assurance and Quality Control (QA/QC) program, where possible. Pre-cleaned sample containers for chemical analyses were provided by the laboratories for this survey. The following control process were undertaken to quantify potential within-laboratory variability in analysis and any potential sample contamination that could have occurred during sample collection, handling, storage or transport. All samples were transported with relevant and fully completed Chain of Custody (CoC) documentation.

### 2.5.1 Triplicates/duplicates

Triplicate sediment and water samples were collected at the offshore pipeline and spoil ground sites, while duplicates were collected within the Darwin Harbour sites, to determine potential within-laboratory variability in analyses. At least one triplicate or duplicate sample was collected for every 20 primary samples. Triplicates and duplicates were collected from the same bulk sediment sample as the primary sample and were labelled appropriately. The labelling code for triplicates allowed RPS to identify the collection site but it was not apparent to the laboratories.

### 2.5.2 Trip blanks

Trip blanks, or transport blanks, are used to assess potential contamination of samples during transport and storage. Trip blanks were supplied by the laboratory and consisted of plastic jars pre-filled with deionised water. They remained unopened during sampling. Rinsate water was used rather than inert sediment as it is considered to be a more sensitive test.

### 2.5.3 Field blanks

Field blanks detect contamination from sample handling, dust and other atmospheric fallout during the sampling process. Laboratory-supplied deionised water was decanted and stored in the same containers and in the same way as for the sediment samples and left open during sediment sampling. Water was used rather than inert sediment as it is considered to be a more sensitive test.

### 2.5.4 Equipment blanks

Equipment blanks measure contamination introduced through contact with sampling equipment. The samples were taken after the grab sampler had been decontaminated with Decon-90. After decontamination, the operator thoroughly rinsed the grab with seawater, then rinsed it again with the laboratory-supplied deionised water, which was captured in a laboratory-supplied sample container. This will detect potential contamination from the stainless-steel grab sampler.

### 2.5.5 Sample preservation and storage

Water containers were filled to ~80% to leave a head-space sufficient to allow for expansion of the sample during freezing. Samples were stored during each of the surveys as required in Table 2-2–Table 2-5. During vessel demobilisation, samples were separated based on the laboratory they were being shipped to and transferred to clean eskies containing ice blocks for delivery to the laboratory. CoCs were filled out for each laboratory and sent with the relevant eskies.

## **3 RESULTS**

### **3.1 Benthic habitat**

#### **3.1.1 October 2021 survey**

Eight high-level habitat types were identified along the Barossa DPD pipeline route and in the spoil ground area. This comprised six soft substrate habitats and two hard substrate habitats, with the offshore pipeline route and spoil ground dominated by particulate sediments with sparse to medium-density epibiota (Figure 3-1, Figure 3-2 and Figure 3-3). The hard substrate habitats were limited to the Darwin Harbour section of the pipeline route (Figure 3-4 and Figure 3-5). Offshore fishing sites were commonly identified with known shoals and were not identified along the pipeline route (Figure 3-1 and Figure 3-2). Inside Darwin Harbour, higher densities of fishing sites were located in close proximity to areas identified as hard substrate (Figure 3-4 and Figure 3-5).

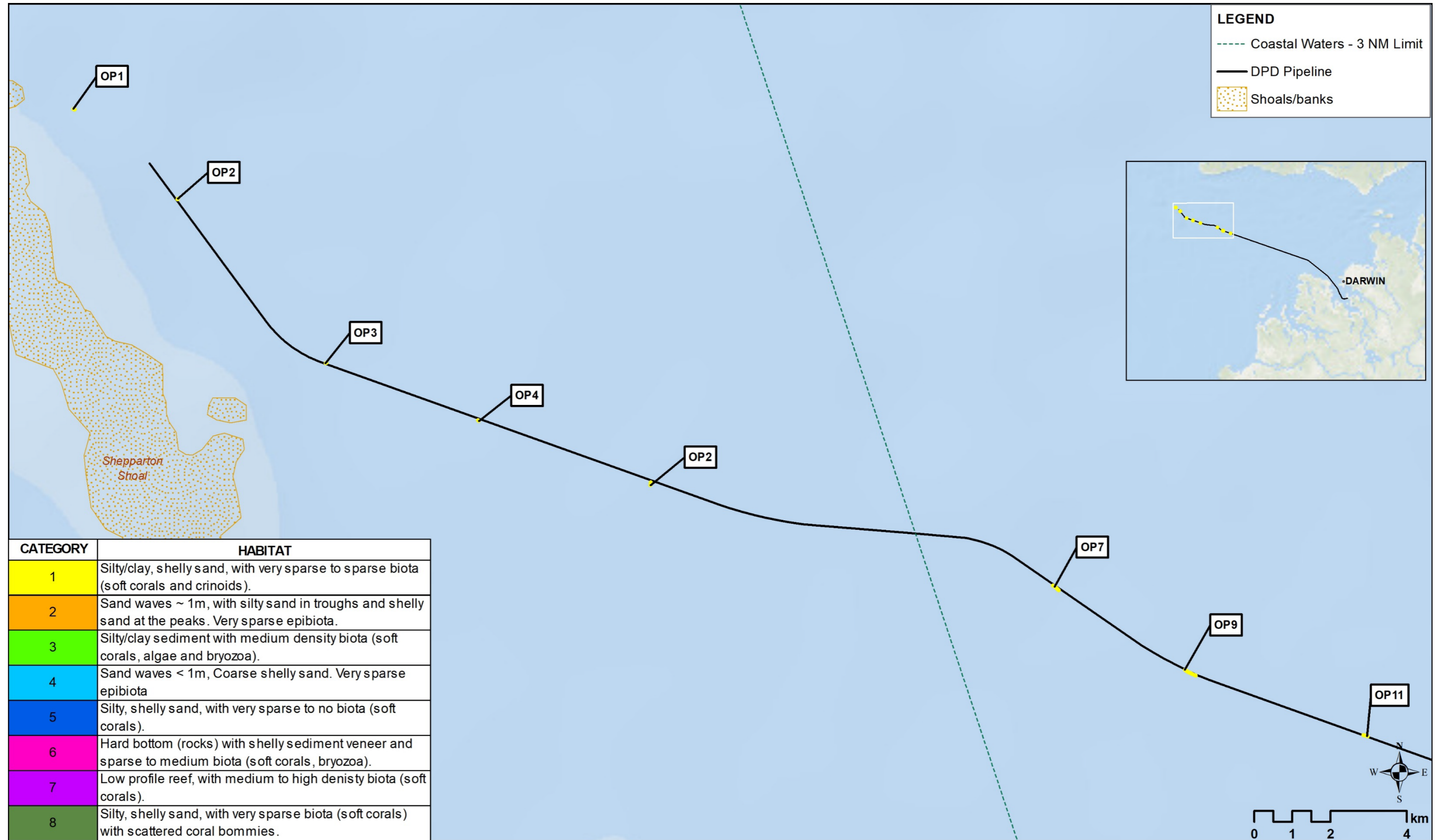


Figure 3-1: Benthic habitat types identified along the furthest offshore pipeline route (October 2021)

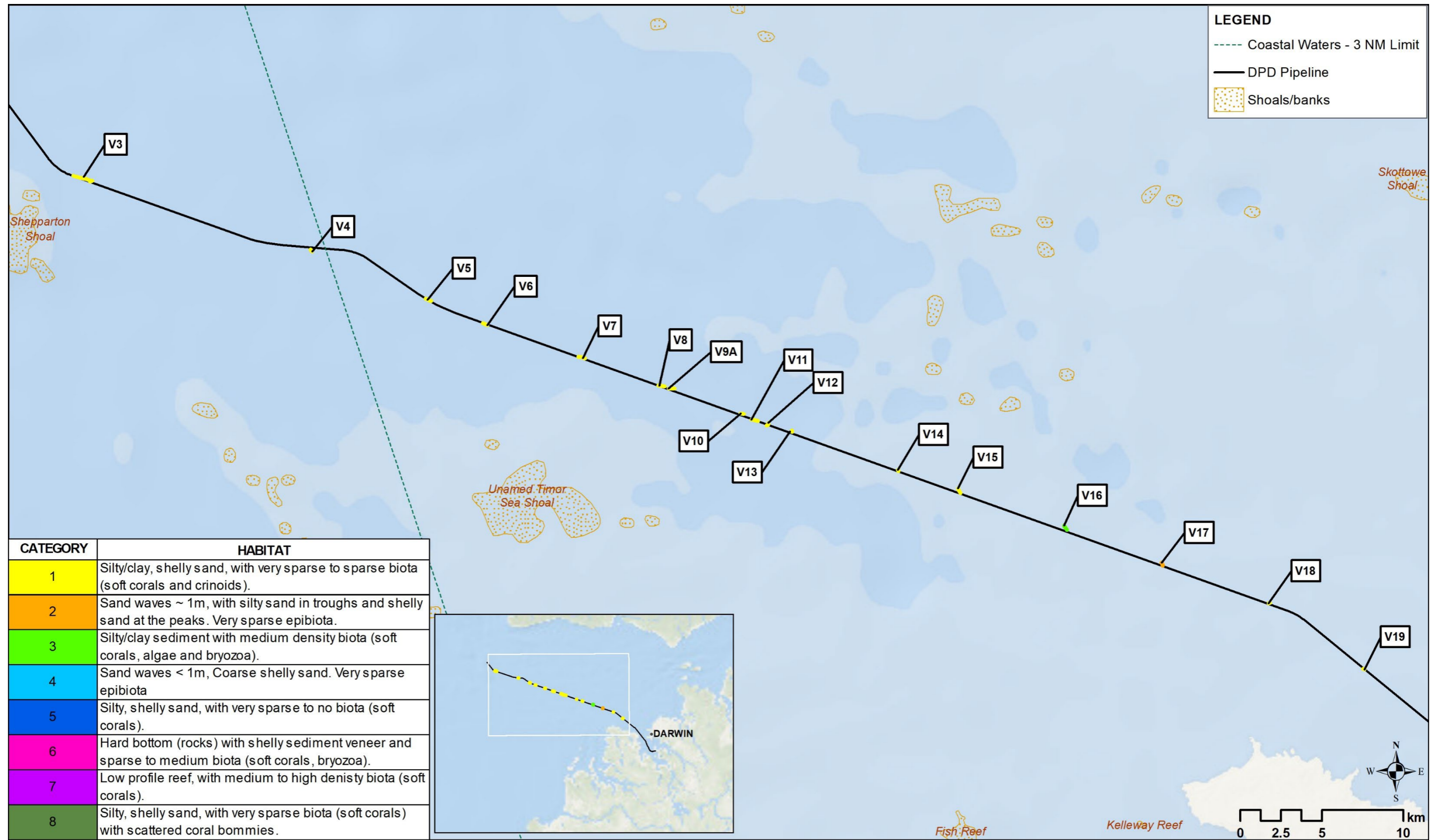


Figure 3-2: Benthic habitat types identified along the offshore pipeline route (October 2021), including the Reef Fish Protection Area

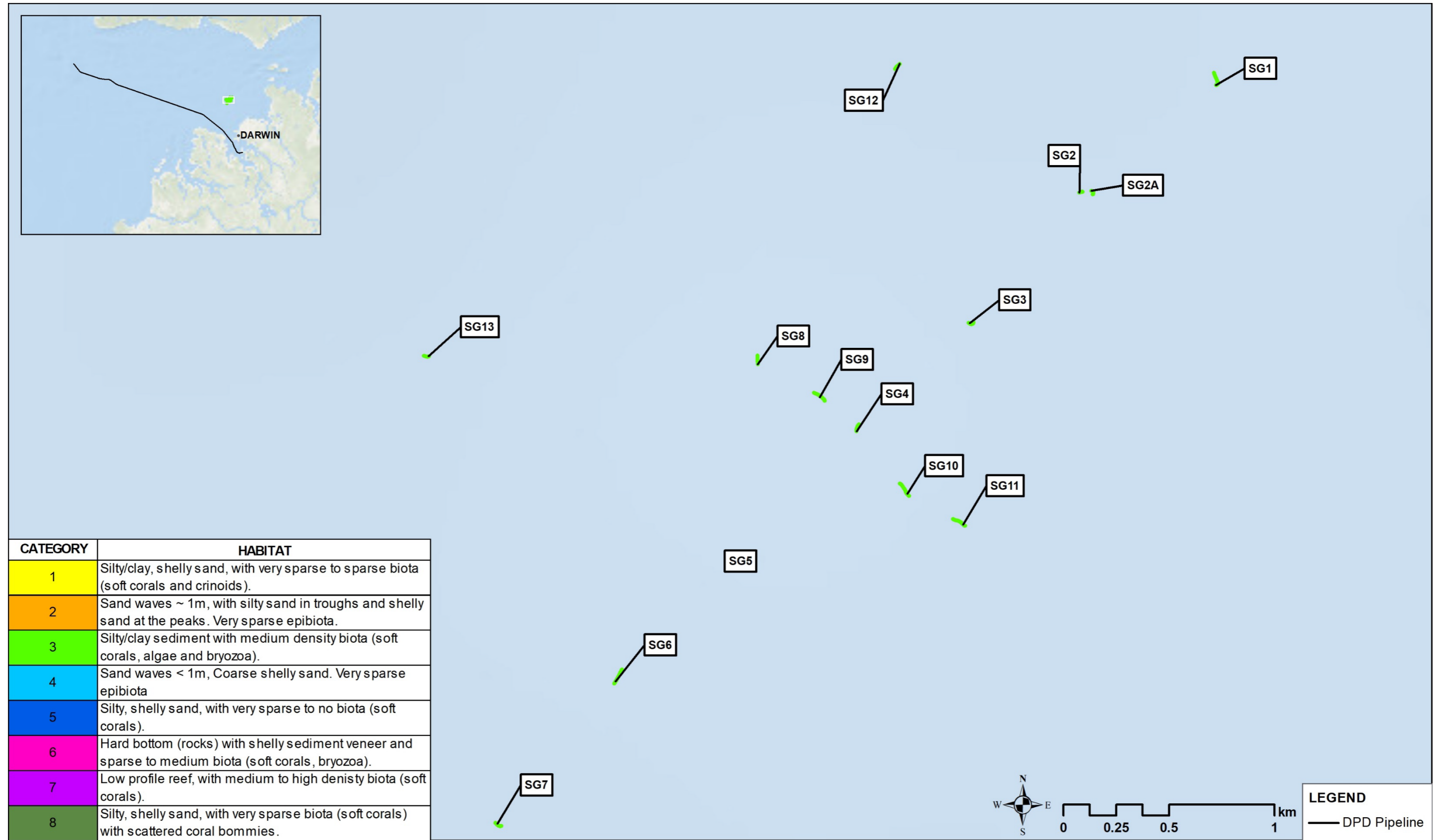


Figure 3-3: Benthic habitat types identified within the spoil ground (October 2021)

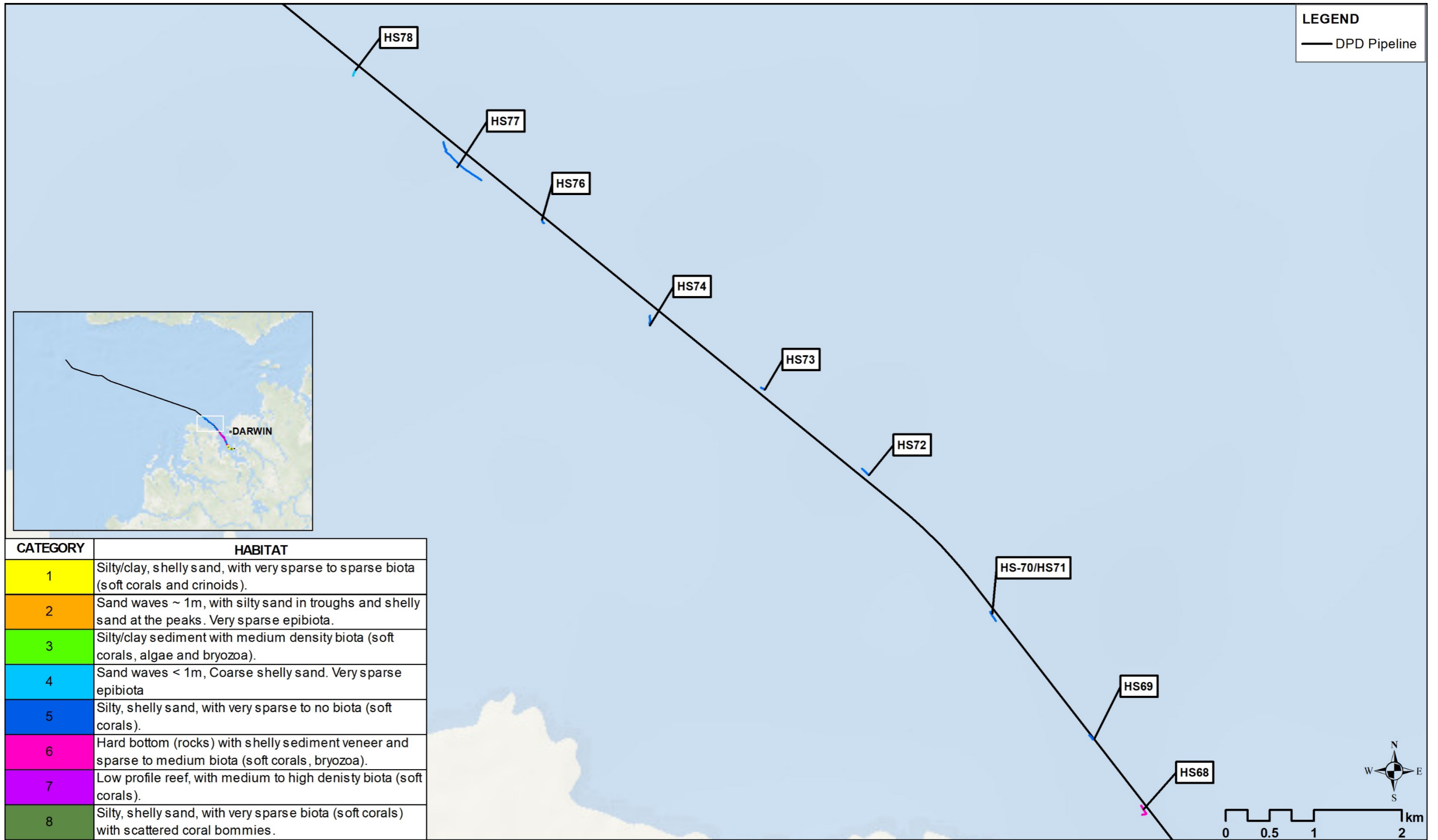


Figure 3-4: Benthic habitat types along the pipeline route in northern Darwin Harbour (October 2021), including the Reef Fish Protection Area

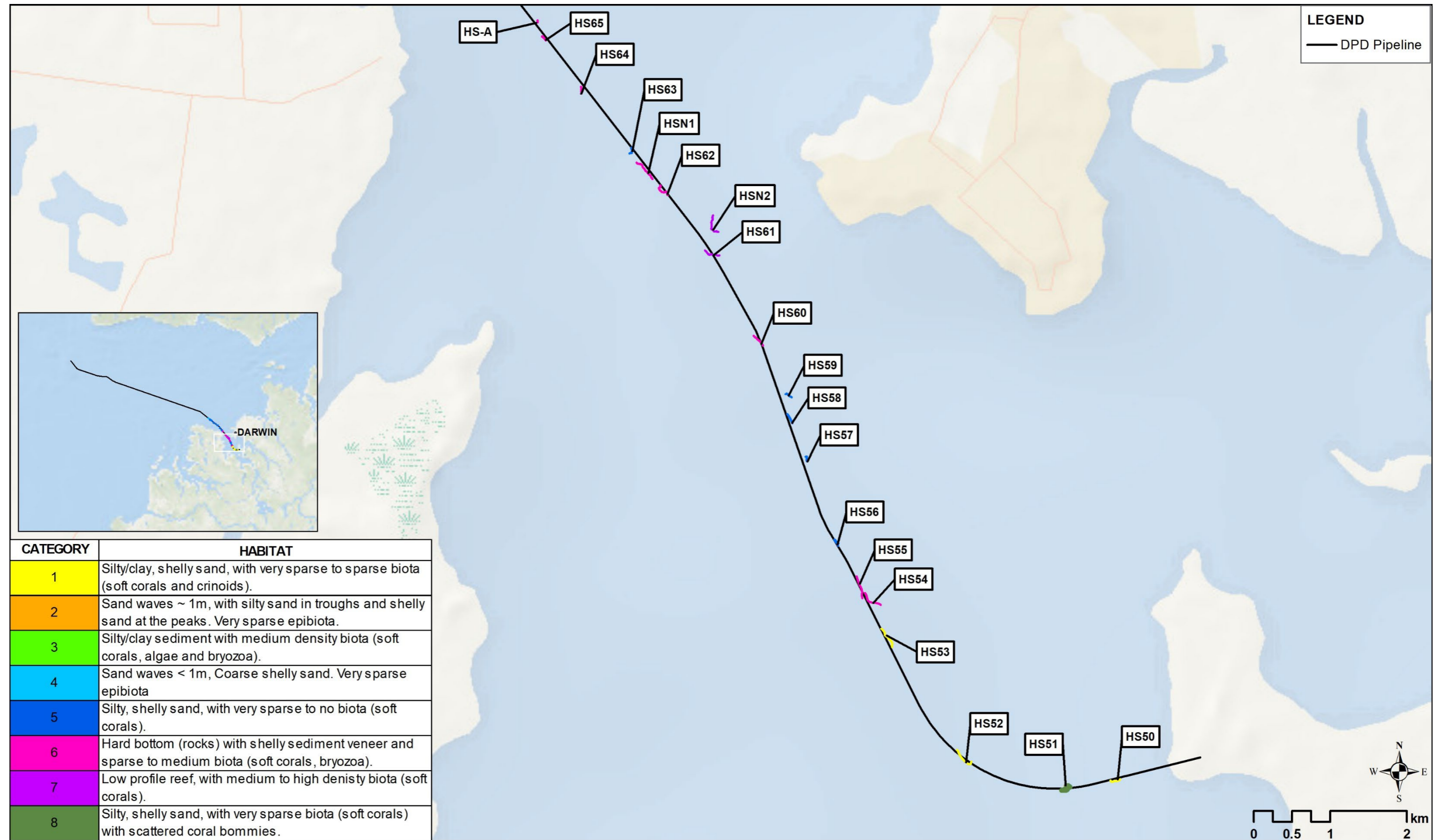


Figure 3-5: Benthic habitats along the southernmost section of the pipeline route in Darwin Harbour (October 2021)

### 3.1.1.1 Soft substrate habitats

#### 3.1.1.1.1 Offshore pipeline

Offshore seabed habitats were characterised by silty/clay shelly sand from KP0 to KP65 (Plate 3-1), with very sparse to sparse conspicuous epibiota (mainly soft corals and crinoids). This soft sediment habitat was identified again at the shoreward end of the pipeline route (near the shore crossing). Biota commonly associated with this habitat type included:

- Soft corals, including gorgonians, sea whips (*Junceella* spp.), Neptheidae and Alcyoniidae (Plate 3-2)
- Echinoderms including sea urchins, sea stars, sea cucumbers and crinoids (Plate 3-3)
- Molluscs, including squid
- Crustaceans including shrimp and the painted pebble crab (*Leucosia anatum*)
- Burrows and polychaete tubes.



Plate 3-1: Grab sample from site OP1, showing silty shelly sand with clumps of clay



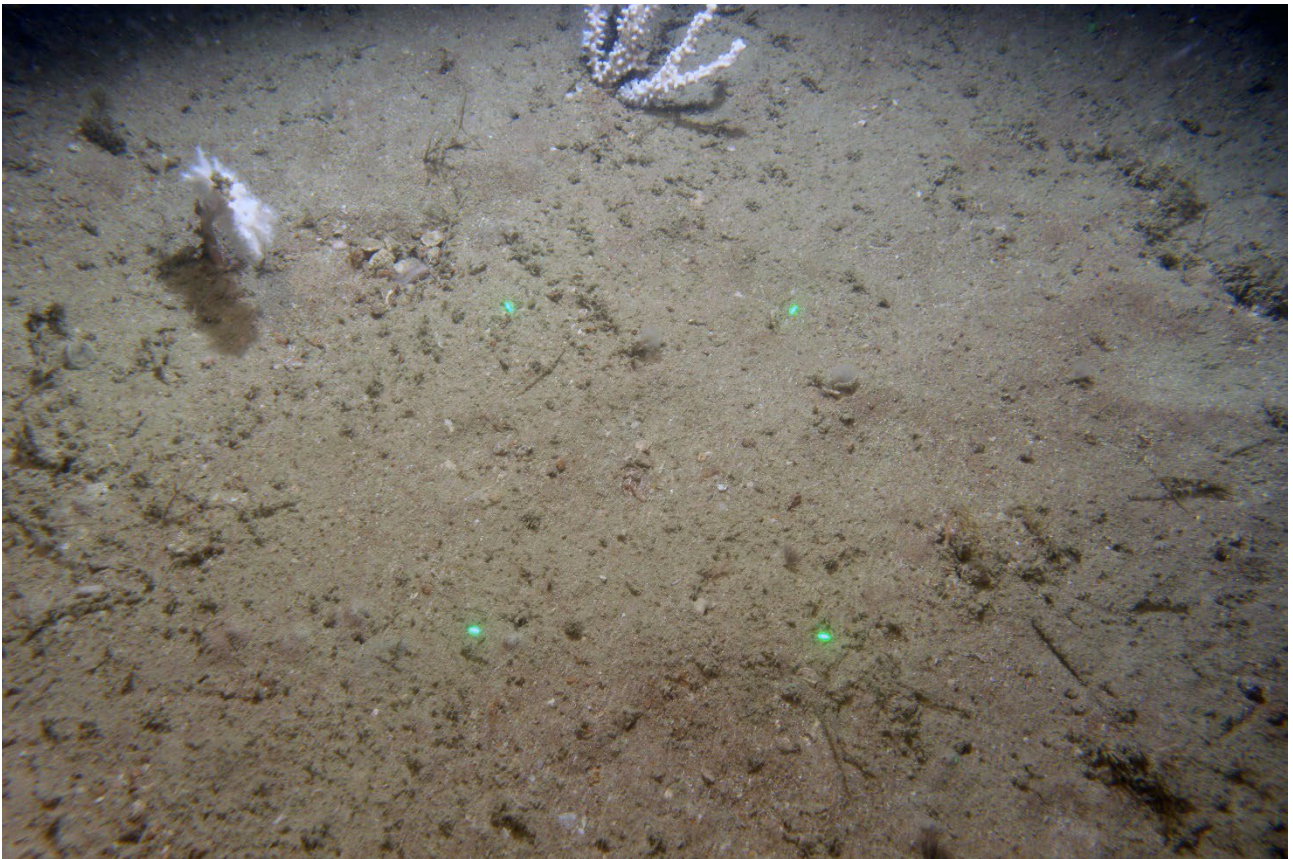


Plate 3-2: Silty, shelly sand with very sparse soft corals (Alcyoniidae) at site OP1

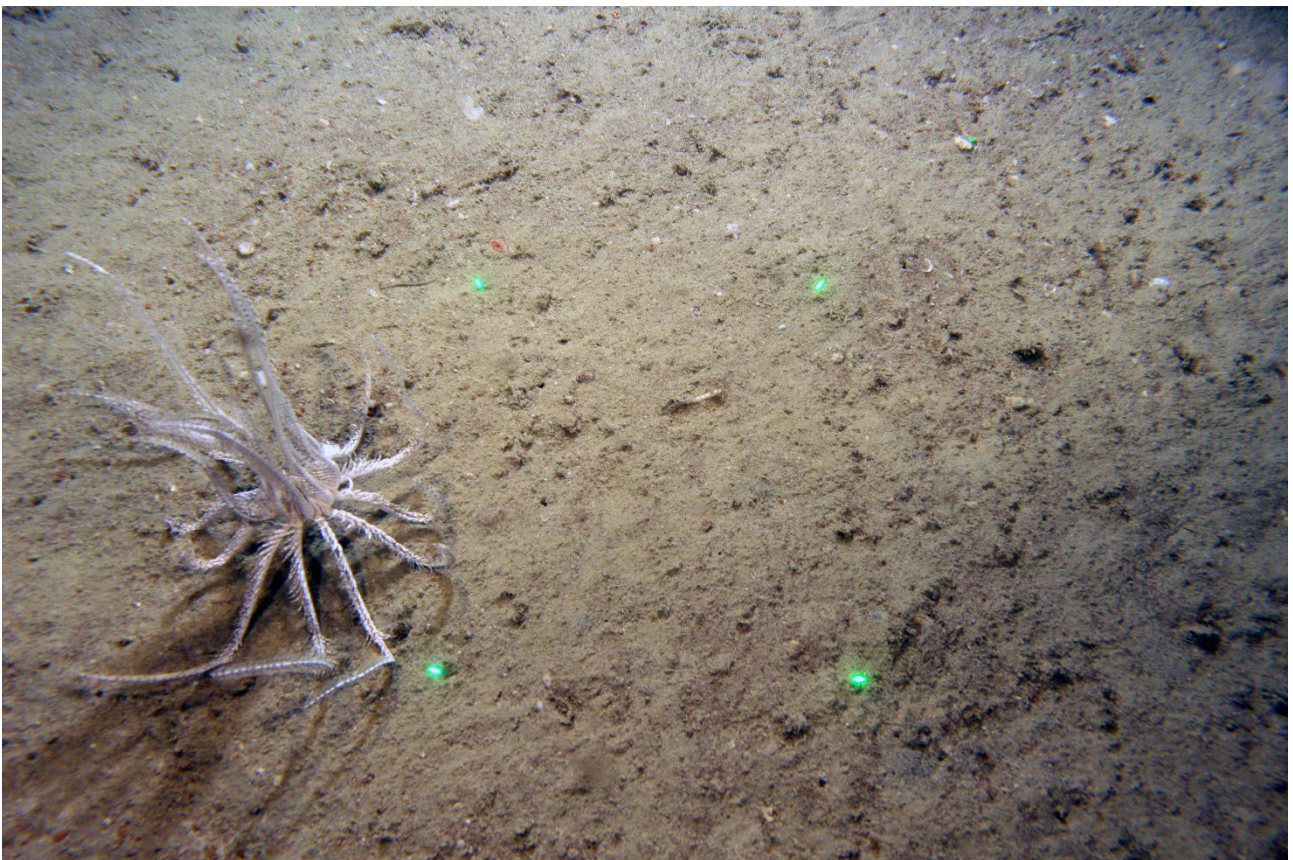
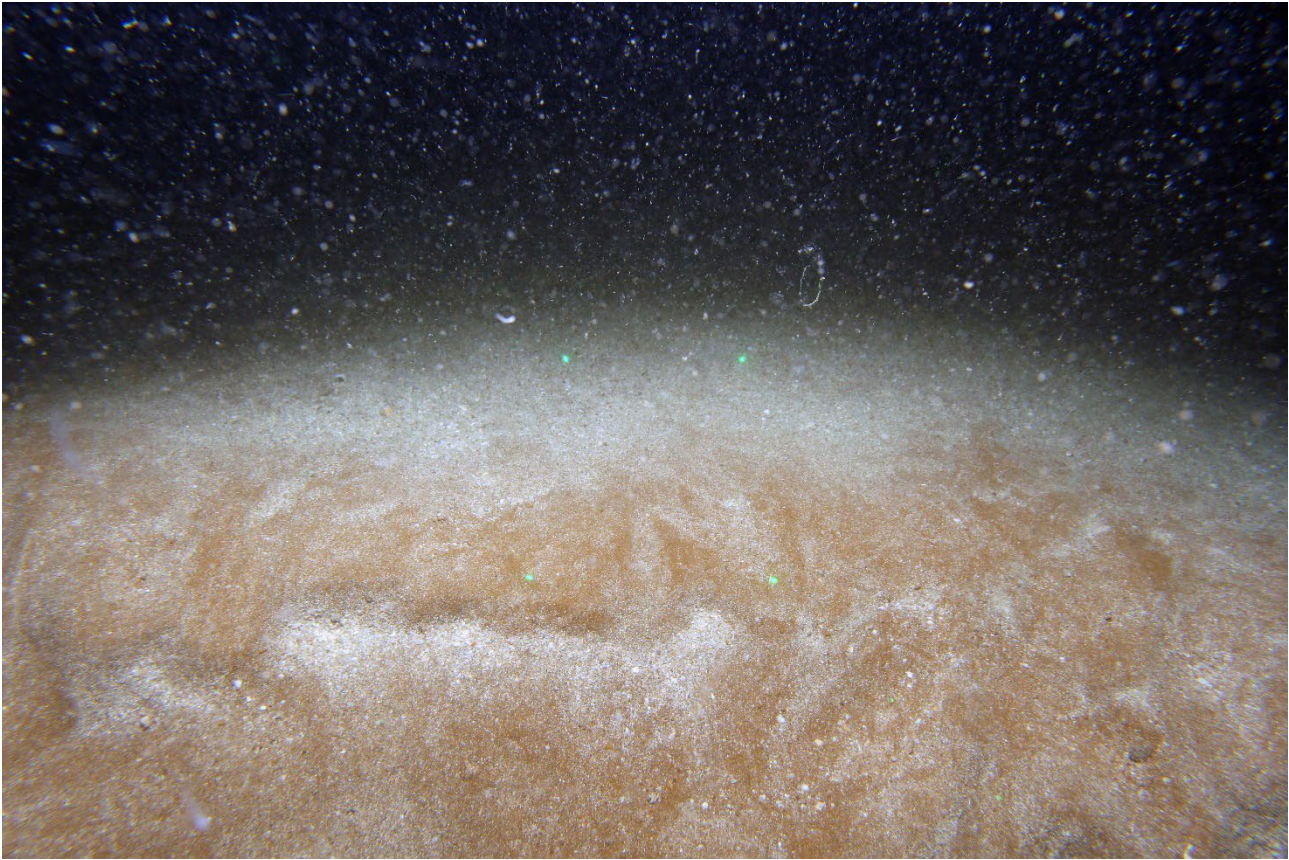


Plate 3-3: Silty/clay sand with a motile crinoid at site V12

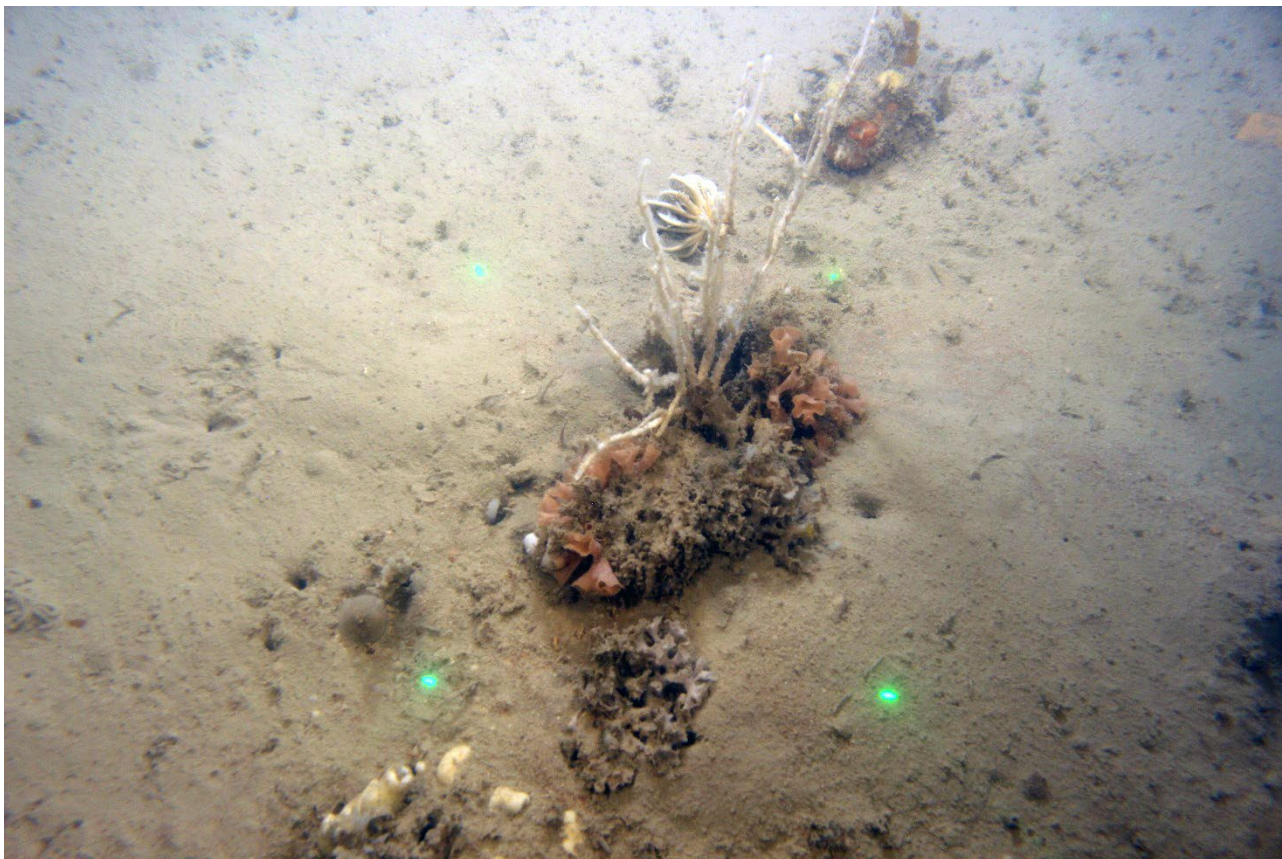
Sand waves were recorded at three offshore silty/clay shelly sand sites (V10, V11 and V12), roughly 1 m in height, with silty sand in the troughs and coarse shelly sand at the crests (Plate 3-4). This substrate was associated with very sparse epibiota.



**Plate 3-4: Small sand wave at site V11, with coarse, shelly sand at the crest**

### 3.1.1.1.2 Spoil ground

The spoil ground sites all consisted of soft substrate habitat, which was only identified at one other site along the offshore pipeline route (V16). This habitat is defined by silty/clay sediment with medium density biota (soft corals, algae and Bryozoa). Biota commonly associated with this habitat were soft corals (gorgonians, *Junceella* spp. and Alcyoniidae), branching and encrusting sponges, Bryozoa (lace corals), invertebrate burrows, polychaete tubes, brown algae and occasional motile crinoids.



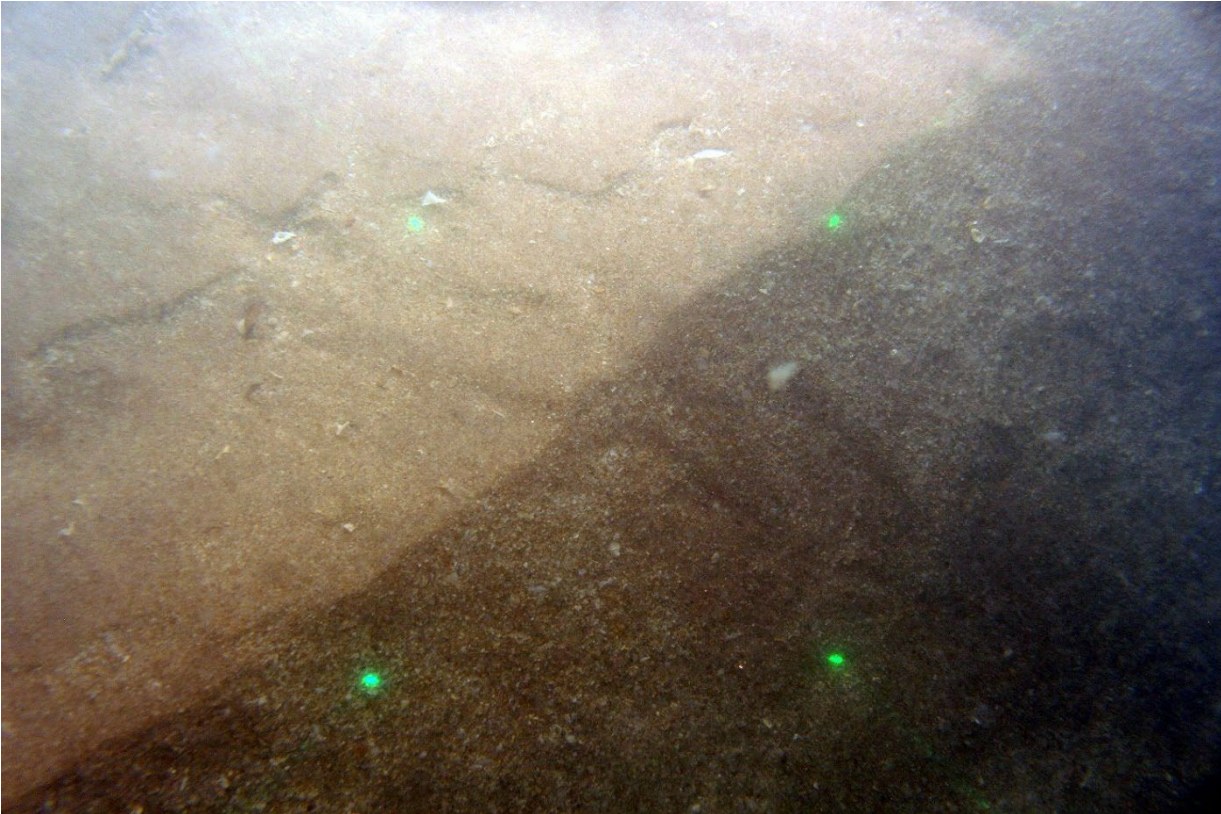
**Plate 3-5: Silty/clay sediment with soft corals, Bryozoa (lace coral) and a motile crinoid at site SG10**

### 3.1.1.1.3 Darwin Harbour

There were three main soft substrate habitat types identified in Darwin Harbour. The first comprised coarse shelly sand waves, less than 1 m in height with very sparse epibiota (Plate 3-6). This habitat was only recorded at three sites (HS78, HS79 and HS80), all of which were in the potential sand wave rectification zone at the outer edges of Darwin Harbour (Plate 3-7). While this habitat is very sparse in conspicuous epibiota, grab samples from one of the sites in this area (HS33) retrieved a very high density of hermit crabs (Plate 3-8), with over 100 crabs recorded from each grab.

The most common soft substrate habitat type within Darwin Harbour consisted of silty, shelly sand, with very sparse soft corals to no conspicuous epibiota (Plate 3-9). The epibiota recorded from this habitat included hydroids, occasional soft corals and sea pens (gorgonians, Pennatulacea, *Junceella* spp. and Alcyoniidae), Bryozoa (lace corals), sea urchins and sea stars.

The third habitat identified was a mixed habitat of silty shelly sand, with very sparse biota (soft corals) with scattered bombora was recorded at only one site, HS51 (Plate 3-10). The bombora supported assemblages of hydroids, soft corals (gorgonians), anemone colonies and encrusting sponges.



**Plate 3-6: Coarse shelly sand waves with very sparse epibiota at site HS78**



**Plate 3-7: Coarse shelly sand from site HS34, inside the potential sand wave dredging zone at the outer edge of Darwin Harbour**



Plate 3-8: Hermit crabs from site HS33

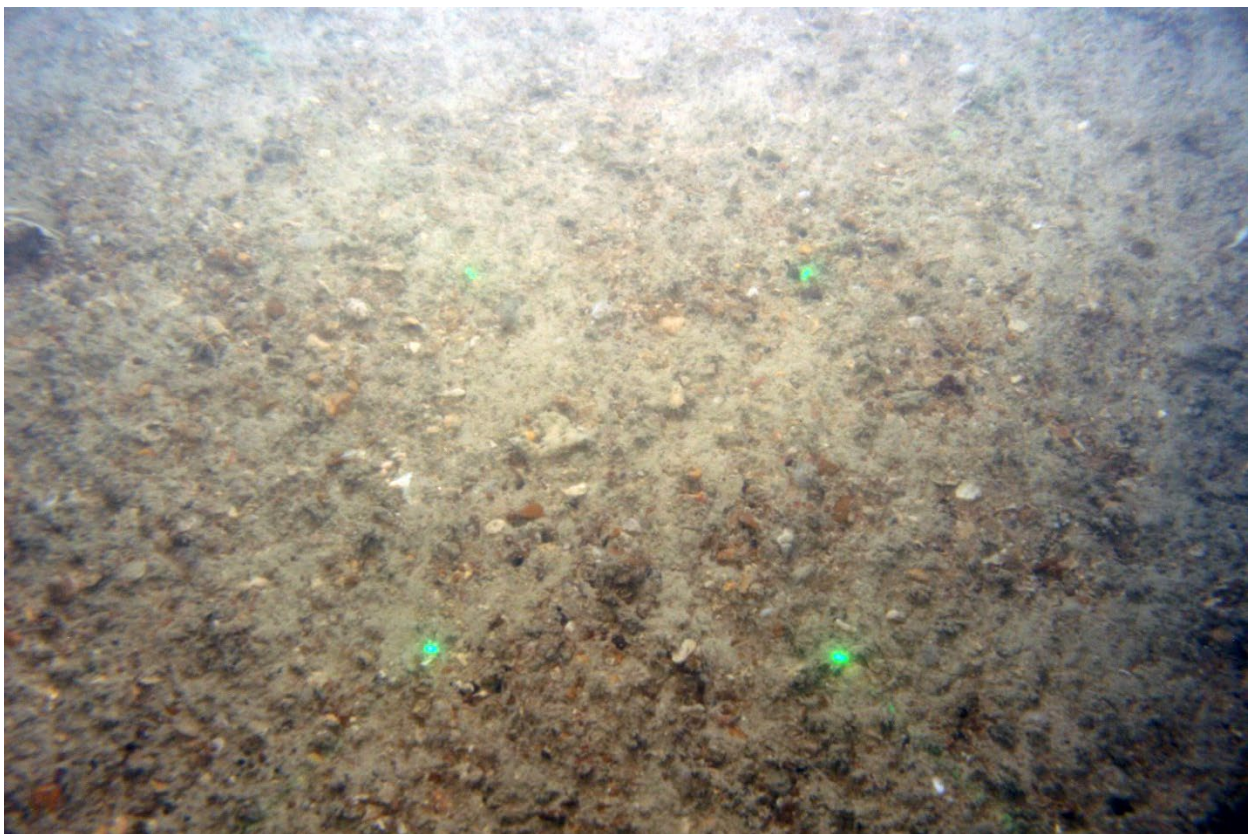


Plate 3-9: Silty shelly sand, with very sparse to no conspicuous epibiota at site HS73

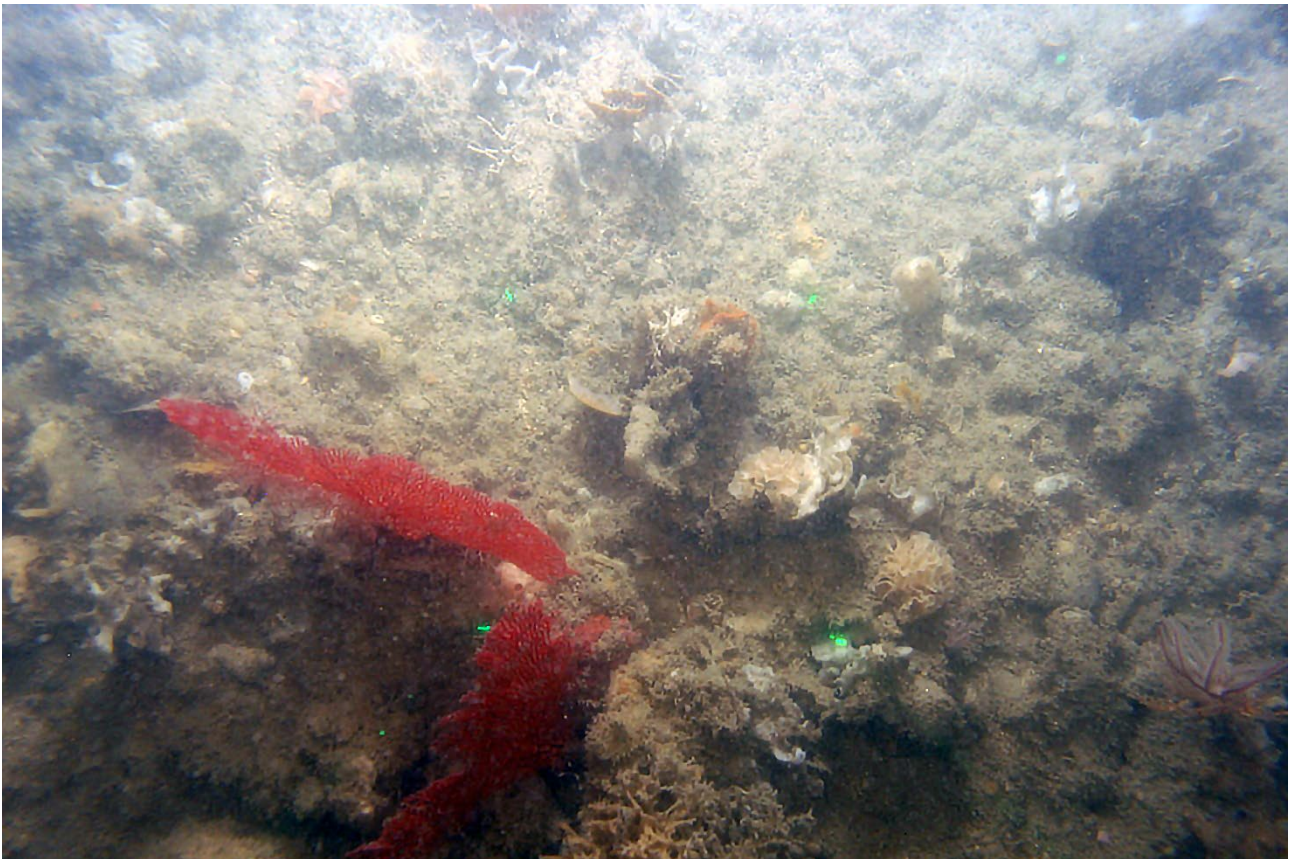


**Plate 3-10: Silty shelly sand and part of a bombyx supporting assemblages of sponges, anemones and soft corals at site HS51**

### **3.1.1.2 Hard substrate habitats**

#### **3.1.1.2.1 Darwin Harbour**

The majority of hard substrates were recorded along the section of the pipeline route offshore from Fannie Bay with a number also recorded in the inner harbour. Most of these sites were hard bottom (consolidated rocks) with a shelly coarse sediment veneer and sparse to medium conspicuous epibiota (mainly soft corals and bryozoans) (Plate 3-11). However, low profile reef was recorded at sites HS61 and HSN2, with medium to high density epibiota. The epibiota associated with this habitat type included hydroids, soft corals (gorgonians, *Junceella* spp.), brown algae, bryozoans (lace corals), ascidians, and encrusting, digitate and globular sponges.



**Plate 3-11: Hard bottom (consolidated granite rocks) with a shelly sediment veneer supporting gorgonians and bryozoans (lace corals) at site HS68**



**Plate 3-12: Low-profile reef with medium density gorgonians and sponges at site HSN2**

### 3.1.2 June 2022 survey

The June 2022 showed similar results to the October 2022 video transect surveys. Each site was evaluated in detail, and then sorted into the same broad habitat categories outlined for the October 2021 survey (Table 3-1). The harder substrates were limited to the inner Darwin Harbour and the coastal areas, while the offshore pipeline was dominated by silty sand substrate (Figure 3-6). Epibiota density also increased towards the inner Darwin Harbour, with the densest area surveyed occurring in rocky reefs located outside the project area, in the shallow protected areas of the inner harbour (Figure 3-6). The outer Darwin Harbour had more variation, and represented more of a transitional habitat, containing some area of rocky rubble and increased epibiota density, with large areas of bare silty sand with sparse epibiota (Figure 3-6). Overall, biota density and diversity were greatest in the rocky/hard substrate, which was predominantly located in the inner portions of Darwin Harbour, while the outer/offshore sections of the pipeline consisted mainly of silty to coarse sands.



REPORT

**Table 3-1: Transects conducted in June 2022 survey, describing substrate and predominate biota and the mapping habitat classification**

Transect	Substrate	Biota	Mapping habitat classification
BACI_1C	Thin silt/shelly sand veneer over bedrock, some rock and boulders.	Turf with low to medium density epibiota (5–15%); gorgonians (sea fans and sea whips—some with crinoids attached), hydroids. Fish in burrows	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_1P	Rock, boulders, cobbles; broken low relief rock pavement; mixed sediments	Turf with low to medium density epibiota (5–15%); gorgonians (sea fans and whips- some with crinoids attached), sponges (encrusting), hydroids, sea pens). Fish in burrows.	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_2C	Medium sand veneer with gravel, over bedrock	Bioturbation (burrows and mounds), low density epibiota (1–2%); gorgonians (sea whips and fans), sponge (fan)	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_2P	Fine sand veneer, with gravel and some rubble	Bioturbation (fish burrows and mounds), very low density epibiota (<1–2%); soft corals (sea whip, sea fan, sea pen), hydroids	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_3C	Rock reef (medium relief), muddy shelly sand veneer, rocks/boulders	Turf with medium to dense large epibiota (20–70%); sponges (multiple forms: 60% cover), soft corals (sea fans and whips: 20–30% cover), hydroids (<1%), hydroid/bryozoan turf (60–80%)	Low profile reef, with medium to high density biota.
BACI_3P	Rock reef (high relief), muddy shelly sand veneer, rocks/ boulders	Turf with dense large epibiota (40–80%); sponges (multiple forms), soft corals (sea fans and whips). Hydroid/bryozoan turf (40–80%), Fish (big school of snapper, batfish). Areas of shelly sand and rubble with little conspicuous epibiota (<1–2%); hydroids	Low profile reef, with medium to high density biota.
BACI_4C	High profile reef with sediment veneer	Turf with dense large epibiota (40–60% cover); hydroids, sponges (large, with diverse morphologies on reef (up to 60% cover), gorgonians (mainly large sea fans (20% cover) and branching forms with fewer sea whips on reef), hydroid/bryozoan turf (<20%)	Low profile reef, with medium to high density biota.
BACI_4P	Rock, boulders, cobbles; broken low relief rock pavement; mixed sediments	Low density epibiota (5–30% cover). Hydroids and encrusting biota (inc. calcareous tube worms, <1% cover). Hydroid/bryozoan turf (40–100% cover). Rare to low density gorgonians (branching, sea fans: 20–30%) and sponges (tube and burrowing types: <5% cover). Occasional crinoids on larger epibiota.	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_5C	Thin silt/shelly sand veneer over bedrock	Turf and large epibiota; hydroids, sponges (erect forms: 10–20%, low forms <20% cover), gorgonians (sea fans and sea whips rare), hydroid/bryozoan turf (60–80%)	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, Bryozoa).
BACI_5P	Thin silt/shelly sand veneer over bedrock	Turf with low density large epibiota; hydroids, sponges (tubular form: 20%, coned/spherical forms: ~5%, encrusting sponge: 40–60% coverage), gorgonians (sea fans and sea whips; often patchy/rare: <10% coverage), crinoids on sea whips, hydroid/bryozoan turf (70–90%)	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_6C	Fine, rippled sand with rubble	Very sparse epibiota (<1%); soft corals, digitate sponges, brown macroalgae, sea pen, bivalve, hydroids, fish in burrows, octopus. Bryozoan turf (<1%)	Sand waves < 1m, Course shelly sand. Very sparse epibiota.
BACI_6P	Fine sand with rubble	Bioturbation. Low density epibiota (1–5%); Soft corals and gorgonians (1–5%), hydroids (<1%), brown macroalgae (<1–2%), ascidians (<1%), encrusting and digitate sponges (<1%), crinoid, starfish, bryozoan turf (<1%)	Silty, shelly sand, with very sparse to no biota (soft corals).
Fish aggregation site	Rock reef (medium relief), mixed sand veneer, rocks/boulders	Bioturbation, turf and medium density large epibiota (10–40%); soft corals (gorgonians: 10%), crinoids (1–2%), sponges (multiple morphotypes: 5–10%), ascidians, fish (golden snapper, cod, butterflyfish, stingray). Hydroids/bryozoan turf (40–60%)	Low profile reef, with medium to high density biota.
Hab1	Rippled sand, sand bank; sand ridges	Rare, low density soft corals/gorgonians (<1%)	Silty, shelly sand, with very sparse to no biota (soft corals).
Hab2	Rippled sand, sand bank; sand ridges and large sand waves.	Generally, no conspicuous epibiota; except for some very low-density turf epibiota (1–2% coverage) and two soft corals/gorgonians recorded.	Sand waves ~ 1m, with silty sand in troughs and shelly sand at the peaks. Very sparse epibiota.
Hab3	Coarse sand/shell, coarser with increased depth. Sand waves/ripples and large sand ridges, sand bank	Very low-density turf epibiota (1–2% coverage), single branched brown macroalgae and single large burrowing anemone (<1% coverage); rare soft corals (gorgonians: 1–3% coverage). Single crab.	Sand waves < 1m, Course shelly sand. Very sparse epibiota.
Hab4	Medium sand with some gravel. Sand ripples	Rare gorgonians (<1% coverage) and very rare macroalgae (<1% coverage)	Sand waves < 1m, Course shelly sand. Very sparse epibiota.
Hab5	Medium sand with some gravel. Sand ripples	Bioturbation. No conspicuous epibiota.	Sand waves < 1m, Course shelly sand. Very sparse epibiota.
Hab6	Mobile sediments, reef (high and low relief) and patchy rock	Turf (40–50% cover) and large epibiota on bedrock (10–15%); hydroids, sponges (multiple forms), gorgonians (sea fans and sea whips), anemones, hydroid/bryozoan turf, hard coral (1–5%)	Silty, shelly sand, with very sparse biota (soft corals) with scattered bombora.
Hab7	Patchy rock (occasional high relief ridges and outcrops) with thick coarse sediment veneer	Dense turf (60% cover) and moderate density large epibiota on bedrock (15–20% cover); hydroids, sponges (multiple forms), soft corals and gorgonians (sea fans and sea whips), hard coral (10–20% cover), hydroid/bryozoan turf (60% cover), starfish, bivalve	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
Hab8	Patchy rock (frequent high relief ridges and outcrops) with thick coarse sediment veneer	Dense turf (70% cover) and dense large epibiota on bedrock (20–60% cover); hydroid/bryozoan turf (10–50%), sponges (branching: 5–20%; encrusting: 30–65%; burrowing: 5%; stalked: 5–10%; tubular: 3–5%), hard coral (5–10%), echinoderm (sea star), gorgonians (3–5%), macroalgae (green 1–7%; brown <2%), fish	Low profile reef, with medium to high density biota (soft corals).
Hab9	Sand veneer with patches of rocks	Bioturbation (mounds and burrows). Low to medium density large epibiota (5–40%); soft corals (gorgonian fans: 1–2%), anemones, brown macroalgae (20%), sponges (multiform: 10–20%)	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
Hab10	Shelly coarse sand, large/wide sand waves	Bioturbation (burrows and mounds), little conspicuous epibiota- crinoids and soft coral (sea whips) (<1%), hydroid (1–2%), crab	Sand waves ~ 1m, with silty sand in troughs and shelly sand at the peaks. Very sparse epibiota.
Heritage_147	Thin silt/sand veneer over bedrock (areas of high relief); Areas of low relief flat bedrock	Dense turf and diverse large epibiota (40–60%); holes lined with stones; Lots of gorgonians (40%), some with crinoids. Schools of fish.	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
Heritage_031	Rock with boulders and sediment veneer; change to thicker rippled sand veneer with exposed cobbles and epibiota	Medium density epibiota (20–50%); sponges (fans) and soft corals (sea fans), bryozoa turf (30–60%); less (patchier) epibiota (10–30%) on rippled sand; soft coral (sea whip), burrowing sponges, hydroids/bryozoans	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).

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Transect	Substrate	Biota	Mapping habitat classification
Hertage_241	Rock with boulders and sediment veneer; depression	Low density sea fans (1–2%), tube and burrowing sponges, gorgonians, dense bryozoa turf (70%)	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
INPHCCHI	Low profile rocky reef, with thin shelly sediment veneer	Medium density epibiota (20–60%); brown algae (5–10%), hard corals (encrusting, foliose, massive: 10–50%), soft corals (sea fans and whips: 5–10%), sponge (multiple forms: 10–30%). Bryozoan turf (20–40%)	Low profile reef, with medium to high density biota.
INPHCNEW	Rock with patchy sand veneer	Low to medium density epibiota (20–60%); large soft corals (sea whips, fans: 2–10%) and sponges (diverse morphotypes: 10–40%), hard coral (encrusting: 1–5%) anemone, fish (butterflyfish, wrasse).	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
INPHCMAN	Low to medium profile rocky reef, with thin shelly sediment veneer	Turf with medium to high density large epibiota (30–60%); sponges (multiple forms: 5–40%), soft corals (gorgonian fans and sea whips: 1–10%), hydroids (<1–15%), Bryozoan turf (40–70%)	Low profile reef, with medium to high density biota.
INPHCMAN_1	Low to medium profile rocky reef, with thin shelly sediment veneer	Turf with medium to high density large epibiota (40–80%); sponges (multiple forms: 5–40%), hard corals (1–10%), soft corals (gorgonian fans and sea whips: 1–20%), hydroids (<1–15%). Bryozoan turf (40–70%)	Low profile reef, with medium to high density biota.
INPHCSSI	Fine sediment with patchy/scattered rocks	Bioturbation. Areas with no conspicuous epibiota. Patches of low to high density epibiota (20–80%); soft corals (10–20%), sponges (multiple morphotypes: 10–30%), gorgonians, hard coral (encrusting and massive: 20–60%), brown (10–60%) and green macroalgae (inc. <i>Halimeda</i> spp) (1–5%), ascidians, anemone, bivalves fish (wrasse, pufferfish, butterflyfish, shark (whaler sp. or Bull shark) Bryozoan turf (20–60%)	Silty, shelly sand, with very sparse to no biota (soft corals) with bombora.
INPSGCPW	Bedrock (inc. medium relief reef) with coarse shelly sand veneer (occasional rippled sand); scattered bombora; low relief reef	Bioturbation. Medium to high density epibiota (20–80%); coral (inc. plate, foliose, encrusting and massive corals: 40–90%). Gorgonians (fans and whips: 1–5%), ascidians, <i>Halimeda</i> spp. (green macroalgae: 2–10%), patchy coral, sponges (digitate and basket), fan worm. turf (10–30%). No conspicuous epibiota on rippled sand areas	Low profile reef, with medium to high density biota.
INPHCWED2	Fine sand veneer, some rubble and small rocks	Bioturbation, turf and low density epibiota (1–40%); soft corals (sea whips: 1–5%) and sponges (multiple forms: 1–15%), hard coral (plate, encrusting: 1–30%), brown macroalgae (20–40%), green macroalgae ( <i>Halimeda</i> spp. 1–2%), bryozoan turf (10–30%). Fish (snapper, wrasse, damselfish)	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
INPHCWOD	Rippled coarse sand, occasional shelly rubble	Bioturbation (large, deep burrows and large mounds), Low density seagrass (possibly <i>Halodule</i> spp.: 5–15%) along entire transect	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA1	Fine sediment with small rubble/rock	Bioturbation. Often no conspicuous epibiota. Hydroids (1–2%), soft corals (<1%), starfish, tubeworm, fish (blenny or goby)	Silt/clay, shelly sand, with very sparse to sparse biota (soft corals and crinoids).
RFPA2	Fine sand veneer, some rubble and small rocks	Bioturbation. Low density epibiota (1–10%); Soft corals (1–5%), sponges (encrusting, digitate and branching: 1–5%), ascidians, crinoids, hydroids (1–2%), bryozoan turf (20–80%), starfish	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA3	Fine sand with scattered rocks and rubble	Bioturbation. Low density epibiota (1–15%); ascidians, crinoids, sponges (digitate and branching: 1–5%) soft corals (fans and sea whips: 1–10%), white ascidians (patches: <1–5%), crinoids (<1–2%)	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA4	Mainly fine sand with occasional coral rubble	Bioturbation. Low density epibiota (<1–10%); soft corals (sea fans and whips), sponges (encrusting and branching), crinoids	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA5	Coarse, shelly rippled sand, sand waves	Areas of no conspicuous epibiota, bioturbation, fish; very low density/patchy epibiota (<1–2%); soft corals, macroalgae, hydroids, crinoids, sponges	Sand waves < 1m, Course shelly sand. Very sparse epibiota.
RFPA6	Coarse, shelly rippled sand, sand waves	Bioturbation; low density/rare epibiota (<1–5%); soft corals, hydroids, brittle star, starfish, macroalgae, crinoid, stingray, tube worms, blennies.	Sand waves < 1m, Course shelly sand. Very sparse epibiota.
RFPA8	Fine sediment, occasional rock	Bioturbation. Low density epibiota (<1–5%); soft corals (gorgonians: <1–2%), sponges (branching and encrusting), hydroids (1–2%), ascidians, nudibranch, starfish, brown macroalgae (1–2%), sea pens	Silt/clay, shelly sand, with very sparse to sparse biota (soft corals and crinoids).
Sand waves	Rippled coarse shelly sand; sand waves; occasional coral rubble	Mainly no conspicuous epibiota; sparse soft corals (<1%), ascidians, crinoids (1–2%), polychaete tubes	Sand waves < 1m, Course shelly sand. Very sparse epibiota.

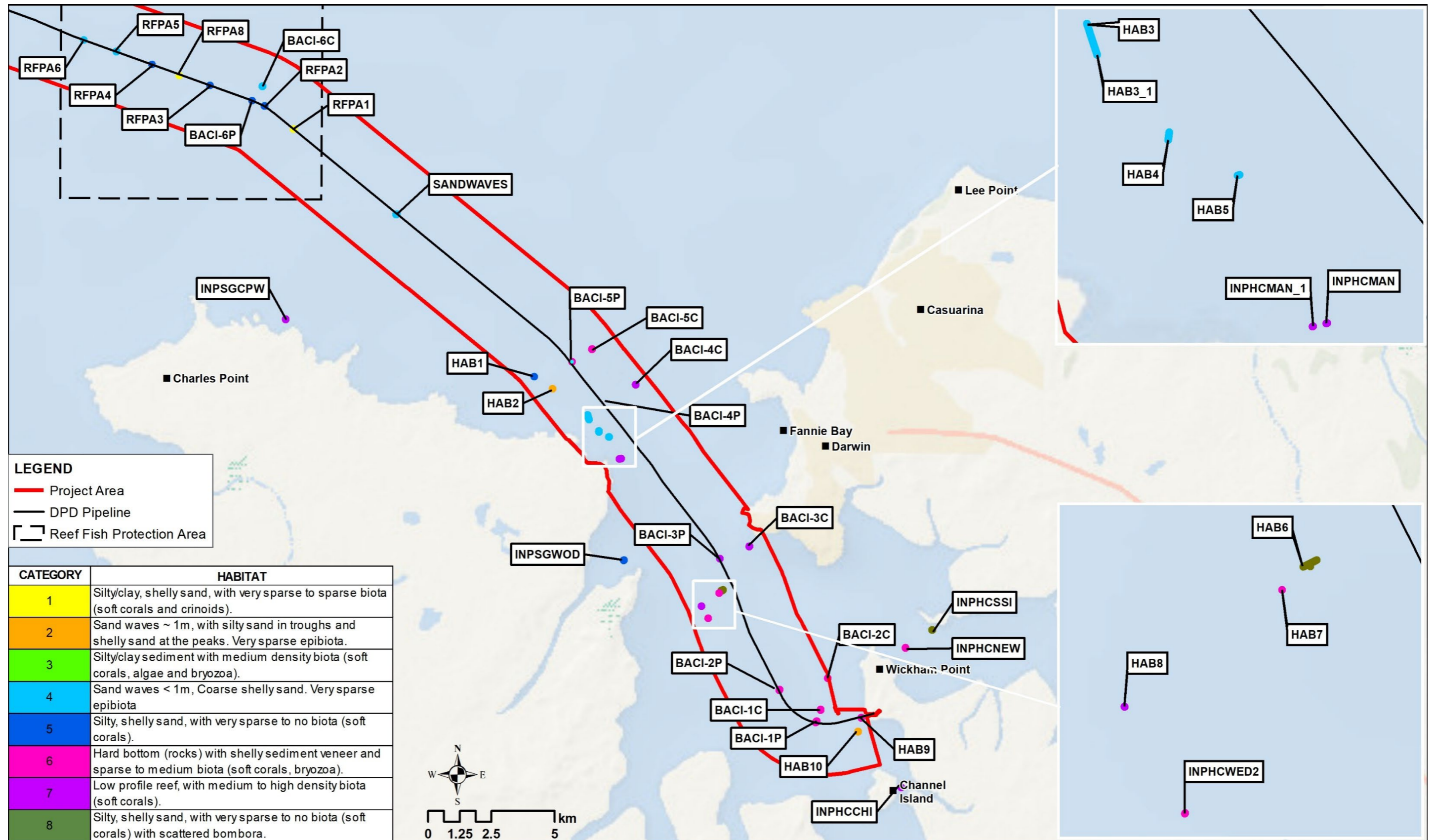


Figure 3-6: Benthic habitats along the proposed Barossa GEP pipeline, including outer pipeline, outer Darwin Harbour and inner Darwin Harbour survey sites (June 2022), including the Reef Fish Protection Area

### 3.1.2.1 Offshore pipeline

Similar to the October 2021 survey, the offshore seabed habitats were characterised by silty shelly sand from RFPA1 to RFPA8, including BACI\_6C/P and Sand waves (Plate 3-13), with very sparse to sparse (1–5% coverage) epibiota (mainly soft corals, crinoids and sponges). Courser patches of sand were also observed in the outer offshore pipeline region. Areas of soft silty and shelly sand were also observed in the inner portions of Darwin Harbour, and near Wickham Point. Biota commonly associated with this habitat type included:

- Soft corals, including gorgonians, sea whips (*Junceella* spp.), Neptheidae and Alcyoniidae
- Sponges, including digitate and branching
- Echinoderms including sea urchins, sea stars, sea cucumbers and crinoids
- Crustaceans including shrimp
- Burrows and polychaete tubes.

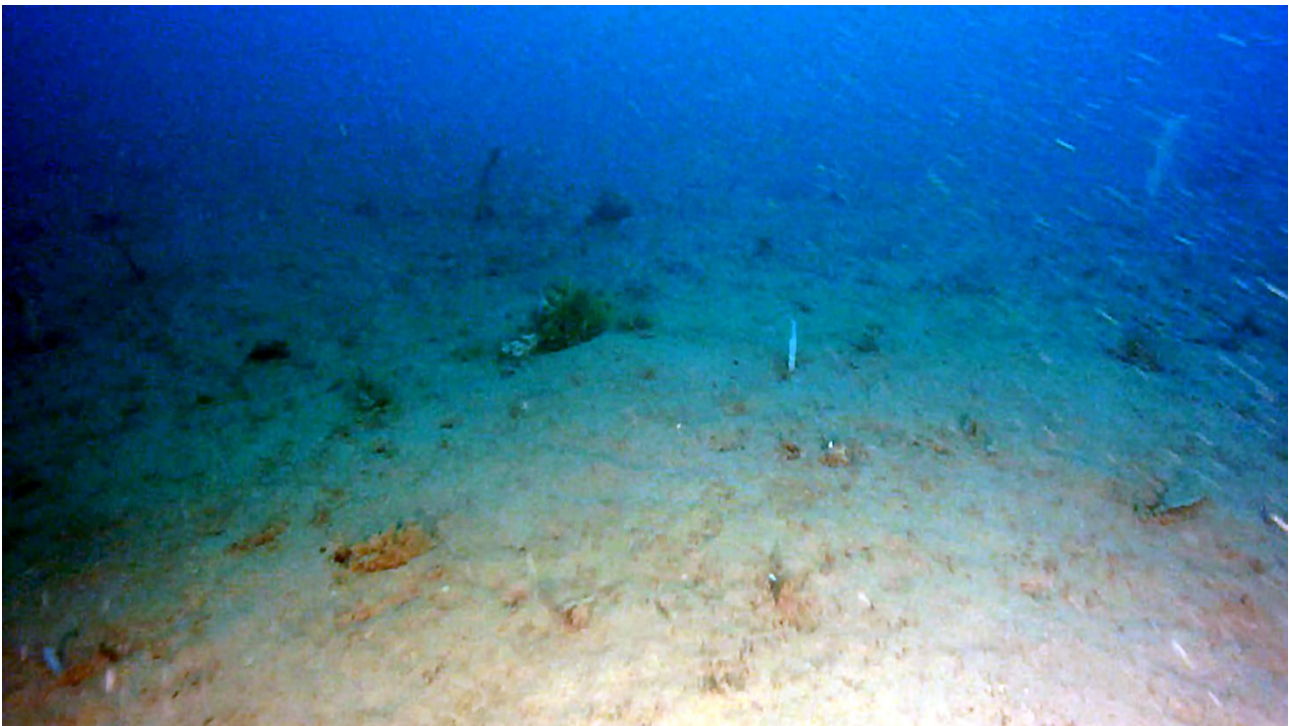


Plate 3-13: Silty shelly sand with sparse soft corals at RFPA3

### 3.1.2.2 Outer Darwin Harbour

The outer Darwin Harbour region represented a transition between hard and soft substrates. Sites Hab1–Hab5 were located just on the opening of Darwin Harbour with substrate ranging from rippled sand to medium sand with gravel toward the harbour opening. These sites had epibiota less than 1% coverage, consisting mainly of sparse anemone, soft corals and macroalgae (Plate 3-14). The further south sites, such as INPHCMAN, had rockier substrate and increased epibiota (Plate 3-15). This region was dominated by sponges (diverse morphotypes), soft corals, macroalgae, echinoderms with some fish and crustacean presence.



**Plate 3-14: Rippled coarse shelly sand with no to very sparse epibiota at Hab3**



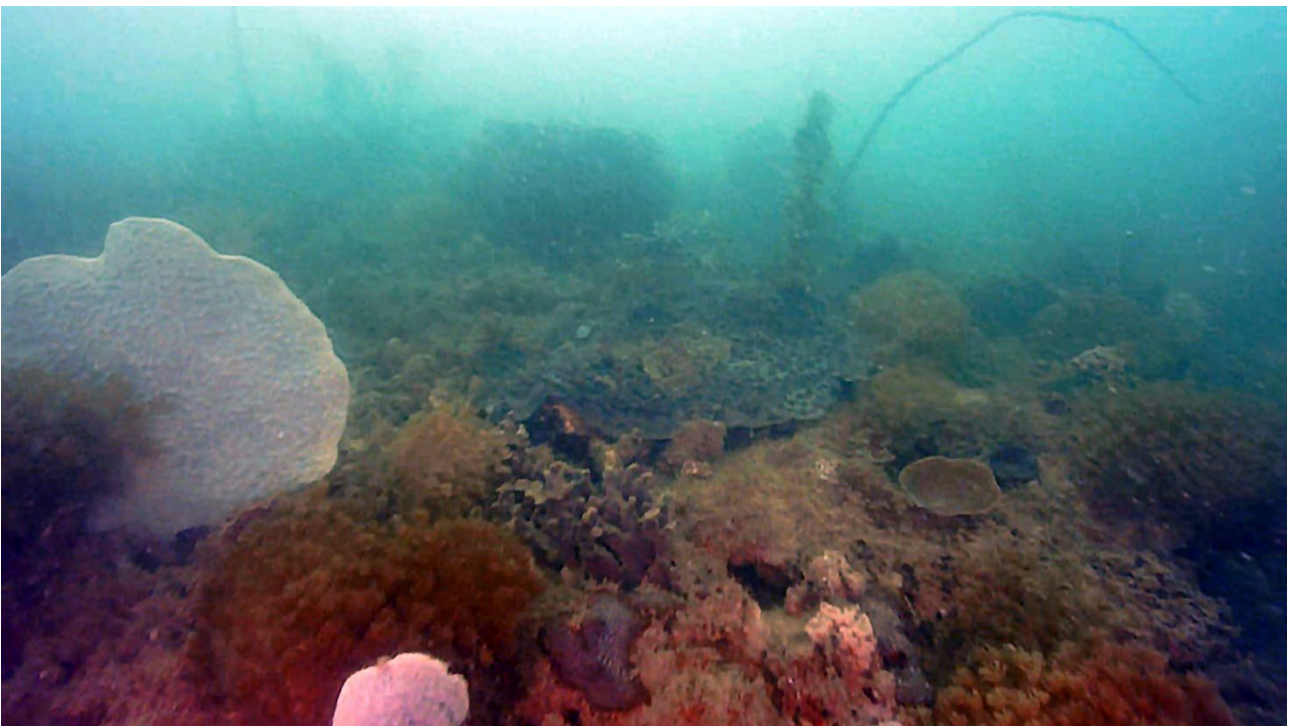
**Plate 3-15: Rocky reef with medium to high density epibiota, including large soft corals (gorgonian fans and sea whips), hydroids, sponges (multiple morphotypes) and occasional hard coral at INPHCMAN**

### **3.1.2.3 Inner Darwin Harbour**

The inner portions of Darwin Harbour consisted of mainly hard rocky substrates, other than sites near Wickham Point. Hab6-Hab8 had increasingly rocky substrate and increasing biodiversity and epibiota density, similar to INPHCMAN (Plate 3-15), while Hab-9-Hab10 had decreasing epibiota density and increased portions of silty mobile sand towards Wickham Point (Plate 3-16). The sites located outside of the project area in the shallower protected areas of Darwin Harbour boasted the greatest epibiota densities and diversity, including sponges, soft and hard corals, echinoderms and schools of fish (Plate 3-17).



**Plate 3-16: Coarse shelly sand with sparse epibiota and moderate bioturbation at Hab10**



**Plate 3-17: Rocky reef with diverse sponges, soft and hard corals, macroalgae and fish at INPHCCHI**

## 3.2 Sediment quality

### 3.2.1 Offshore pipeline

#### 3.2.1.1 Particle size distribution

Laboratory PSD results can be found in Appendix D. The data were analysed to characterise sediment samples in terms of Wentworth size classifications, which classify particle size into total clay (0-4 µm), total silt (4-63 µm), total sand (63-2000 µm) and total gravel (>2000 µm) (Table 3-2).

The offshore pipeline route was predominantly sand. The northern end of the pipeline route was gravelly silty sand, which became less gravelly and much siltier, with higher proportions of clay, towards the eastern end of the offshore pipeline route (Figure 3-7). The westernmost site (OP1) had 9.29% silt and 16.2% gravel, compared with the southernmost site (OP30) which had 39.22% silt and 0.28% gravel (Table 3-2). Proportions of clay in the sediment ranged from 1.86% at OP9, to 7.03% at OP30.

**Table 3-2: Sediment particle size characteristics along the offshore pipeline route (from west (OP1) to Darwin Harbour limits (OP30))**

Site	Total% clay (0-4 µm)	Total% silt (4-63 µm)	Total% sand (63-2000 µm)	Total% gravels (>2000 µm)
OP1	2.92	9.29	71.59	16.20
OP2	1.99	6.57	62.85	28.58
OP3	3.45	11.58	43.23	41.73
OP4	1.87	6.46	74.52	17.15
OP5	2.23	7.30	63.21	27.27
OP6	2.30	7.50	50.88	39.32
OP7	2.56	8.60	73.60	15.24
OP9	1.86	6.55	62.04	29.55
OP10	2.51	8.25	69.95	19.29
OP11	2.73	8.68	64.24	24.36
OP12	2.48	8.41	43.57	45.53
OP13	2.37	7.43	67.80	22.40
OP14	2.83	8.30	71.35	17.53
OP15	2.57	8.04	73.63	15.76
OP16	3.54	10.26	64.94	21.26
OP17	2.19	6.41	77.29	14.12
OP18	4.43	11.67	73.36	10.54
OP19	2.34	6.88	78.28	12.49
OP20	3.95	11.77	79.06	5.22
OP21	2.95	10.10	79.79	7.16
PTS-57.5-GS	3.43	11.11	76.09	9.36
OP22	3.07	9.49	66.71	20.72
PTS-62.5-GS	3.62	11.23	74.71	10.45
PTS-64.0-GS	3.29	10.23	66.40	20.09
OP23	5.32	14.11	61.18	19.38
OP24	2.33	7.66	54.83	35.19
OP25	5.42	16.78	72.35	5.45
OP26	5.03	17.16	73.39	4.42
OP27	6.77	22.88	61.48	8.88
OP28	5.86	22.38	60.57	11.19
OP29	6.03	25.18	57.40	11.39
OP30	7.03	39.22	53.47	0.28

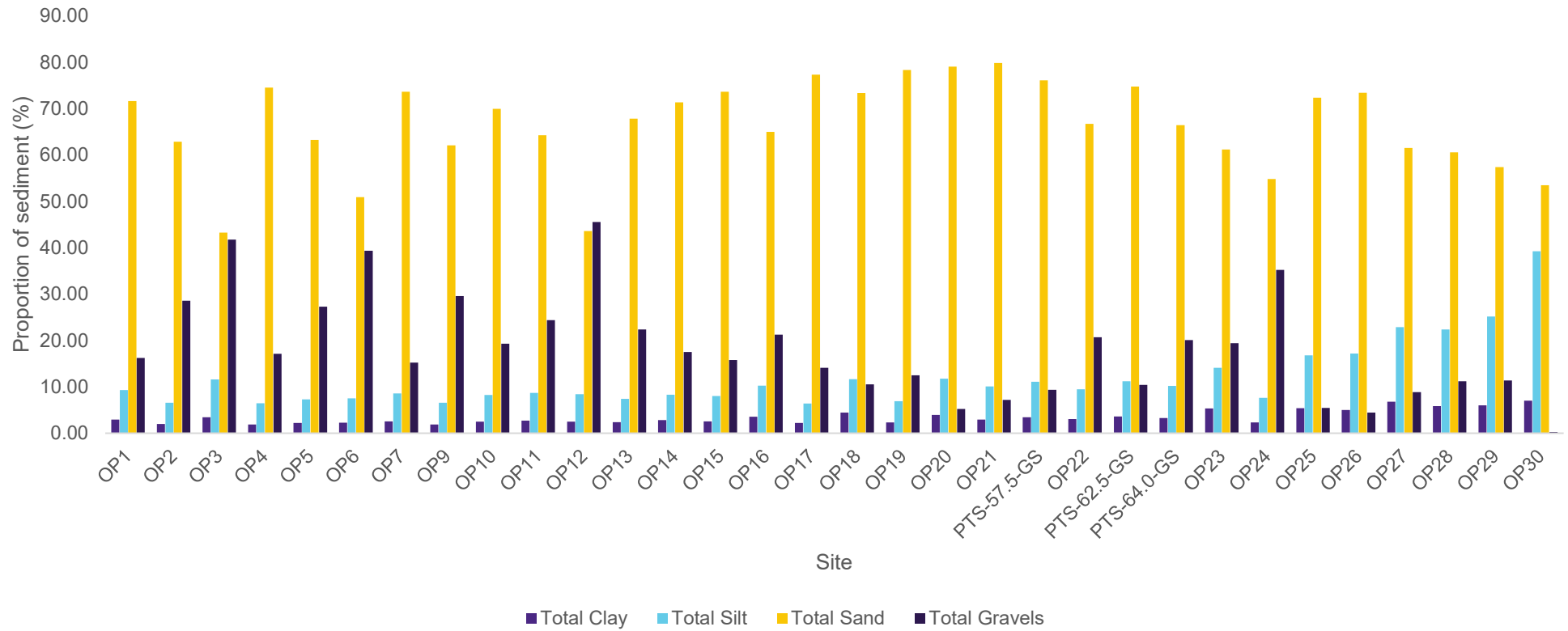


Figure 3-7: Sediment sample particle size characteristics along the offshore pipeline route



### 3.2.1.2 Infauna

A total of 744 individuals from ten phyla were recorded from the 29 offshore pipeline samples analysed. The dataset was dominated by crustaceans (350 individuals) and annelids (polychaete worms; 313 individuals). Crustaceans were the most abundant phylum at 16 of the 29 OP sites (55.2%), with Annelids the most abundant phylum at the other 13 sites (44.8%). The next most numerous phyla were an order of magnitude lower in abundance (Sipuncula, Echinodermata, Mollusca and Chordata, represented by 32, 23, ten and eight individuals, respectively). The remaining phyla, Brachiopoda, Cnidaria, Echiura, and Porifera, were only represented by doubletons (i.e. two individuals per phyla). The full dataset can be found in Appendix E.

Descriptive statistics of infaunal community data describing the number of species (S), abundance (N), Margalef's species richness (d), Pielou's evenness (J'), Shannon-Weiner diversity (H') and Simpson's alpha diversity index (1-λ) are presented in Table 3-3. All metrics were lowest at site OP30 (three individuals from one taxa). The number of species, Margalef's species richness and Shannon-Weiner diversity were greatest at site OP9 (39 individuals from 26 taxa). Abundance was greatest as site OP15 (n = 53), and Pielou's evenness and Simpson's index were greatest at sites OP25 and OP26 (J' = 1, 1- λ = 1).

**Table 3-3: Descriptive statistics of offshore pipeline (OP) infaunal data**

Site	Species (S)	Abundance (N)	Margalef's species richness (d)	Pielou's evenness (J')	Shannon-Weiner diversity (H')	Simpson's alpha diversity index (1-λ)
OP01	19	42	4.816	0.886	2.609	0.9233
OP02	22	48	5.425	0.9187	2.84	0.9468
OP03	13	20	4.006	0.9584	2.458	0.9526
OP04	24	33	6.578	0.9812	3.118	0.983
OP05	15	22	4.529	0.9465	2.563	0.9524
OP06	23	31	6.407	0.95	2.979	0.9677
OP07	26	46	6.53	0.9066	2.954	0.9372
OP09	28	49	6.938	0.9461	3.152	0.9677
OP10	18	23	5.422	0.9805	2.834	0.9802
OP11	16	22	4.853	0.9699	2.689	0.9697
OP12	22	29	6.236	0.9753	3.015	0.9803
OP13	14	24	4.091	0.9293	2.453	0.9348
OP14	22	39	5.732	0.9609	2.97	0.9676
OP15	24	53	5.793	0.8825	2.805	0.9238
OP16	19	26	5.525	0.9661	2.845	0.9723
OP17	26	48	6.458	0.9439	3.075	0.9654
OP18	18	24	5.349	0.9796	2.831	0.9783
OP19	13	18	4.152	0.9654	2.476	0.9608
OP20	8	9	3.186	0.9826	2.043	0.9722
OP21	9	10	3.474	0.9849	2.164	0.9778
OP22	14	17	4.588	0.9692	2.558	0.9706
OP23	14	17	4.588	0.95	2.507	0.9559
OP24	24	49	5.91	0.8758	2.783	0.9175
OP25	8	8	3.366	1	2.079	1
OP26	4	4	2.164	1	1.386	1
OP27	6	7	2.569	0.9755	1.748	0.9524
OP28	13	16	4.328	0.9796	2.513	0.975
OP29	6	7	2.569	0.9755	1.748	0.9524
OP30	1	3	0	††	0	0

Cluster analysis of with Similarity Profiles (SIMPROF) of offshore pipeline infauna data indicated that sites were clustered into three significant groupings with three outliers, which were 'groups' A to C (sites = OP30, OP20 and OP25; Figure 3-8).

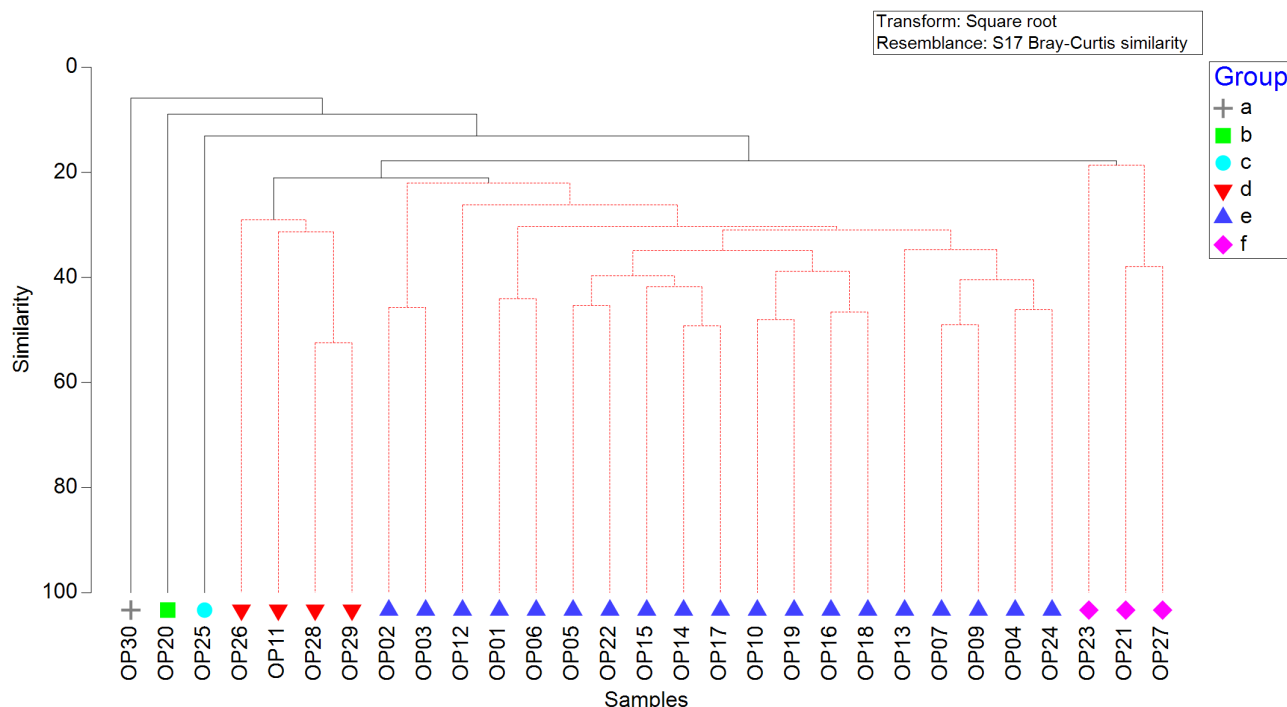


Figure 3-8: Offshore pipeline infaunal SIMPROF cluster groups

**Group D – sites OP11, OP26, OP28 and OP29**

This group was dominated by Anthuridea (elongate isopod crustaceans) and polychaete worms (*Eunice* sp., *Axiiothella* sp. and *Nephtys* sp.). The average abundance of these taxa are higher than, e.g. group F, which is likely due to a greater range of particle sizes in the substrate, as indicated by the dominance of Anthuridea, which live in crevices, empty calcareous worm tubes or structurally complex epibiota. Review of the particle size data (Section 3.2.1.1) indicated sediment at these sites had a higher % gravel component, but also a higher silt component than Group F.

**Group E – sites OP1 to OP7, OP9, OP10, OP12 to OP19, OP22, OP24**

Group E was characterised by a much more diverse community, with 30 taxa comprising the top 90% of taxa characterising the biological assemblage (as opposed to four and five taxa for Groups D and F, respectively). The crustaceans (mainly amphipods, tanaids and isopods) and polychaetes (mainly deposit-feeding tube worms and free-living taxa) were the dominant taxa, with echinoderms (Ophiuroidea) and sipunculids also represented. Group E was the coarsest sediment in terms of particle size, and with the lowest silt/clay component which would have provided a more complex substrate and potentially better sediment oxygenation in surficial sediments.

**Group F – sites OP21, OP23 and OP27**

This group was dominated by brittlestars (Ophiuroidea) and polychaetes (*Lumbrineris* sp., spionids, *Nephtys* sp. and *Axiiothella* sp.). These taxa are generally surface deposit feeders and/or carnivores/scavengers, with several capable of interface feeding (switching between e.g. deposit feeding and suspension/filter feeding), which is a trait often associated with harsh or nutrient-poor environments, such as the fine or sandy sediments these taxa inhabit.

### **3.2.1.3 Metals**

The metals and metalloid concentrations for all sites (see Appendix G) were compared to the NAGD screening levels (CoA, 2009). Of the metals and metalloids in the sediments sampled from offshore pipeline route; only mercury was below the LoR for all sites.

Aluminium concentrations were all above the LoR and ranged from 3,500 to 12,000 mg/kg. There is no NAGD screening level for aluminium in marine sediments.

Arsenic concentrations were all above the LoR and ranged from 7 mg/kg to 35 mg/kg. There were 13 sites that had arsenic concentrations above the NAGD screening level of 20 mg/kg but were below the Sediment Quality Guideline (SQG)-High value of 70 mg/kg. Most of these sites were towards the western end of the offshore pipeline (Figure 3-9).

Barium concentrations were all above the LoR and ranged from 5.5 to 13 mg/kg, except for one outlier site (OP19) which had a barium concentration of 81 mg/kg. This outlier is potentially an error and was removed from the graphs. Barium concentrations were higher at the southern end of the offshore pipeline route (towards Darwin Harbour) (Figure 3-9). There is no NAGD screening level for barium in marine sediments.

Cadmium concentrations were all above the LoR, except for one site (OP27). Concentrations were relatively consistent along the offshore pipeline route and ranged from <0.1 to 0.3 mg/kg. All sites had cadmium concentrations below the NAGD screening level of 1.5 mg/kg (Figure 3-9).

Chromium concentrations were all above the LoR and ranged from 11 to 26 mg/kg. All concentrations were well below the NAGD screening level of 80 mg/kg.

Cobalt concentrations were all above the LoR and ranged from 2.6 to 6.3 mg/kg. There is no NAGD screening level for cobalt in marine sediments (Figure 3-9).

Copper concentrations were all above the LoR and ranged from 1.2 to 4.7 mg/kg. Copper concentrations were higher at the southern end of the offshore pipeline route (towards Darwin Harbour). All concentrations were well below the NAGD screening level of 65 mg/kg (Figure 3-9).

Iron concentrations were all above the LoR and ranged from 8,300 to 15,000 mg/kg. There is no NAGD screening level for iron in marine sediments. Iron concentrations were lowest at site OP1 (Figure 3-9).

Nickel concentrations were all above the LoR and ranged from 4 mg/kg to 8.7 mg/kg. All sites were below the NAGD screening level of 21 mg/kg (Figure 3-9).

Zinc concentrations were all above the LoR and ranged from 4.5 to 16 mg/kg. Zinc concentrations were higher at the southern end of the offshore pipeline route (towards Darwin Harbour). All concentrations were well below the NAGD screening level of 200 mg/kg (Figure 3-9).

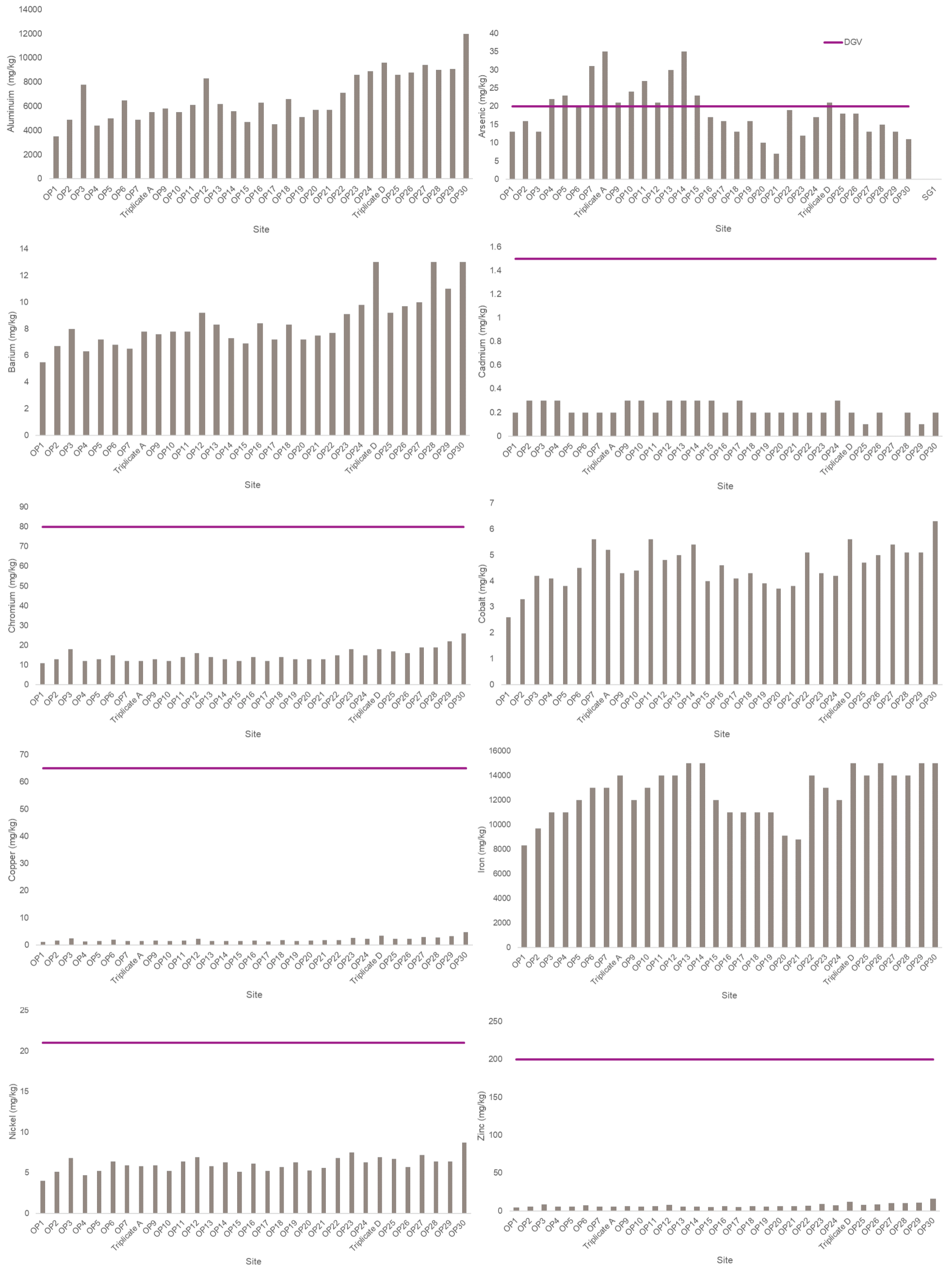


Figure 3-9: Metal concentrations along the offshore pipeline route (from west (OP1) to east (OP30))

Arsenic is considered to become concentrated in sedimentary rocks through sedimentation processes. Studies have shown that iron formations and iron rich sediments can contain very large concentrations of natural arsenic (Tanaka, 1988). Thirteen samples had arsenic concentrations above the NAGD screening level (Figure 3-9). Arsenic concentrations were therefore plotted against iron concentrations along the offshore pipeline route to determine if there was a correlation between arsenic and iron. A weak positive polynomial correlation between iron concentrations and arsenic concentrations was identified ( $R^2$  value of 0.2) (Figure 3-10).

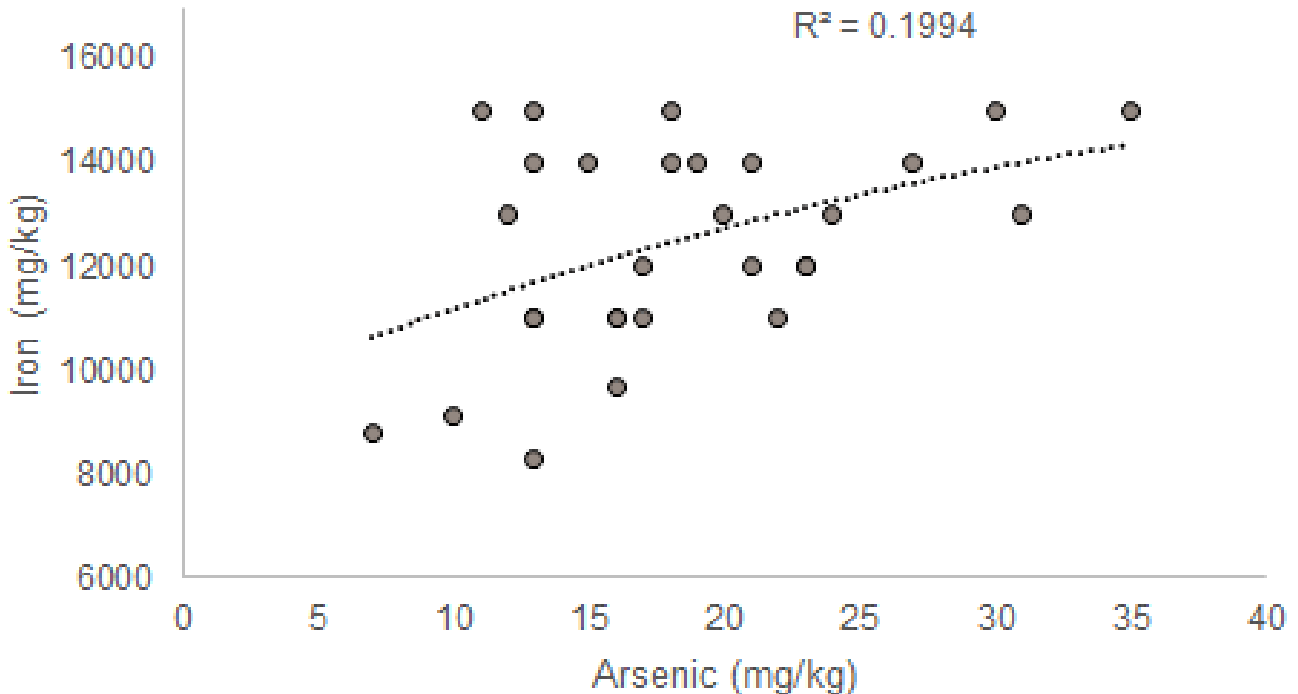


Figure 3-10: Correlation between iron and arsenic concentrations along the offshore pipeline route

### 3.2.1.4 Nutrients

TKN concentrations exhibited low variability across sites, ranging from 0.3 to 0.6 mg.N/g (Table 3-4; Appendix G). TP concentrations also exhibited low variability across sites, ranging from 0.36 to 0.59 mg.P/g (Table 3-4). TOC concentrations were also low, ranging from 0.2 to 0.5%. Levels were generally higher at the eastern (Darwin Harbour) end of the offshore pipeline route.

### 3.2.1.5 Hydrocarbons

TRH and BTEXN concentrations at offshore pipeline sites were below the LoR for all samples (Appendix H). Therefore, no PAH analysis was undertaken at these sites.

### 3.2.1.6 Naturally occurring radioactive materials

All samples taken along the offshore pipeline route had NORMs concentrations above the LoR for all three analytes (radium-226, radium-228 and thorium-228; Appendix F). Radium-226 concentrations ranged from 3.6 to 17.0 Bq/kg, radium-228 concentrations ranged from 4.2 to 26.0 Bq/kg and thorium-228 concentrations ranged from 4.3 to 24.0 Bq/kg (Figure 3-11). These results were calculated with a 95% level of confidence, with the measurement uncertainty ranging from  $\pm 0.4$  to 3.0 Bq/kg. All concentrations were well below the guideline value of 35 Bq/g (=35,000 Bq/kg) screening level (effects range-low) (CoA 2009).

The concentrations of all three NORMs analytes were lower further offshore and increased towards Darwin Harbour (Figure 3-11).

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**Table 3-4: Total Kjeldahl nitrogen, total phosphorus and total organic carbon concentrations along the offshore pipeline route**

Site	Total Kjeldahl nitrogen as N (mg.N/g)	Total phosphorus as P (mg.P/g)	Total organic carbon (%)
OP1	0.3	0.36	0.2
OP2	0.3	0.42	0.2
OP3	0.6	0.47	0.4
OP4	0.3	0.49	0.2
OP5	0.3	0.52	0.2
OP6	0.5	0.53	0.3
OP7	0.3	0.53	0.2
Triplicate A	0.3	0.59	0.2
OP9	0.4	0.50	0.2
OP10	0.3	0.53	0.2
OP11	0.3	0.53	0.3
OP12	0.6	0.55	0.2
OP13	0.3	0.57	0.2
OP14	0.3	0.56	0.2
OP15	0.3	0.50	0.2
OP16	0.4	0.44	0.2
OP17	0.3	0.42	0.3
OP18	0.4	0.41	0.2
OP19	0.3	0.40	0.3
OP20	0.5	0.37	0.3
OP21	0.5	0.37	0.2
OP22	0.4	0.48	0.4
OP23	0.5	0.38	0.3
OP24	0.5	0.49	0.3
Triplicate D	0.4	0.46	0.3
OP25	0.4	0.48	0.4
OP26	0.5	0.55	0.4
OP27	0.5	0.45	0.4
OP28	0.4	0.43	0.5
OP29	0.5	0.38	0.2
OP30	0.6	0.45	0.2

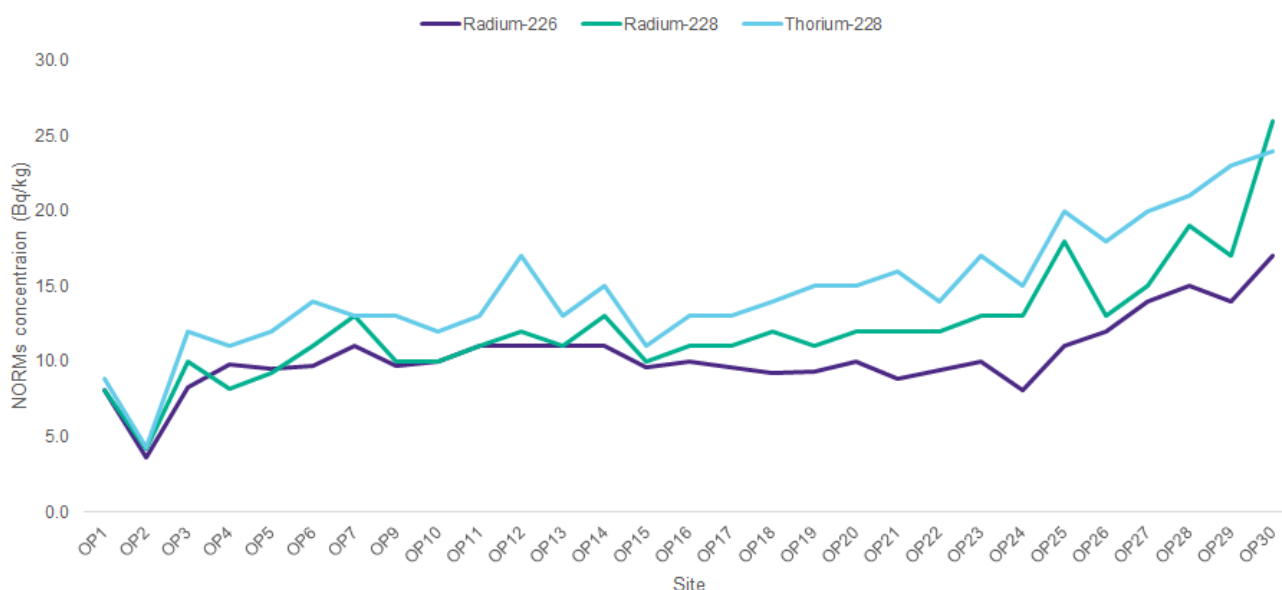


Figure 3-11: NORMs concentrations along the offshore pipeline route (from west (OP1) to east (OP30))

### 3.2.2 Darwin Harbour pipeline

#### 3.2.2.1 Particle size distribution

Laboratory PSD results can be found in Appendix D. The data were analysed to characterise sediment samples in terms of Wentworth size classifications, which classify particle size into total clay (0–4 µm), total silt (4–63 µm), total sand (63–2000 µm) and total gravel (>2000 µm).

The particle size distribution varied from south to north along the pipeline route in Darwin Harbour. The northernmost site (HS49) had a very high proportion of silt (46%) and clay (10%) (Table 3-5), similar to high silt and clay content found at the southern end of the offshore pipeline route (OP30, Section 3.2.1.1). The sand wave dredge area (HS48–HS32) had very high proportions of sand (68–93%), while the southern end of the pipeline route consisted of gravelly silty sand (Figure 3-12).

Table 3-5: Sediment particle size characteristics along the Darwin Harbour pipeline route (from south (HS01) to north (HS49))

Site	Total clay % (0–4 µm)	Total silt% (4–63 µm)	Total sand% (63–2000 µm)	Total gravels % (>2000 µm)
HS01	3.12	14.50	55.48	26.90
HS02	4.60	18.25	43.63	33.52
HS03	3.68	12.90	23.63	59.79
HS04	5.68	21.19	41.73	31.40
HS05	6.92	24.55	41.55	26.98
HS06	3.06	11.05	52.66	33.23
HS07	3.38	12.57	57.86	26.19
HS08	3.21	11.78	40.47	44.54
HS09	3.31	11.84	39.79	45.07
HS10	3.92	14.20	58.42	23.47
HS11	2.42	8.99	38.72	49.87
HS12	3.57	13.57	42.95	39.91
HS13	3.36	12.82	46.50	37.31
HS14	4.25	14.48	41.85	39.42
HS15	3.18	11.37	22.22	63.24
HS16	2.94	10.18	29.79	57.09

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Site	Total clay % (0-4 µm)	Total silt% (4-63 µm)	Total sand% (63-2000 µm)	Total gravels % (>2000 µm)
HS17	2.84	9.19	53.38	34.59
HS18	2.49	8.76	53.69	35.06
HS19	3.76	13.83	35.57	46.83
HS20	4.44	16.67	48.51	30.38
HS21	3.33	13.16	41.58	41.93
HS22	1.04	6.14	56.66	36.16
HS23	3.26	12.99	38.14	45.60
HS25	1.52	7.01	40.85	50.62
HS26	2.31	8.94	33.80	54.95
HS27	1.79	7.02	34.72	56.46
HS31	1.99	7.47	34.49	56.05
HS70	3.54	13.12	54.36	28.98
HS74	2.79	11.76	53.10	32.35
HS75	2.35	10.65	49.41	37.59
HS77	3.02	14.00	65.16	17.82
HS32	0.46	3.95	68.69	26.91
HS33	0.29	2.59	76.76	20.35
HS34	0.00	1.36	86.70	11.94
HS35	1.51	6.76	69.83	21.90
HS36	0.05	2.12	88.33	9.50
HS37	0.00	0.60	88.20	11.20
HS38	2.17	8.36	69.87	19.60
HS39	0.00	0.79	80.44	18.77
HS40	1.40	6.50	70.44	21.65
HS41	2.02	9.99	75.50	12.49
HS42	4.05	17.33	67.88	10.74
HS44a	0.13	1.20	76.77	21.90
HS44b	0.14	1.78	76.49	21.60
HS45	0.68	3.16	70.04	26.12
HS46	0.08	0.74	92.85	6.33
HS47	2.66	14.24	77.63	5.47
HS48	4.31	20.61	70.46	4.62
HS49	9.95	45.67	44.16	0.22



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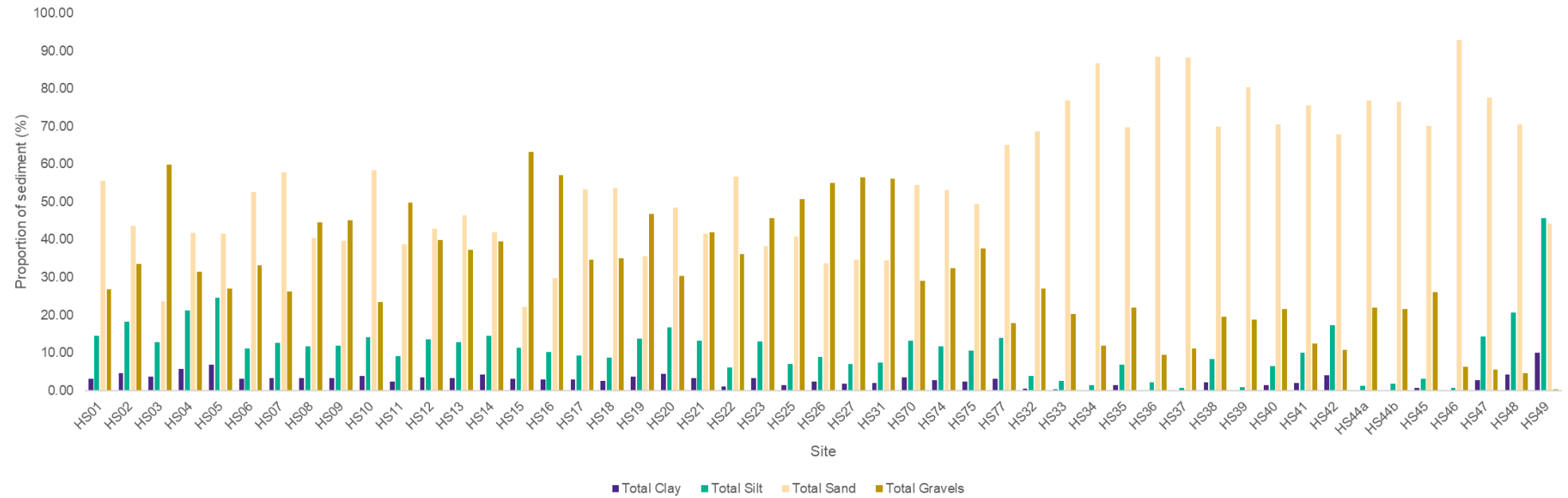


Figure 3-12: Sediment sample particle size characteristics inside Darwin Harbour (from south (HS01) to north (HS49))

### **3.2.2.2 Metals**

The metals and metalloid concentrations for all sites (see Appendix G) were compared to the NAGD screening levels (CoA, 2009), where available. Of the metals and metalloids in the sediments sampled from Darwin Harbour; cadmium, mercury and silver were below the LoR for all sites.

Aluminium concentrations were all above the LoR and ranged from 1,330 to 14,600 mg/kg. There is no NAGD screening level for aluminium in marine sediments (Figure 3-13).

Antimony concentrations were above the LoR at 18 sites, ranging from <0.5 to 1.07 mg/kg (Figure 3-13). All the sites in the potential sand wave dredging area were below the LoR. All samples were below the NAGD screening level for antimony of 2 mg/kg (Figure 3-13).

Arsenic concentrations were found to be very high inside Darwin Harbour. All samples were above the LoR, and only seven samples were below the NAGD screening level of 20 mg/kg., all of which were within the potential sand wave dredging area. Arsenic concentrations ranged from 8.27 to 108 mg/kg, with a total of nine samples (HS06, HS07, HS08, HS09, HS10, HS11, HS12, HS20 and HS24) above the NAGD SQG-High of 70 mg/kg (Figure 3-13).

Chromium concentrations were above the LoR at all sites and ranged from 6.9 to 114 mg/kg. Only one sample (HS31) was above the NAGD screening level of 80 mg/kg (Figure 3-13). However the 95% upper confidence limit of the samples in the Darwin Harbour pipeline (32.6 mg/kg) meet the NAGD screening level.

Cobalt concentrations were above the LoR at all sites, ranging from 1 to 10.9 mg/kg. There is no NAGD screening level for cobalt in marine sediments. Cobalt concentrations were generally high at the southern end of the pipeline, with lower concentrations found within the potential sand wave dredging area (Figure 3-13).

Eleven sites had copper concentrations below the LoR. These sites were all within the potential sand wave dredging area. Copper concentrations within Darwin Harbour ranged from <1 to 7.6 mg/kg. All sites were well below the NAGD screening level 65 mg/kg (Figure 3-13).

Iron concentrations were all above the LoR at all sites and ranged from 8,140 to 58,100 mg/kg. There is no NAGD screening level iron in marine sediments. Iron concentrations were lowest within the potential sand wave dredge area (Figure 3-13).

Lead concentrations were all above the LoR and ranged from 1.6 to 28 mg/kg. All sites were below the NAGD screening level of 50 mg/kg. Lead concentrations were slightly lower within the sand wave dredge area (Figure 3-13).

Manganese concentrations were variable across Darwin Harbour but were generally high within the proposed sand wave dredging area. Manganese concentrations were all above the LoR and ranged from 169 to 800 mg/kg (Figure 3-13). There is no NAGD screening level for manganese in marine sediments.

Nickel concentrations were all above the LoR at all sites and ranged from 1.6 to 9.8 mg/kg. All sites were below the NAGD screening level of 21 mg/kg (Figure 3-13).

Zinc concentrations were all above the LoR at all sites and ranged from 2 to 20.3 mg/kg. All sites were all below the NAGD screening level of 200 mg/kg (Figure 3-13).

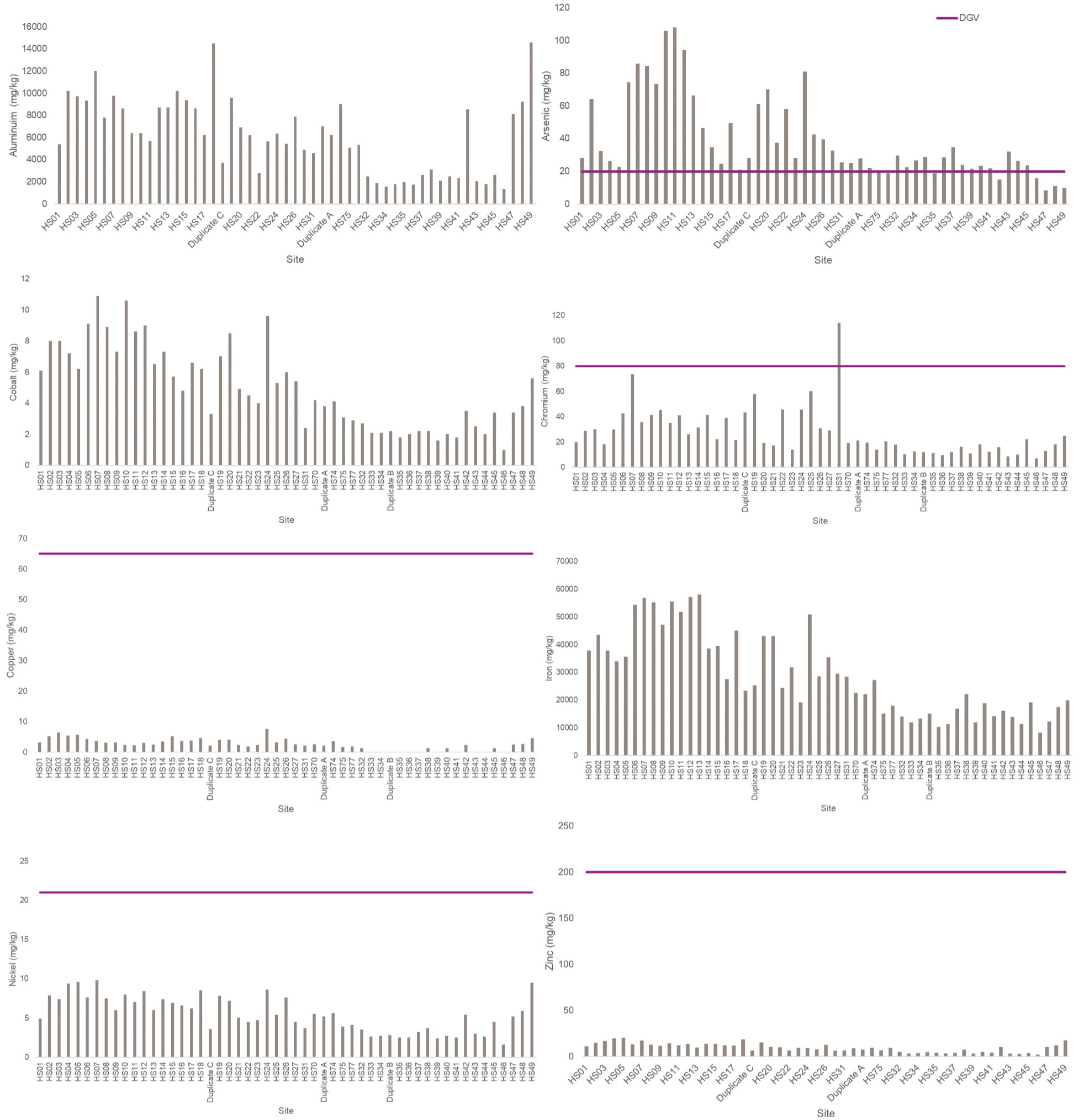


Figure 3-13: Metal concentrations along the offshore pipeline route (from south (HS1) to north (HS49))

Arsenic concentrations were plotted against iron concentrations along the Darwin Harbour pipeline route to determine if there was a correlation between arsenic and iron. A strong positive polynomial correlation between iron concentrations and arsenic concentrations was identified ( $R^2$  value of 0.76) (Figure 3-14).

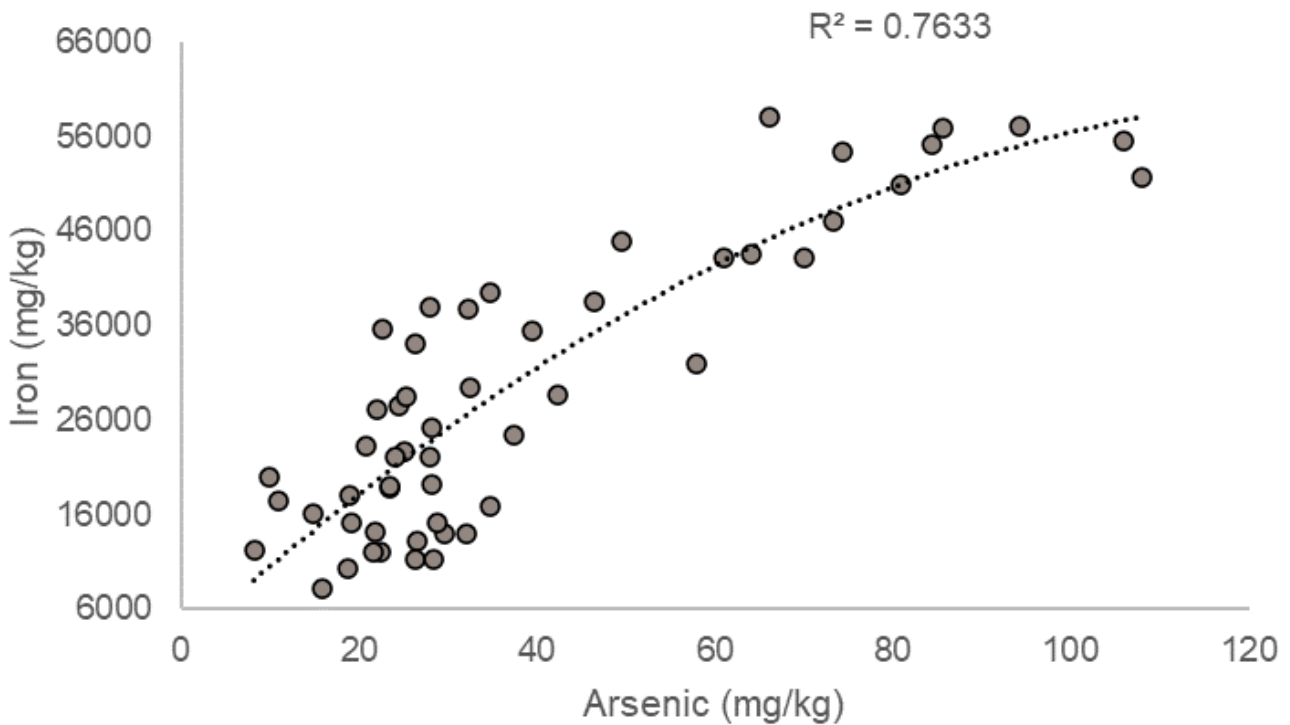


Figure 3-14: Correlation between iron and arsenic concentrations along the Darwin Harbour pipeline route (HS1 to HS49)

### 3.2.2.3 Nutrients

TKN concentrations exhibited high concentrations and variability across sites (Table 3-6; Appendix G). TKN in Darwin Harbour ranged from 20 to 540 mg/kg. TP concentrations also exhibited high concentrations and variability across sites, ranging from 86 to 1,130 mg/kg. TKN and TP concentrations were generally lower within the proposed sand wave dredging area. TOC concentrations were also variable, ranging from 0.08% to 2.24%, and with peak concentrations much higher than recorded for the offshore pipeline section.

Table 3-6: Total Kjeldahl nitrogen, total phosphorus and total organic carbon concentrations in Darwin Harbour

Site	Total Kjeldahl nitrogen as N (mg/kg)	Total phosphorus as P (mg/kg)	Total organic carbon (%)
HS01	280	549	0.36
HS02	350	428	0.34
HS03	380	540	0.26
HS04	370	297	0.46
HS05	540	416	0.55
HS06	180	1120	0.21
HS07	300	635	0.24
HS08	330	834	0.24
HS09	300	589	0.20
HS10	330	631	0.22
HS11	270	697	0.22
HS12	290	1130	0.23
HS13	360	661	0.28

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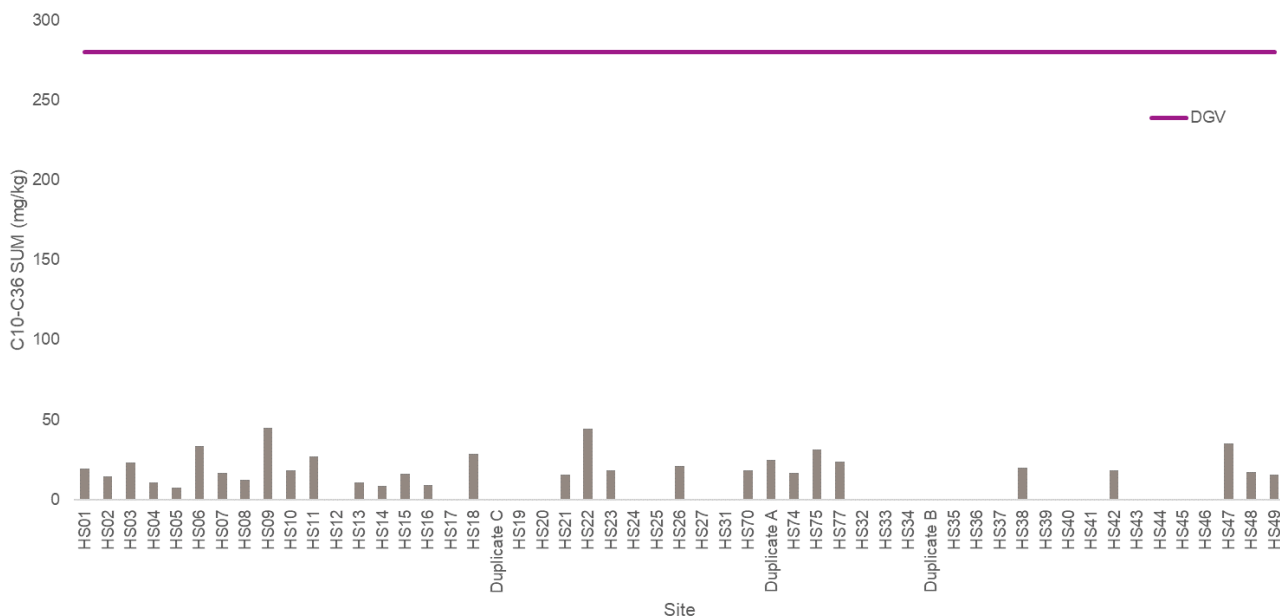
Site	Total Kjeldahl nitrogen as N (mg/kg)	Total phosphorus as P (mg/kg)	Total organic carbon (%)
HS14	310	555	0.34
HS15	270	322	0.31
HS16	270	485	0.32
HS17	280	483	0.14
HS18	480	696	0.14
Duplicate C	270	319	0.22
HS19	260	626	0.19
HS20	130	569	0.20
HS21	250	422	0.26
HS22	220	704	0.09
HS23	220	482	0.22
HS24	120	758	0.14
HS25	150	499	0.15
HS26	240	394	0.19
HS27	190	152	0.12
HS31	160	86	0.16
HS70	180	244	0.22
Duplicate A	220	398	0.20
HS74	380	508	0.18
HS75	240	553	0.19
HS77	410	270	0.21
HS32	80	331	0.09
HS33	110	344	0.11
HS34	90	408	0.08
Duplicate B	60	371	0.09
HS35	180	317	0.13
HS36	60	338	0.09
HS37	20	219	0.08
HS38	160	281	0.15
HS39	50	250	2.24
HS40	100	308	0.10
HS41	230	197	0.11
HS42	180	403	0.22
HS43	40	291	0.08
HS44	40	256	0.08
HS45	40	212	0.08
HS46	30	200	0.08
HS47	270	353	0.17
HS48	300	310	0.35
HS49	470	341	0.51

### 3.2.2.4 Hydrocarbons

Total petroleum hydrocarbons (TPH) and TRH were detected at 35 of the 53 Darwin Harbour sites, these ranged from <3 to 9 mg/kg (raw data) (Table 3-7; Appendix H). TPH and TRH results were normalised to 1% total organic carbon (TOC). The normalised TPH and TRH concentrations were below the Default Guideline Value (DGV) of 280 mg/kg across all sites (Figure 3-15). Analysis of PAHs were requested for these 35 sites. All PAH concentrations were below the LoR.

**Table 3-7: Total recoverable hydrocarbons detected above the LOR in Darwin Harbour sediments, normalised to 1% TOC**

Analyte	TOC (%)	C10–C40 (sum) (mg/kg)	C10–C36 (sum) (mg/kg)
DGV			280
HS01	0.36	25.00	19.44
HS02	0.34	17.65	14.71
HS03	0.26	30.77	23.08
HS04	0.46	17.39	10.87
HS05	0.55	9.09	7.27
HS06	0.21	42.86	33.33
HS07	0.24	25.00	16.67
HS08	0.24	20.83	12.50
HS09	0.20	60.00	45.00
HS10	0.22	27.27	18.18
HS11	0.22	36.36	27.27
HS13	0.28	14.29	10.71
HS14	0.34	14.71	8.82
HS15	0.31	19.35	16.13
HS16	0.32	12.50	9.38
HS17	0.14	21.43	<3
HS18	0.14	42.86	28.57
Duplicate C	0.22	18.18	<3
HS19	0.19	21.05	<3
HS20	0.20	20.00	<3
HS21	0.26	19.23	15.38
HS22	0.09	55.56	44.44
HS23	0.22	27.27	18.18
HS24	0.14	28.57	<3
HS26	0.19	31.58	21.05
HS31	0.16	25.00	<3
HS70	0.22	22.73	18.18
Duplicate A	0.20	30.00	25.00
HS74	0.18	27.78	16.67
HS75	0.19	42.11	31.58
HS77	0.21	28.57	23.81
HS35	0.13	30.77	<3
HS38	0.15	26.67	20.00
HS42	0.22	22.73	18.18
HS47	0.17	41.18	35.29
HS48	0.35	22.86	17.14
HS49	0.51	19.61	15.69



Note duplicate samples were collected from the site directly to the left of the duplicate reference code

**Figure 3-15: Total recoverable hydrocarbons (normalised to 1% TOC) in Darwin Harbour (from south (HS01) to north (HS49))**

### 3.2.2.5 Pesticides

Pesticide analysis was undertaken for 33 out of the 53 Darwin Harbour sediment samples across the study area. All pesticide chemicals analysed were below the LoR across all sites (Appendix I).

### 3.2.2.6 Tributyltin

Tributyltin concentrations were below the limit of reporting (LOR) of 0.5 µg/kg in all sediment samples and thus well below the NAGD screening level of 9 µg.Sn/kg (Appendix J).

### 3.2.2.7 Naturally occurring radioactive materials

All samples had NORMs concentrations above the LoR for all three analytes (radium-226, radium-228 and thorium-228). radium-226 concentrations ranged from 5.2 to 79.1 Bq/kg, radium-228 concentrations ranged from 5.6 to 59.5 Bq/kg and thorium-228 concentrations ranged from 5.8 to 63.8 Bq/kg (Figure 3-16). These results were calculated with a 95% level of confidence, with the measurement uncertainty ranging from ± 1.1 to 6.7 Bq/kg. All concentrations were well below the guideline value of 35,000 Bq/kg NAGD screening level (effects range-low) (CoA 2009).

NORMs concentrations were relatively consistent between HS01 and HS27 (radium-228 and thorium-228) and HS28 (radium-226), then peaked at sites HS27 and HS31 along the pipeline route. The laboratory report for NORMs analysis is in Appendix F.

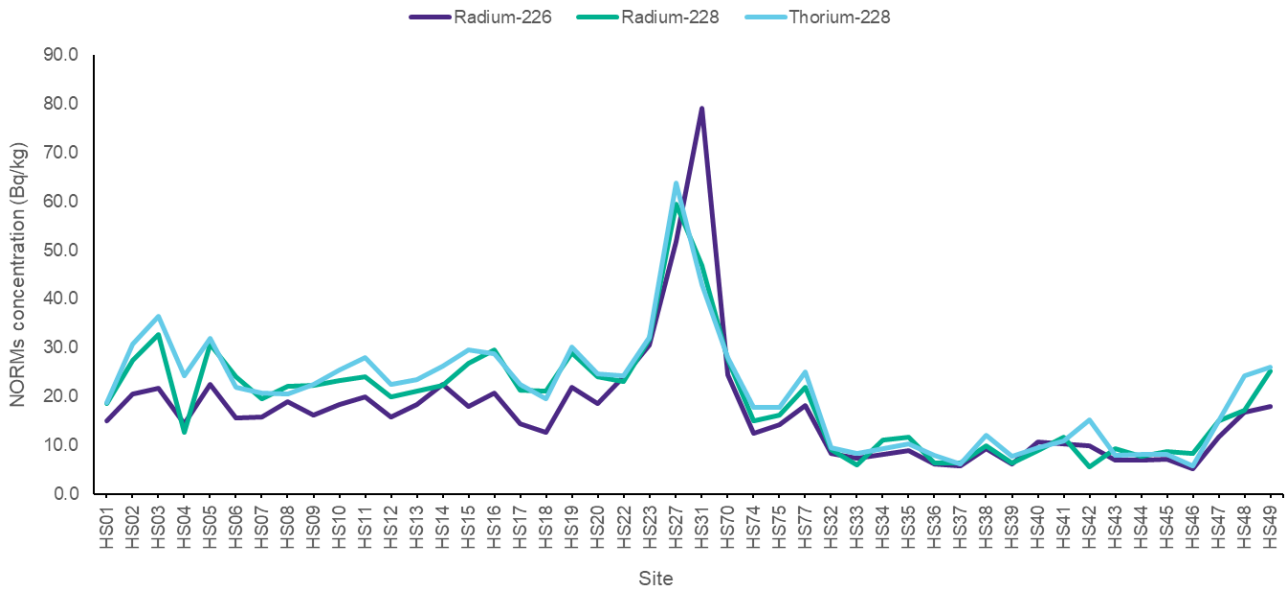


Figure 3-16: NORMs concentrations along the Darwin Harbour section of the pipeline route (from South (HS01) to North (HS49))

### 3.2.3 Spoil ground

#### 3.2.3.1 Particle size distribution

Laboratory PSD results can be found in Appendix D. The data were analysed to characterise sediment samples in terms of Wentworth size classifications, which classify particle size into total clay (0–4 µm), total silt (4–63 µm), total sand (63–2000 µm) and total gravel (>2000 µm).

The particle size distribution was consistent across the spoil ground, comprising of sandy sediment with some gravel and silt (Figure 3-17). The total proportion of sand ranged from 51.75 to 72.79% across the spoil ground (Table 3-8).

Table 3-8: Sediment particle size characteristics at the spoil ground

Site	Total clay % (0–4 µm)	Total silt % (4–63 µm)	Total sand % (63–2000 µm)	Total gravels % (>2000 µm)
SG1	4.58	12.82	64.00	18.60
SG2	4.78	14.36	62.58	18.28
SG3	3.76	14.45	72.79	9.00
SG4	4.83	17.60	51.75	25.81
SG5	4.13	15.54	57.38	22.96
SG6	4.28	16.80	63.14	15.78
SG7	4.11	17.46	66.78	11.65
SG8	4.20	15.22	62.94	17.64
SG9	3.74	14.01	53.73	28.52
SG10	4.64	19.26	63.24	12.87
SG11	5.07	22.86	56.10	15.97
SG12	4.62	14.59	59.26	21.53
SG13	4.89	15.85	61.69	17.57



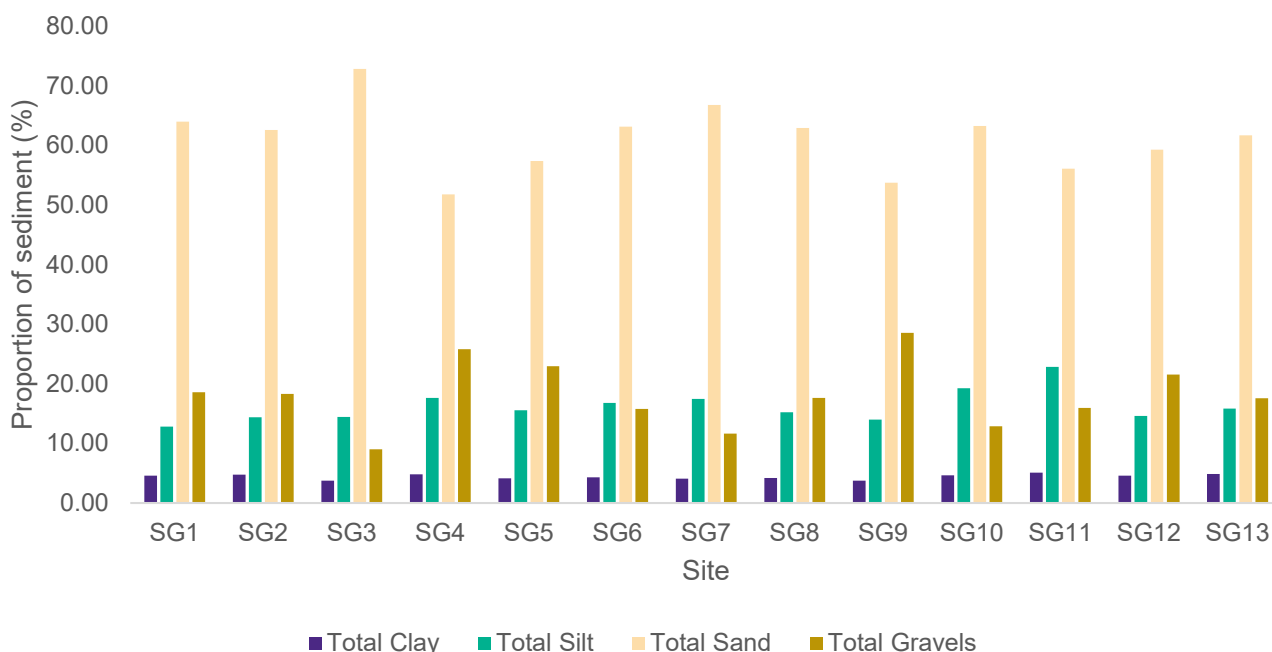


Figure 3-17: Sediment sample particle size characteristics at the spoil ground

### 3.2.3.2 Infauna

A total of 185 individuals from five phyla were recorded from the 13 spoil ground samples analysed. The dataset was dominated by crustaceans (107 individuals) and annelids (polychaete worms; 55 individuals), with the next most numerous phyla being Echinodermata, Sipuncula and Nematoda, represented by 16, six and one individual, respectively). The full dataset can be found in Appendix E.

Descriptive statistics of infaunal community data describing the number of species (S), abundance (N), Margalef’s species richness (d), Pielou’s evenness (J’), Shannon-Weiner diversity (H’) and Simpson’s alpha diversity index (1-λ) are presented in Table 3-9. The number of species, Margalef’s species richness and Shannon-Weiner diversity were all greatest as site SG11 (S = 21, d = 6.002, H’ = 2.936 and 1- λ = 0.9735). Abundance was greatest at site SG13 (one of the control sites; N = 30). Pielou’s evenness and Simpson’s index were greatest at site SG12 (the other control site; J’ = 1, 1- λ = 1). All metrics were lowest at site OP30 (three individuals from one taxa). The number of species, Margalef’s species richness and Shannon-Weiner diversity were greatest at site OP9 (39 individuals from 26 taxa).

Table 3-9: Descriptive statistics of spoil ground infaunal data

Site	Species (S)	Abundance (N)	Margalef’s species richness (d)	Pielou’s evenness (J’)	Shannon-Weiner diversity (H’)	Simpson’s alpha diversity index (1-λ)
SG01	6	8	2.404	0.9306	1.667	0.8929
SG02	5	6	2.232	0.9697	1.561	0.9333
SG03	6	8	2.404	0.9306	1.667	0.8929
SG04	3	4	1.443	0.9464	1.04	0.8333
SG05	8	12	2.817	0.9518	1.979	0.9242
SG06	13	21	3.942	0.9359	2.401	0.9381
SG07	12	18	3.806	0.9772	2.428	0.9608
SG08	7	8	2.885	0.9796	1.906	0.9643
SG09	13	28	3.601	0.8661	2.221	0.8889
SG10	6	11	2.085	0.8597	1.54	0.8
SG11	21	28	6.002	0.9644	2.936	0.9735
SG12	3	3	1.82	1	1.099	1
SG13	11	30	2.94	0.8243	1.976	0.8322

No significant clusters of spoil ground infaunal samples were found following cluster analysis with SIMPROF (in PRIMER v7). Analysis of the ranked total abundance and frequency of occurrence of each taxa identified that the spoil ground was characterised by crustaceans, echinoderms and polychaete worms.

Pseudozeuthidae (tanaids) were both the most abundant (35 individuals from the 13 samples, with a maximum abundance of 11 individuals at any one site) and frequently-occurring taxa (11 of 13 samples, or 84.6%). The spoil ground was also characterised by Anthuridae (elongate isopods; 17 individuals between seven sites or 53.8% of samples), Ophiuridae (brittlestars; 13 individuals between six sites or 46.2% of samples), Ampeliscidae (tube-building amphipods; 11 individuals between six sites or 46.2% of samples), *Nephtys* sp. (catworms; eight individuals between four sites or 30.8% of samples) and Meltidae (amphipods; eight individuals between two sites or 15.4% of samples).

### 3.2.3.3 Metals

The metals and metalloid concentrations for all sites (see Appendix G) were compared to the NAGD screening levels (CoA, 2009, where available). Of the metals and metalloids sampled at the Spoil Ground, mercury was the only one below the LoR at all sites.

Aluminium concentrations were all above the LoR and ranged from 6,200 to 10,000 mg/kg. There is no NAGD screening level for aluminium in marine sediments (Figure 3-18).

Arsenic concentrations were all above the LoR and ranged from 18 to 38 mg/kg. There were 12 sites that had arsenic concentrations above the NAGD screening level of 20 mg/kg but were below the NADG SQG-High value of 70 mg/kg (Figure 3-18).

Barium concentrations were all above the LoR and ranged from 11 to 15 mg/kg. There is no NAGD screening level for barium in marine sediments (Figure 3-18). Cadmium concentrations were all above the LoR and ranged from 0.1 to 0.3 mg/kg. Cadmium concentrations were all well below the NAGD screening level of 1.5 mg/kg (Figure 3-18).

Chromium concentrations were all above the LoR and ranged from 14 to 20 mg/kg. Chromium concentrations were all well below the NAGD screening level of 80 mg/kg (Figure 3-18). Cobalt concentrations were all above the LoR and ranged from 4.2 to 5.8 mg/kg. There is no NAGD screening level for cobalt in marine sediments (Figure 3-15).

Copper concentrations were all above the LoR and ranged from 2.2 to 4.7 mg/kg. Copper concentrations were all well below the NAGD screening level of 65 mg/kg (Figure 3-18). Iron concentrations were all above the LoR and ranged from 14,000 to 23,000 mg/kg. There is no NAGD screening level for iron in marine sediments. Iron concentrations were highest at site SG2 (Figure 3-18).

Nickel concentrations were all above the LoR and ranged from 5.3 to 7.3 mg/kg. Nickel concentrations were all below the NAGD screening level of 21 mg/kg (Figure 3-18). Zinc concentrations were all above the LoR and ranged from 8.7 to 12.0 mg/kg. Zinc concentrations were all well below the NAGD screening level of 200 mg/kg (Figure 3-18).

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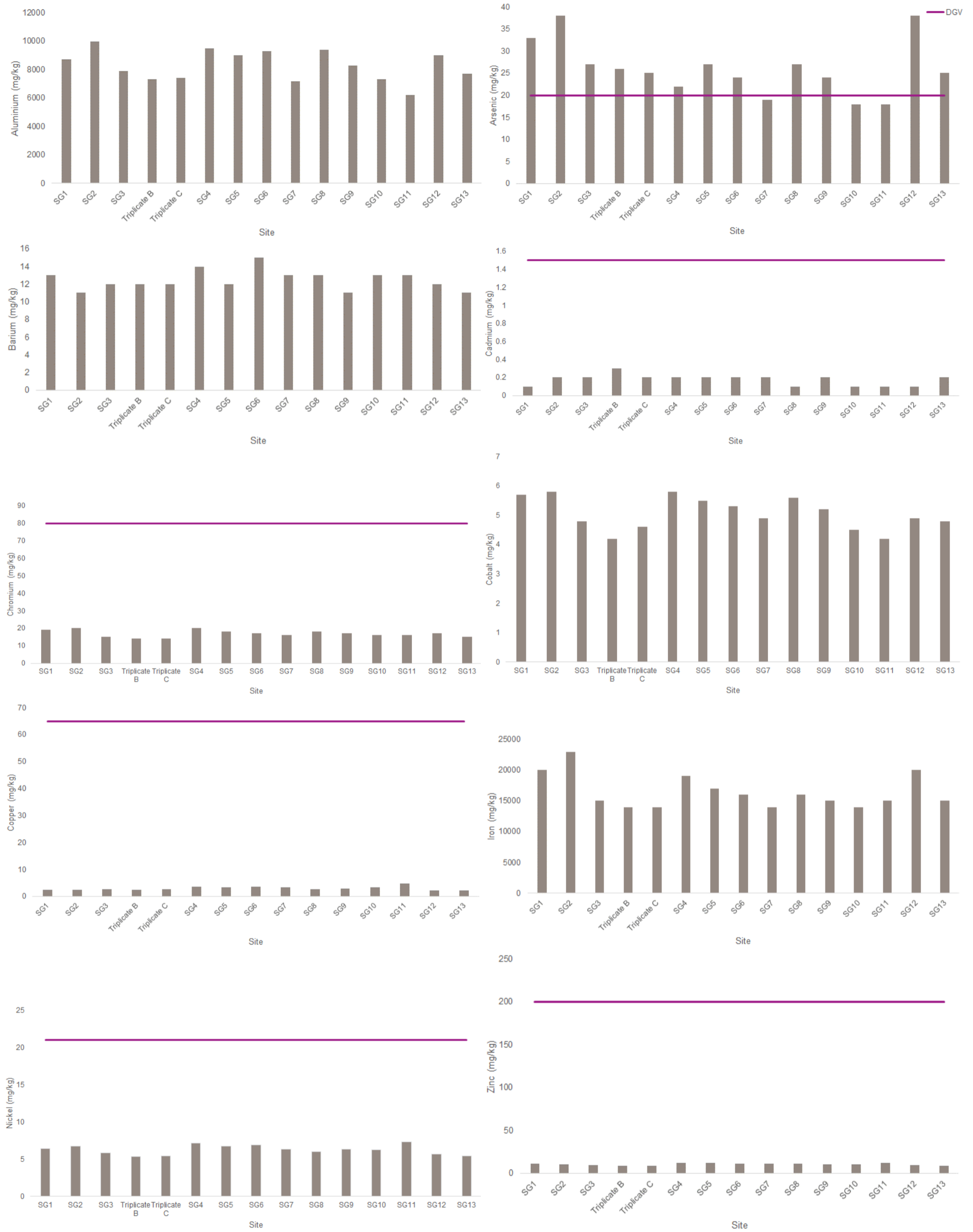


Figure 3-18: Metal concentrations at the spoil ground

Arsenic is considered to have a geological source (see Section 3.2.1.3). Twelve samples had arsenic concentrations above the NAGD screening level (Figure 3-18). Arsenic concentrations were therefore plotted against iron concentrations along the offshore pipeline route to determine if there was a correlation between arsenic and iron. A strong positive polynomial correlation between iron concentrations and arsenic concentrations was identified ( $R^2$  value = 0.73) (Figure 3-19).

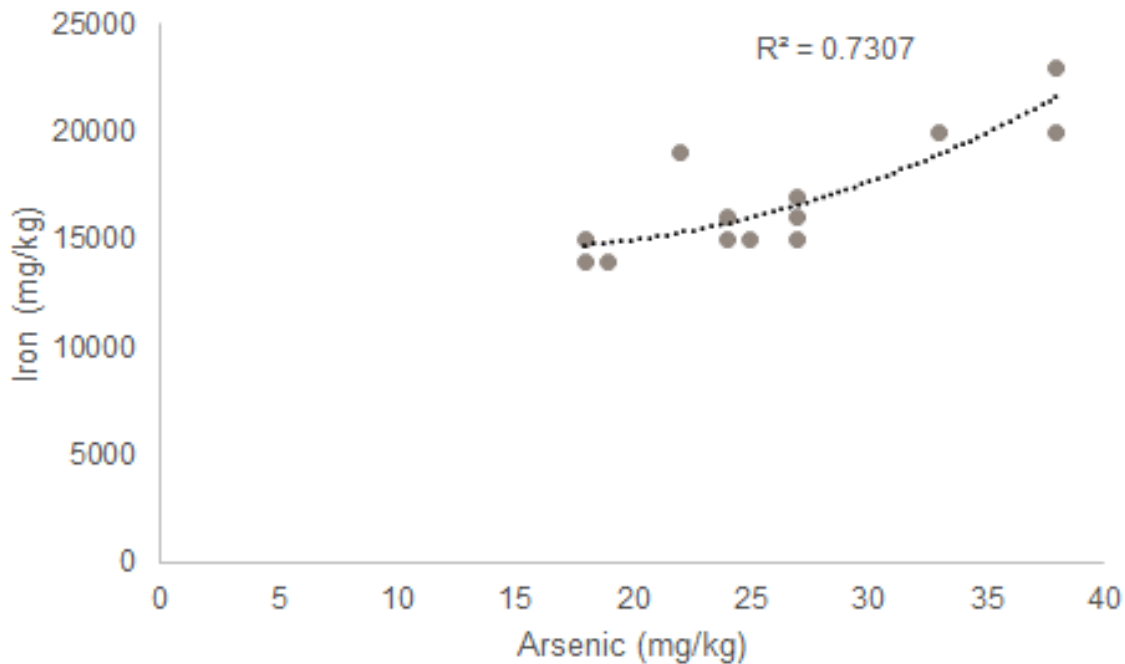


Figure 3-19: Correlation between iron and arsenic concentrations inside the spoil ground

### 3.2.3.4 Nutrients

TKN concentrations exhibited low variability across sites, ranging from 0.3 to 0.5 mg.N/g (Table 3-10; Appendix G). TP concentrations also exhibited low variability across sites, ranging from 0.37 to 0.62 mg.P/g (Table 3-10). Similarly, variability in TOC concentrations between sites was low, with TOC ranging from 0.2% to 0.4%.

Table 3-10: Total Kjeldahl nitrogen, total phosphorus and total organic carbon concentrations at the spoil ground

Site	Total Kjeldahl nitrogen as N (mg.N/g)	Total phosphorus as P (mg.P/g)	Total organic carbon (%)
SG1	0.4	0.59	0.3
SG2	0.4	0.6	0.3
SG3	0.4	0.5	0.3
Triplicate B	0.4	0.51	0.3
Triplicate C	0.4	0.53	0.2
SG4	0.4	0.48	0.4
SG5	0.4	0.5	0.3
SG6	0.4	0.45	0.3
SG7	0.4	0.45	0.3
SG8	0.4	0.58	0.3
SG9	0.4	0.51	0.4
SG10	0.3	0.38	0.3
SG11	0.3	0.37	0.3
SG12	0.4	0.62	0.3
SG13	0.5	0.54	0.4

### 3.2.3.5 Hydrocarbons

The spoil ground TRH and BTEXN concentrations were below the limit of reporting (LoR) for all samples (Appendix H). The spoil ground samples were, therefore, not tested for PAHs.

### 3.2.3.6 Naturally occurring radioactive materials

All samples taken at the spoil ground had NORMs concentrations above the LoR for all three analytes (radium-226, radium-228 and thorium-228; Appendix F). radium-226 concentrations ranged from 0.8 to 15.0 Bq/kg, radium-228 concentrations ranged from 1.1 to 19.0 Bq/kg and thorium-228 concentrations ranged from 1.4 to 21.0 Bq/kg (Figure 3-20). Site SG1 had considerably lower levels of radium-226, radium-228 and thorium-228 than any other sample. For example, radium-226 at SG1 was 0.8 Bq/kg, compared with the next lowest 9.0 Bq/kg at SG13 (Figure 3-20).

These results were calculated with a 95% level of confidence, with the measurement uncertainty ranging from ± 0.09 to 3.0 Bq/kg. All concentrations were well below the NAGD screening level of 35,000 Bq/kg (NAGD screening levels (effects range-low) (CoA 2009).

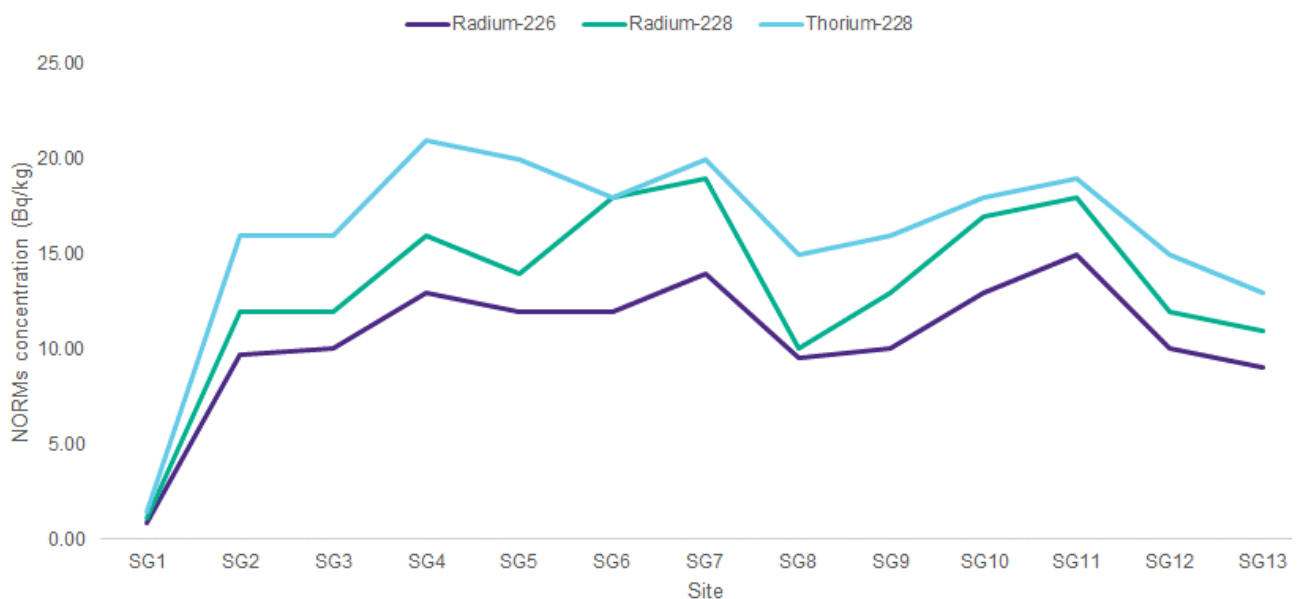


Figure 3-20: NORMs concentrations at the spoil ground

## 3.2.4 Darwin Harbour sediment survey

### 3.2.4.1 Particle size distribution

Laboratory PSD results can be found in Appendix D. The data were analysed to characterise sediment samples in terms of Wentworth size classifications, which classify particle size into total clay (0–4 µm), total silt (4–63 µm), total sand (63–2000 µm) and total gravel (>2000 µm) (Table 3-11, Figure 3-21).

The particle size distribution across the sediment survey area followed the same trend as the Darwin Harbour pipeline PSD results (Section 3.2.2.1). The northern side of the Darwin Harbour pipeline route had a very high proportion of sand (89.34% at the most northern site, KP92-75\_L), with low proportions of gravel (8.41%) and silt (1.95%). These proportions shift towards the southern end of the pipeline route, from site KP102-7, to much higher proportions of gravel (40.66% at KP102-7\_U).

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Table 3-11: Sediment particle size characteristics from the sediment survey

Sample	Total clay (%)	Total silt (%)	Total sand (%)	Total gravels (%)
KP92-75_U	0.42	2.65	86.35	10.58
KP92-75_L	0.31	1.95	89.34	8.41
KP92-85_U	0.22	1.21	90.13	8.44
KP92-85_L	0.19	1.54	85.01	13.26
KP92-85_U_1	0.23	1.80	89.95	8.02
KP92-95_U	2.96	12.31	73.20	11.53
KP92-95_U_1	4.17	15.42	66.25	14.16
KP93-7_U	0.16	3.28	75.63	20.93
KP93-8_U	0.06	1.41	81.70	16.83
KP93-8_L	0.07	1.47	83.21	15.26
KP93-23	0.02	1.05	83.43	15.50
KP93-23_U	0.01	1.03	87.80	11.16
KP102-7_U	7.06	20.98	36.71	35.26
KP102-7_L	8.80	17.83	32.71	40.66
KP103-1_U	8.47	17.20	43.07	31.26
KP103-1_L	9.37	17.63	43.51	29.50
KP103-5_U	2.95	10.32	36.75	49.98
KP104-9_U	9.55	19.13	35.65	35.68
KP106_U_a	6.10	23.39	39.51	31.01
KP106-0_U	4.45	18.31	33.56	43.68
KP106-0_L	3.68	14.39	43.20	38.73
KP110-4_U2	2.77	9.24	33.72	54.28
KP112-4_U	1.16	5.75	34.76	58.33
KP119-7_U	7.24	22.09	35.75	34.91
KP119-7_L	9.38	24.53	26.88	39.22
KP119-8_U	3.46	10.71	19.64	66.18
KP120-5_U	2.19	7.53	20.54	69.74
KP120-6	6.85	17.63	29.60	45.92
KP120-6_U	7.50	18.74	22.43	51.33

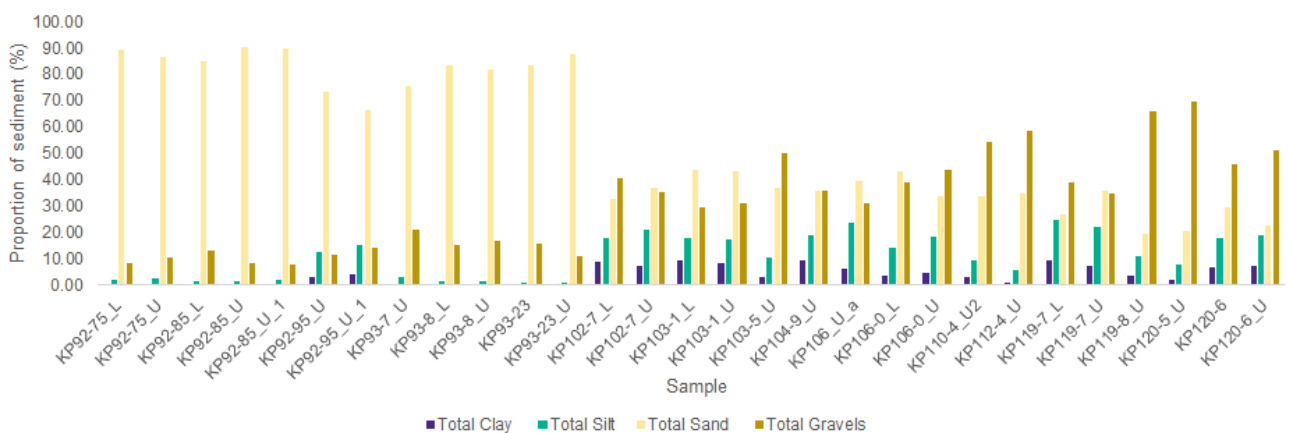


Figure 3-21: Sediment sample particle size characteristics at the sediment sampling sites (from north to south)

### **3.2.4.2 Metals**

The metals and metalloid concentrations for all sites (see Appendix G) were compared to the NAGD screening levels (CoA, 2009), where relevant. Of the metals and metalloids in the sediments sampled from Darwin Harbour; antimony, cadmium and silver were below the LoR for all sites. Mercury was at or below the LoR for all samples except sample KP106.0 L (>0.5 m core depth) where a concentration of 0.02 mg/kg was recorded (Figure 3-22). This value was below the guideline value of 0.15 mg/kg (ANG, 2018).

Aluminium concentrations were all above the LoR and ranged from 340 to 9,520 mg/kg (Figure 3-22). There is no NAGD screening level for aluminium in marine sediments.

All arsenic concentrations were above the LoR and ranged from 8.27 to 108 mg/kg (Figure 3-22). Four samples (KP93.8\_U, KP119-7\_U, KP119-7\_L and KP119-8\_U) were above the NAGD screening level of 20 mg/kg, but all were below the GV-High value of 70 mg/kg.

Chromium concentrations were above the LoR at all sites and ranged from 1.7 to 37 mg/kg (Figure 3-22). All samples were below the NAGD screening level of 80 mg/kg.

All but one cobalt concentration were above the LoR at all sites, ranging from 0.5 to 8.7 mg/kg (Figure 3-22). There is no NAGD screening level for cobalt in marine sediments.

Five samples had copper concentrations below the LoR. These sites were all within the potential sand wave dredging area. Copper concentrations within Darwin Harbour ranged from <1 to 6.1 mg/kg (Figure 3-22). All sites were well below the NAGD screening level of 65 mg/kg.

Iron concentrations were all above the LoR at all sites and ranged from 1,680 to 32,300 mg/kg (Figure 3-22). There is no NAGD screening level for iron in marine sediments.

Lead concentrations were all above the LoR and ranged from 1.9 to 24.1 mg/kg. All sites were below the NAGD screening level of 50 mg/kg.

Manganese concentrations were all above the LoR and ranged from 10 to 710 mg/kg. There is no NAGD screening level for manganese in marine sediments.

Nickel concentrations were all above the LoR at all sites and ranged from 1 to 9.8 mg/kg (Figure 3-22). All sites were below the NAGD screening level of 21 mg/kg.

Zinc concentrations were all above the LoR at all sites and ranged from 1.3 to 17.2 mg/kg (Figure 3-22). All sites were all below the NAGD screening level of 200 mg/kg.

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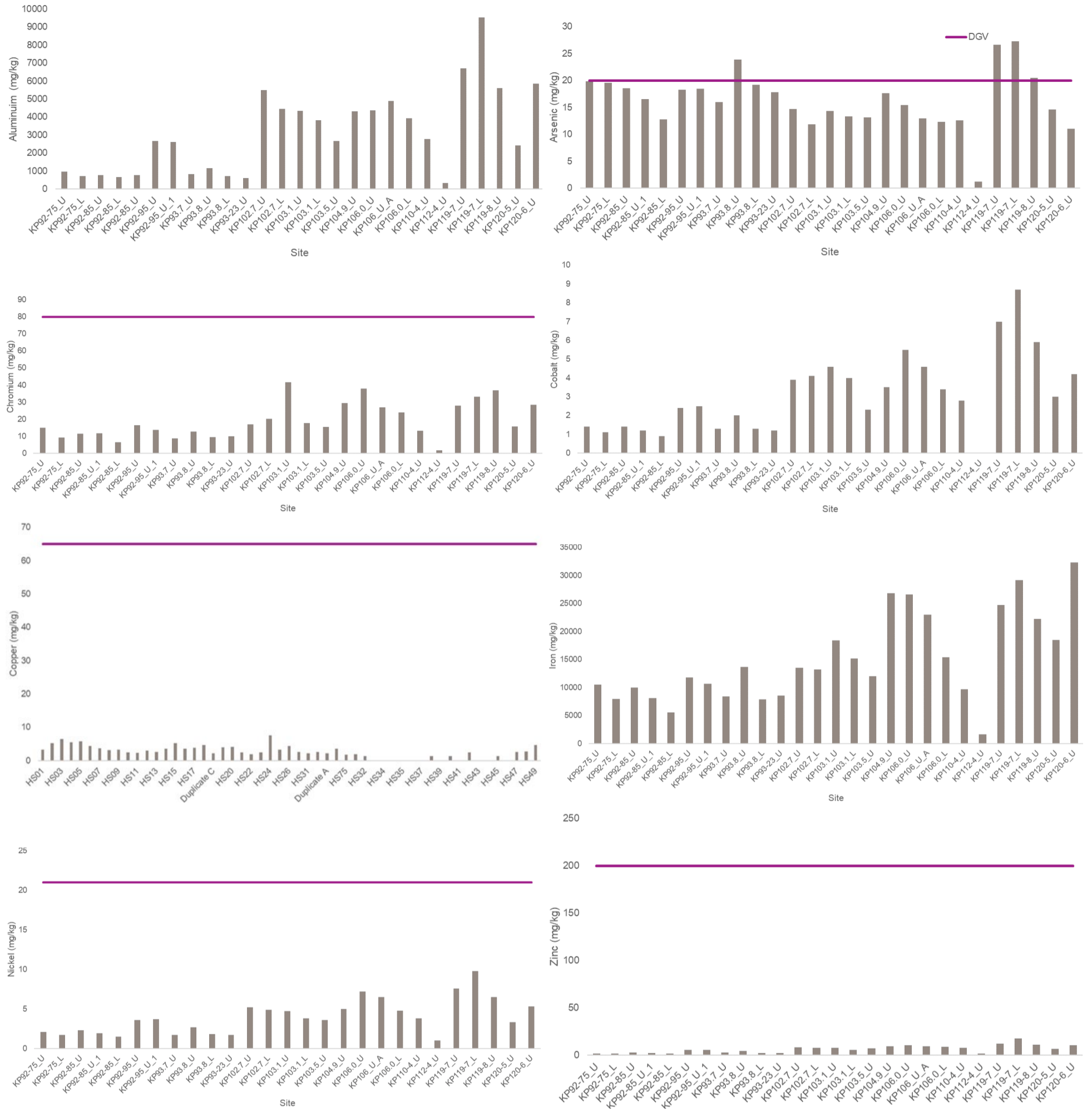


Figure 3-22: Metal concentrations along the Darwin Harbour sediment cores (L = lower (0 to 50 cm core depth), U = upper (>50 cm))



Arsenic concentrations were therefore plotted against iron concentrations along the offshore pipeline route to determine if there was a correlation between arsenic and iron. A weak positive polynomial correlation between iron concentrations and arsenic concentrations was identified ( $R^2$  value of 0.099) (Figure 3-10).

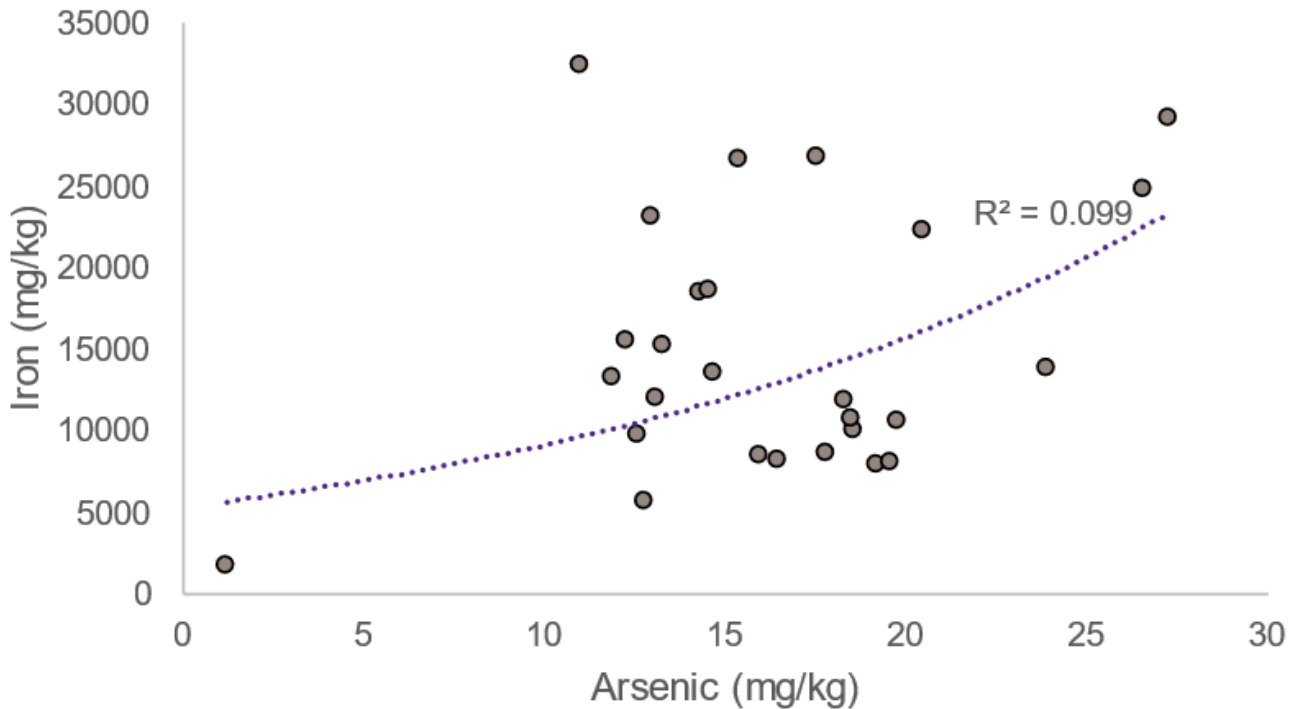


Figure 3-23: Correlation between iron and arsenic concentrations in Darwin Harbour sediment core samples

### 3.2.4.3 Nutrients

Total Kjeldahl nitrogen (TKN) concentrations exhibited high concentrations and variability across sites (Table 3-12; Appendix G). TKN in Darwin Harbour ranged from 40 to 240 mg/kg. Total phosphorus (TP) concentrations also exhibited high concentrations and variability across sites, ranging from 27 to 647 mg/kg. Total organic carbon (TOC) was generally very low and ranged from 0.02% to 0.6%.

### 3.2.4.4 Hydrocarbons

Total petroleum hydrocarbons (TPH) and total recoverable hydrocarbons (TRH) were detected above LoRs in 21 of the 27 Darwin Harbour samples, these ranging from <3 to 22 mg/kg (raw data). TPH and TRH results were normalised to 1% Total organic carbon (TOC). The normalised TPH and TRH concentrations were below the NAGD screening level of 550 mg/kg across all samples (Table 3-13; Appendix H). Polycyclic aromatic hydrocarbons (PAHs) were requested for these samples. All PAH concentrations were below the LoR.

### 3.2.4.5 Pesticides

Pesticide analysis was undertaken for all 27 of the Darwin Harbour sediment core samples. All pesticide chemicals analysed were below the LoR in all samples (Appendix I).

### 3.2.4.6 Tributyltin

Tributyltin concentrations were below the limit of reporting (LOR) in all core samples and thus well below the NAGD screening level of 9 µg.Sn/kg (Appendix J).

### 3.2.4.7 Potential for acid sulfate soils

Net acidity results were all below the LoR (0.02% S) (Table 3-14; Appendix K). The highest net acidity (excluding acid neutralising capacity) and potential acidity (CRS) values recorded were 0.53% S (KP119-7\_L). Titratable Actual Acidity (TAA) concentrations for all samples were below the LoR (0.02% pyrite S), likely due to the Acid Neutralising Capacity (ANC) present in the samples. All pH results were indicative of non-acid sulfate soils (ASS) being present – i.e. >4 pH units. All samples were found to contain significant levels of Acid Neutralising Capacity (ANC). The highest ANC concentration was 15.6% S, with the mean concentration being 10.8% S. The amount of ANC present is likely to buffer inorganic sulfur acidity within the samples. Although significant amounts of ANC are present in all samples; these are potentially an over estimation of ANC due to the crushing of large shell grit and other carbonate material during analysis – increasing the reactive surface area. The data supports a conclusion that although inorganic sulfur is present in the sediments, there is significant ANC kinetically available to neutralise the oxidation products from the inorganic sulfur.

**Table 3-12: Total Kjeldahl nitrogen, total phosphorus and total organic carbon concentrations in Darwin Harbour**

Sample	Total Kjeldahl nitrogen as N (mg/kg)	Total phosphorus as P (mg/kg)	Total organic carbon (%)
KP92-75_L	60	292	0.04
KP92-75_U	50	247	0.05
KP92-85_L	90	346	0.06
KP92-85_U	60	312	0.05
KP92-85_U_1	80	355	0.06
KP92-95_U	140	335	0.12
KP92-95_U_1	160	283	0.6
KP93-23_U	60	315	0.04
KP93.7_U	90	336	0.07
KP93.8_L	60	242	0.05
KP93.8_U	90	238	0.05
KP102.7_L	210	560	0.24
KP102.7_U	80	55	0.27
KP103.1_L	90	97	0.21
KP103.1_U	110	128	0.14
KP103.5_U	180	291	0.13
KP104.9_U	200	428	0.12
KP106.0_L	220	290	0.18
KP106.0_U	120	647	0.12
KP106_U_A	170	282	0.14
KP110-4_U	170	262	0.11
KP112-4_U	50	44	0.02
KP119-7_L	210	210	0.53
KP119-7_U	40	27	0.56
KP119-8_U	60	35	0.2
KP120-5_U	240	340	0.14
KP120-6_U	110	181	0.15

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**Table 3-13: Total recoverable hydrocarbons detected above the LOR, normalised to 1% TOC**

Sample	TRH C10-C40 (Sum) (mg/kg)	TRH C10-C36 (Sum) (mg/kg)
KP92-75_L	< 3	< 3
KP92-75_U	< 3	60
KP92-85_L	< 3	50
KP92-85_U	< 3	60
KP92-85_U_1	< 3	< 3
KP92-95_U	33.3	33.3
KP92-95_U_1	< 3	5
KP93-23_U	< 3	< 3
KP93.7_U	< 3	< 3
KP93.8_L	140	220
KP93.8_U	60	60
KP102.7_L	45.8	62.5
KP102.7_U	48.1	59.3
KP103.1_L	23.8	42.9
KP103.1_U	64.3	150
KP103.5_U	115.4	123.1
KP104.9_U	50	100
KP106.0_L	83.3	88.9
KP106.0_U	133.3	166.7
KP106_U_A	128.6	157.1
KP110-4_U	81.8	72.7
KP112-4_U	< 3	< 3
KP119-7_L	5.7	7.5
KP119-7_U	5.4	< 3

**Table 3-14: Summary of acid sulfate soil results**

Analyte	Unit	(NT guideline levels)	Maximum result	Average result
Net acidity	% S		<0.02	<0.02
Chromium reducible sulfur (CRS)	% S		0.53	0.08
Acidity - chromium reducible sulfur	mole H+/t		328	68.2
Titratable actual acidity (TAA)	% pyrite S		<0.02	<0.02
pH <sub>KCl</sub>	pH units		9.10*	9.57
Acid neutralising capacity (ANC)	% pyrite S		15.6	10.8
Net acidity excluding ANC (sulfur units)	% S		0.52	0.11
Net acidity excluding ANC (acidity units)	mole H+/t		328	68.2
Liming rate excluding ANC	kg CaCO <sub>3</sub> /t		25	5.2

\*The minimum pH result has been reported, representing the most acidic (i.e. maximum) sample

### 3.2.5 Soft substrate benthic habitats across the study area

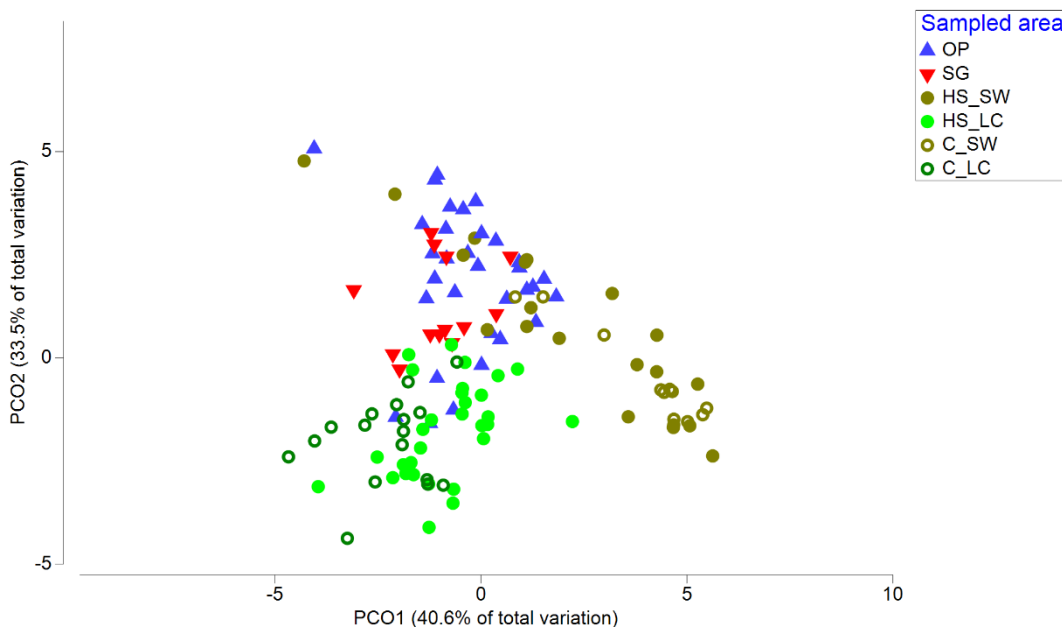
Additional comparison of particle size distributions and infauna between study areas was undertaken where relevant to provide additional understanding of broad-scale local to regional context of the seabed sediment characteristics, relative changes in substrate along the pipeline route and benthic assemblages.

### 3.2.5.1 Particle size distribution

Particle size data was collected from four different study areas, with two different sampling methods used in areas identified for potential dredging/trenching (both in line with the National Assessment Guidelines for Dredging (NAGD; CoA 2009). For the purposes of undertaking comparisons between the four study areas, these were defined as:

- Offshore pipeline route (OP) (from ~KP-3 to ~KP89)
- Potential spoil ground (SG)
- Darwin Harbour samples (from ~KP90 to KP122), comprising van Veen grab samples (HS#) and core samples (KP#):
  - Potential sand wave (SW) rectification area (between KP91 and KP95)
  - Landward/(shore) crossing (LC) dredging/trenching area (between KP95 and KP122.5).

Principal coordinates ordination of the particle size data from all grab and core samples indicated there were differences between the study areas, and that 74.1% of the total variation could be identified by the PCO1 and PCO2 axes (Figure 3-24). Therefore, the majority of variation can be identified from trends that can be observed in the ordination plot. For example, PCO1 identified 40.6% of total variation. By looking at trends along the x-axis, it appeared that the largest contributor to variation is the relative difference of the sand wave samples (to the right of the x-axis) to all other samples within and outside of Darwin Harbour. There also appeared to be some difference between the results of the grab sample data and core data closest to the shore crossing (e.g. KP119 and KP120, and HS1–HS5). A permutational multivariate analysis of variance (PERMANOVA) in PRIMER 7 was used to test for significant differences between the study areas (Anderson 2008). The results confirmed a significant difference in particle size distribution between study areas (Pseudo-F = 20.755, P(perm) = 0.001). Pairwise analysis in PERMANOVA identified that all sampled areas were significantly different (P(perm) = <0.05). To simplify further interpretation of relationships between grouping, cluster analysis was undertaken on the 'average distance between/within groups' resemblance matrix, which is one of the outcomes of the PERMANOVA pairwise comparison test (Figure 3-25). Although all groups are significantly different, the cluster analysis provided context of relative difference between each group. This showed that the particle size distribution data from the sand wave area (both grab and core samples) were less dissimilar from each other than from the other sampled areas. The cluster diagram then split, separating the offshore pipeline and spoil ground samples from the landward Darwin Harbour/shore crossing samples. The sand wave samples were characterised by very low average silt content (<2%), in contrast to the other sampled areas (>10%).



Key: OP = offshore pipeline, SG = spoil ground; HS\_SW = Darwin Harbour grab sample in the sand wave area; HS\_LC = Darwin Harbour grab sample in the lower harbour / shore crossing area; C\_SW = core samples in the sand wave area; C\_LC = core samples in the lower harbour / shore crossing area

**Figure 3-24: Principal coordinates ordination (PCO) plot showing particle size distribution samples by study area**

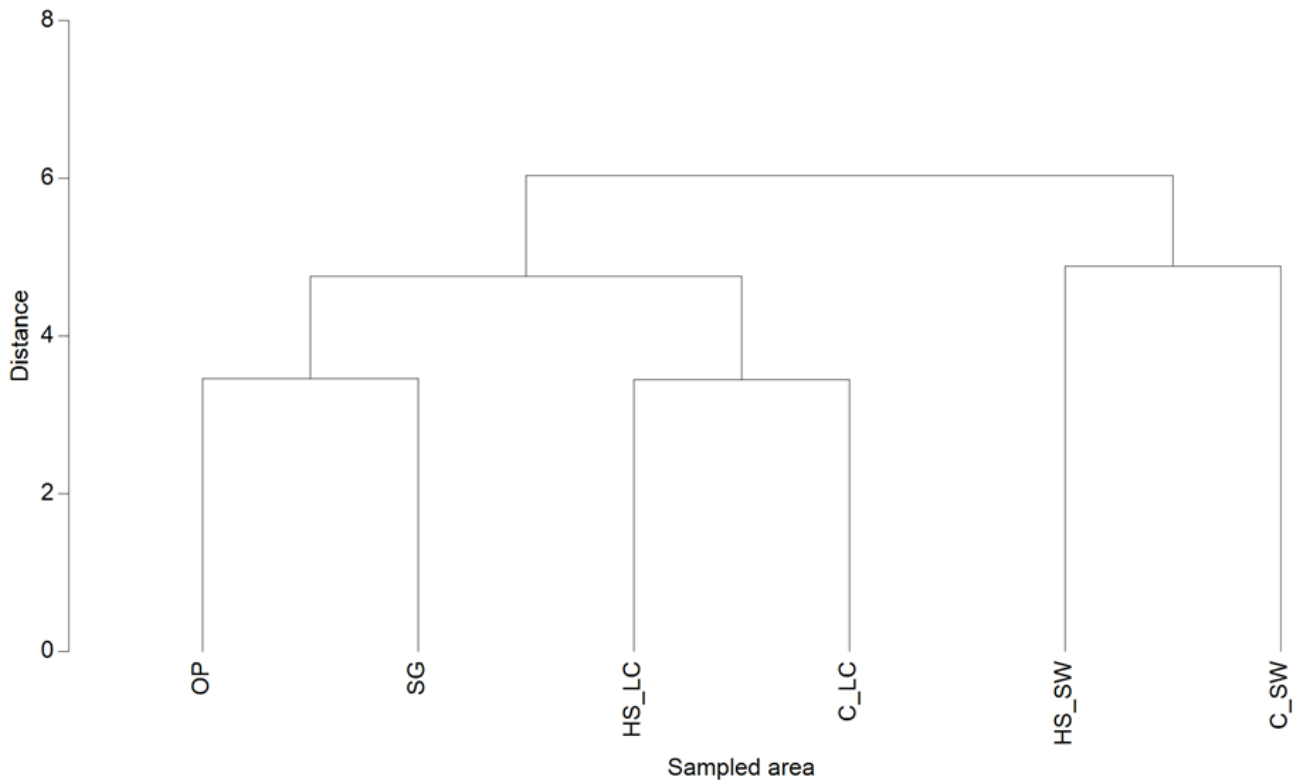


Figure 3-25: Cluster analysis of average distance between/within study area groups

### 3.2.5.2 Infauna

Infauna analysis was completed in two study areas: the offshore pipeline and potential spoil ground. The infaunal assemblages in these areas were dominated by crustaceans and polychaetes. Amphipod crustaceans were commonly recorded as the dominant characteristic taxa in the assemblages. These observations were consistent with investigations of soft substrate infaunal assemblages within Darwin Harbour previously completed as part of the INPEX Ichthys project baseline studies (INPEX Browse Ltd, 2010). The INPEX study recorded 416 individuals from 17 families from a total of  $39 \times \sim 0.15 \text{ m}^2$  van Veen grab samples (total sampled area =  $5.85 \text{ m}^2$ ). This equates to an average of approximately 71.1 individuals and 2.9 families per  $\text{m}^2$  of seabed. In the present study,  $29 \times 0.1 \text{ m}^2$  van Veen grab samples were collected from the offshore pipeline route (outside of the Darwin Port limit) with a total of 744 individuals from 81 families, which equates to approximately 256.6 individuals and 27.9 families per  $\text{m}^2$ . The thirteen  $0.1 \text{ m}^2$  van Veen grab samples collected from the potential spoil grounds contained 185 individuals from 45 families, equating to approximately 142.3 individuals and 34.6 families per  $\text{m}^2$ . These results indicate that the soft sediment benthic habitats of the offshore pipeline route and potential spoil ground are more abundant and diverse than the Darwin Harbour soft sediment habitats reported by INPEX Browse Ltd (2010).

The results from the offshore pipeline and spoil ground infaunal analysis herein indicated a difference between the two study areas and PERMANOVA confirmed a significant difference between the two datasets (Pseudo-F = 3.4179,  $p(\text{perm}) = 0.001$ ). A PCO was used to visualise the differences between datasets, and to identify the variation explained by individual axes (Figure 3-26). A total of 24.2% of the total variance is identified by the PCO1 and PCO2 axes. Similarity percentages breakdown (SIMPER) analysis was used to characterise the taxa contributing to the variability between the two datasets. Of the top 70% of taxa contributing to the variation between the two datasets, 26 OP taxa (11 crustaceans, 14 polychaetes and two sipunculids representing 53.61% of 70.17%) were identified as different by virtue of greater abundance. The remaining 16.56% of the variation was comprised of crustacean (three taxa), echinoderm (one taxa) and polychaetes (three taxa) taxa with increased abundance in the SG sites.

This difference between the OP and SG sites is likely to be due to a combination of factors. For example, there were more than twice as many OP sites collected over a much greater spatial area (>90 km of the proposed pipeline route), along a transitional environment (the Beagle Gulf) between the eastern area influenced by the narrows and Darwin Harbour to the western area, influenced by the open ocean. In contrast, the SG sites were collected over an area of generally flat seabed (in terms of relief) of approximately 5 km by 5 km and therefore the potential for seabed and infaunal community heterogeneity is therefore much more limited.

The transitional environment of the Beagle Gulf and along the proposed pipeline route was also evident in the particle size data (refer to Sections 3.2.5.1). Sediments in Darwin Harbour and in the spoil ground were characterised by mixed sediments, with relatively high silt/gravel to sand contributions (silt = 16.4% and 19.2%, respectively; gravel = 50.7% and 31.7%, respectively; sand = 30.6% and 49.1%, respectively). The western sediments were dominated by the sand fraction (average ~60%), and with lower silt (~11.4%) and gravel content (~29%). Infauna community composition is influenced by environmental factors such as PSD, and therefore PSD is both an indicator of a transitional habitat and a contributory cause of infaunal community heterogeneity in the dataset.

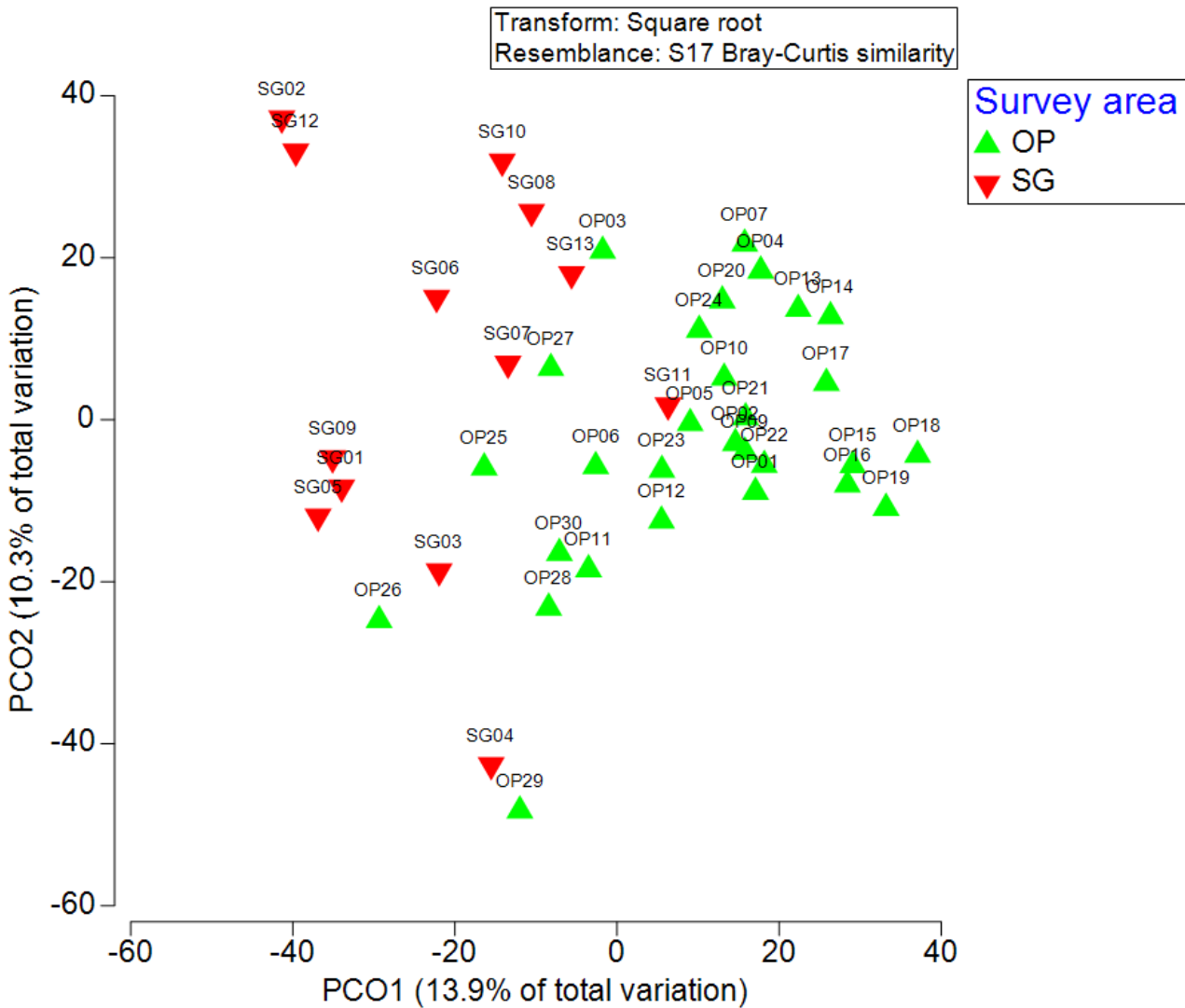


Figure 3-26: Principal coordinates ordination (PCO) of offshore pipeline (OP) and spoil ground (SG) infaunal data

## 3.3 Water quality

### 3.3.1 Offshore pipeline

#### 3.3.1.1 CTD Data

CTD profile data from the offshore pipeline water sampling locations are presented in Figure 3-27 to Figure 3-36. Temperature was either consistent with depth at sample sites or decreased by up to >1 degree over >40 m depth range (e.g. OP2).

Salinity was either consistent or changed marginally over depth – except at sites OP1b and OP2b, where an increase in salinity was recorded over the 0–10 m depth range (particularly notable at site OP1).

Turbidity at sites OP1 to OP6 (except OP2) decreased in the 0 to 15–20 m depth range, then gradually increased with increasing depth. A similar trend may occur at sites OP7, but less obviously. Turbidity at sites OP2 and OP8 were relatively consistent over the depth profile. Turbidity increased with depth at site OP10.

Oxygen levels tended to increase with increasing depth at sites OP1 to OP4 and sites OP7 to OP10. At site OP5, oxygen increased between the surface and around 20 m, with gradually decreased with increasing depth. At site OP6, oxygen levels decreased between the surface and around 10 m, then remained fairly consistent through the water column.

pH decreased with increased depth at sites OP1, OP3, OP4, OP7, OP8 and OP9. In contrast, pH profiles increased with increasing depth at sites OP6b and OP10. At site OP2, pH gradually increased with depth. But an increase in pH was recorded between ~25 m and ~35 m, before decreasing. At site OP5, pH was relatively consistent throughout the water column, except at depths ~15 to 20 m and ~35 m to >50 m where there was a relatively large drop from a pH of 11.5 to 9.5.

#### 3.3.1.2 Metals

Five of the filtered and unfiltered metals and metalloids were below the LoR for all sites, except OP1S. These were cadmium (Cd), chromium (Cr), cobalt (Co), nickel (Ni) and mercury (Hg). OPS1 had filtered nickel and unfiltered chromium concentrations that were above the LoR (1.5 µg/L and 0.3 µg/L, respectively; Appendix G).

Filtered and unfiltered copper (Cu) concentrations ranged from <0.2 to 8.4 µg/L (Figure 3-37). Three of the copper samples were above the ANZG (2018) DGV (for slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level) of 1.3 µg/L, in slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level (Figure 3-37). These results were for unfiltered copper at OP1S and Triplicate B (taken from sample OP8S), and for filtered copper at OP2S. The highest filtered copper concentration was recorded at OP2S (8.4 µg/L), while all other samples had copper concentrations under 1.6 µg/L.

Unfiltered zinc (Zn) concentrations ranged from <1 to 9 µg/L and were at or above the ANZG (2018) DGV of 8 µg/L at two sites (OP1S and OP5S). Filtered zinc concentrations ranged from 1 to 9 µg/L, with three samples being at or above the DGV (Figure 3-37). The filtered and unfiltered arsenic (As) concentrations were very similar. Samples ranged from 1.3 to 1.9 µg/L, with all recorded concentrations below the ANZG (2018) DGV of 4.5 µg/L (Figure 3-37). Filtered and unfiltered lead (Pb) concentrations ranged from <0.1 to 5.4 µg/L (Figure 3-37). Ten unfiltered lead samples below the LoR, whilst six filtered lead samples were below the LoR. One sample of filtered lead (OP5S) was above the ANZG (2018) DGV of 4.4 µg/L in slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level.

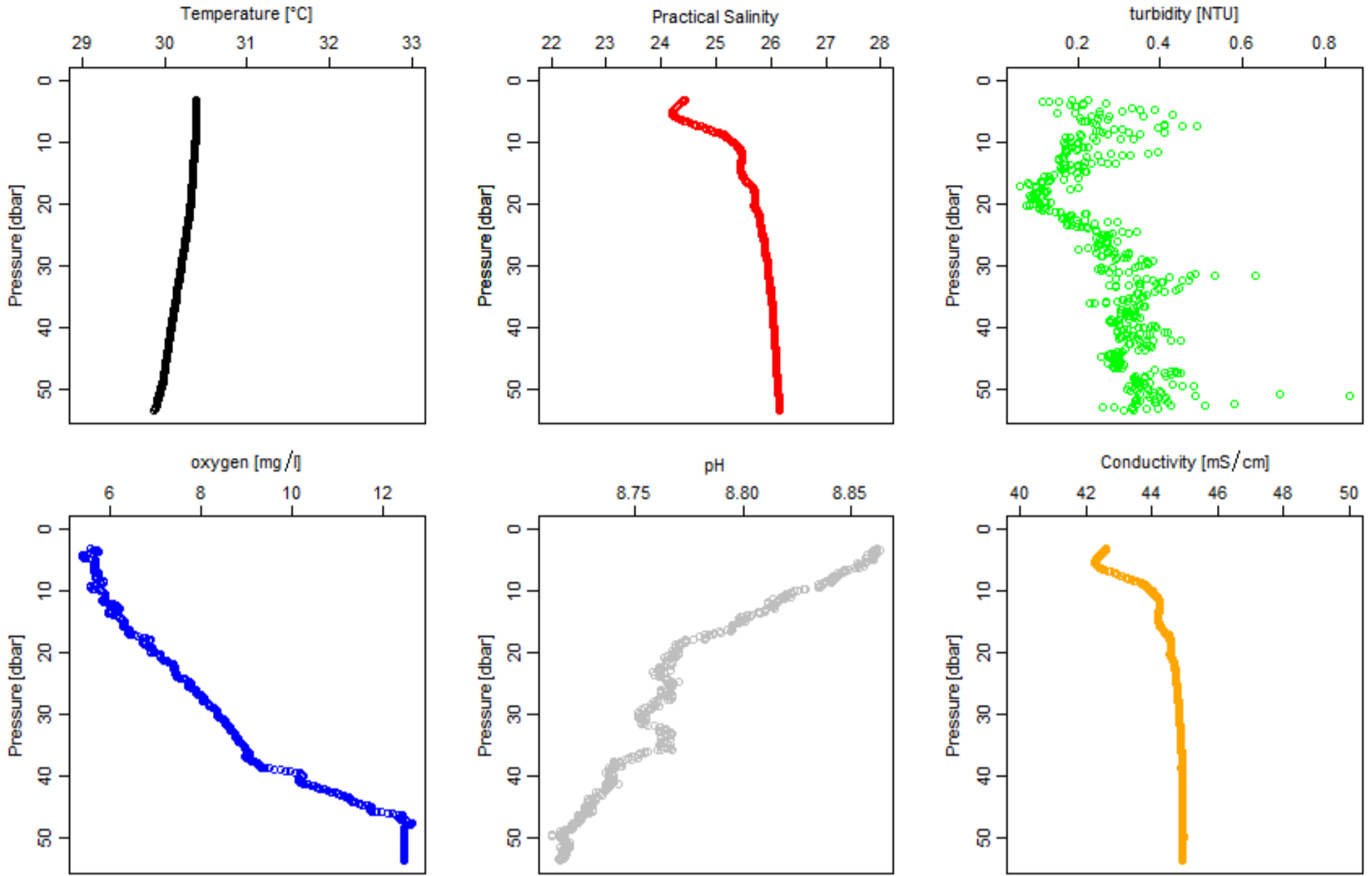


Figure 3-27: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP1

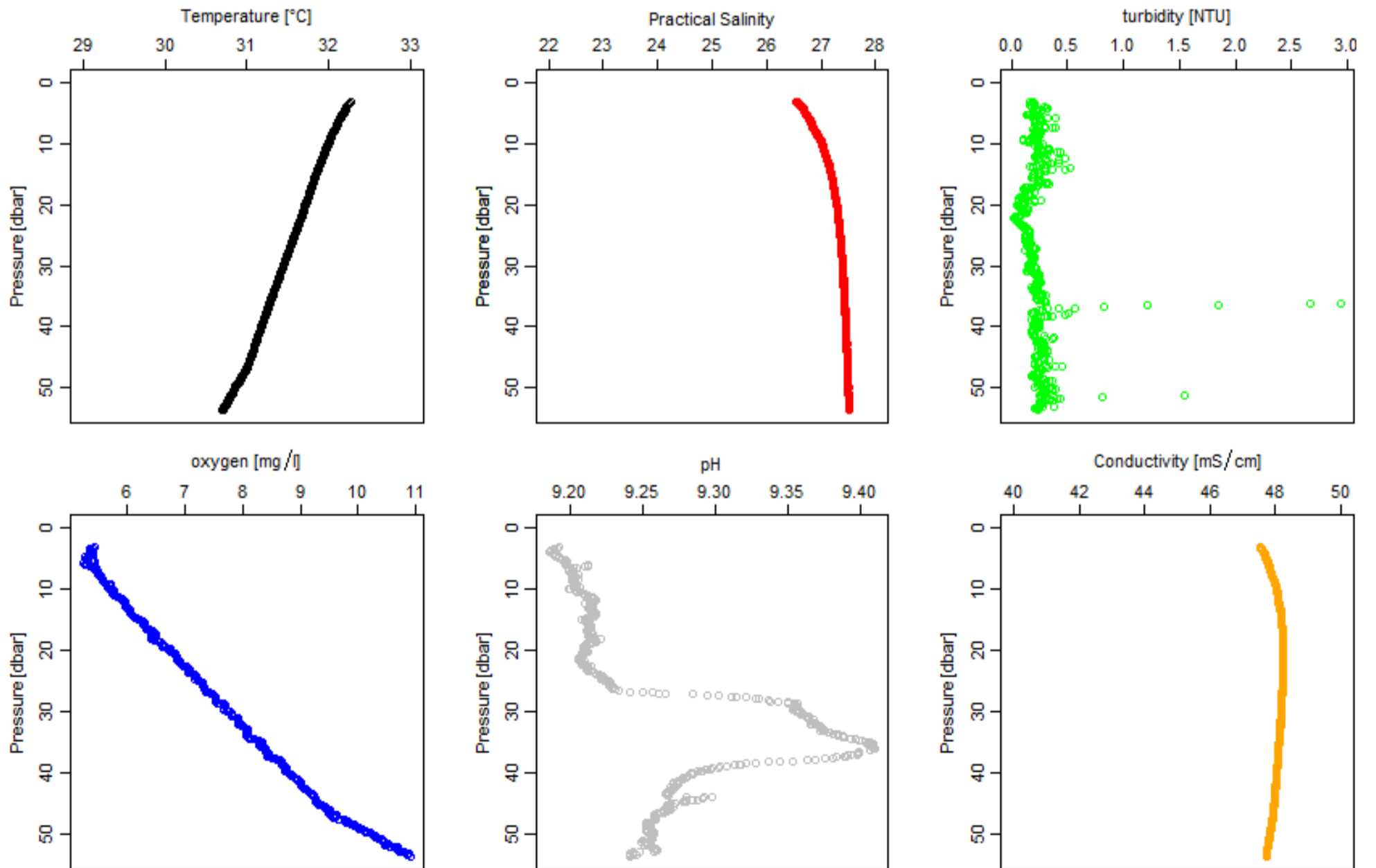


Figure 3-28: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP2



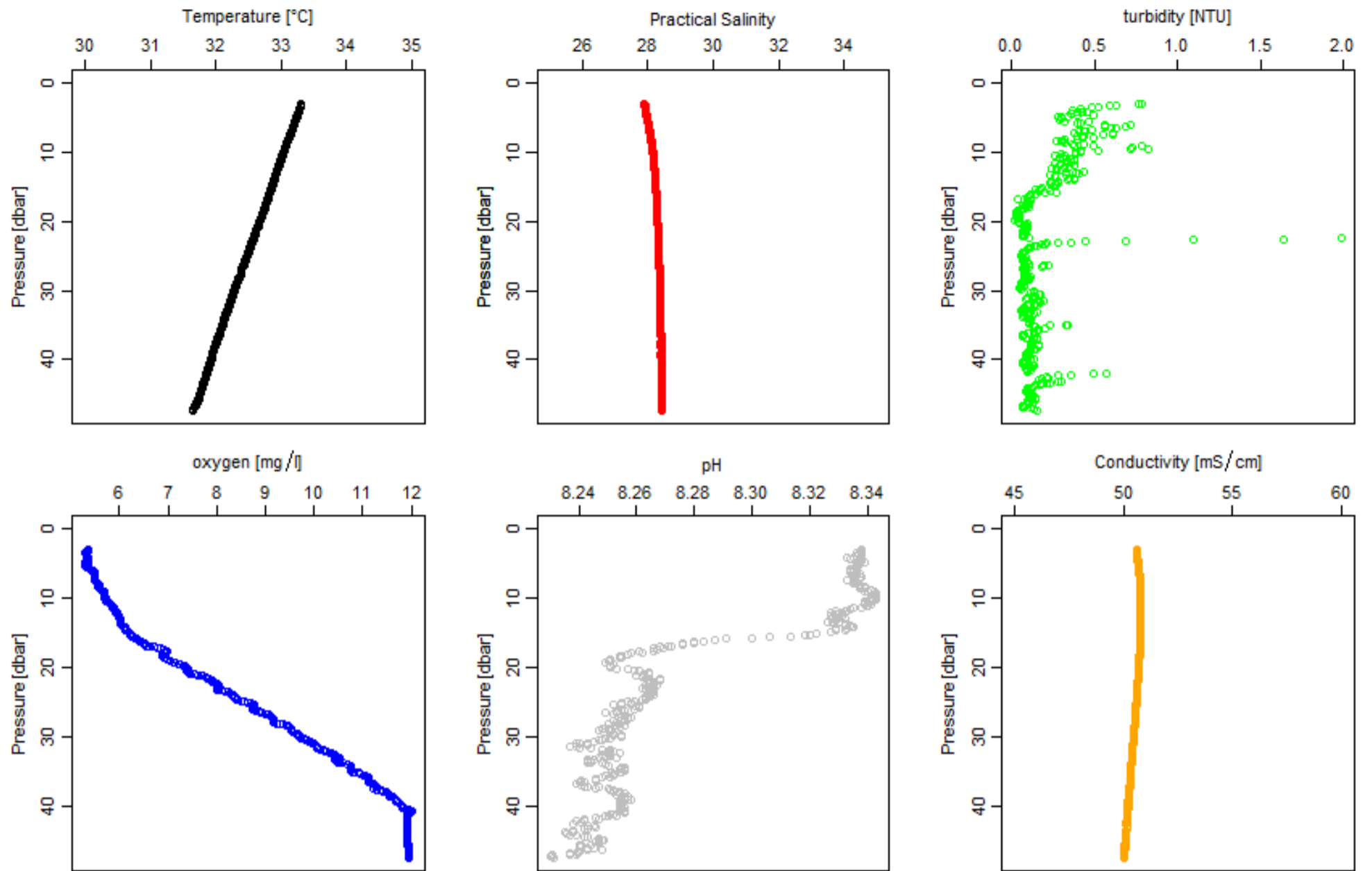


Figure 3-29: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP3

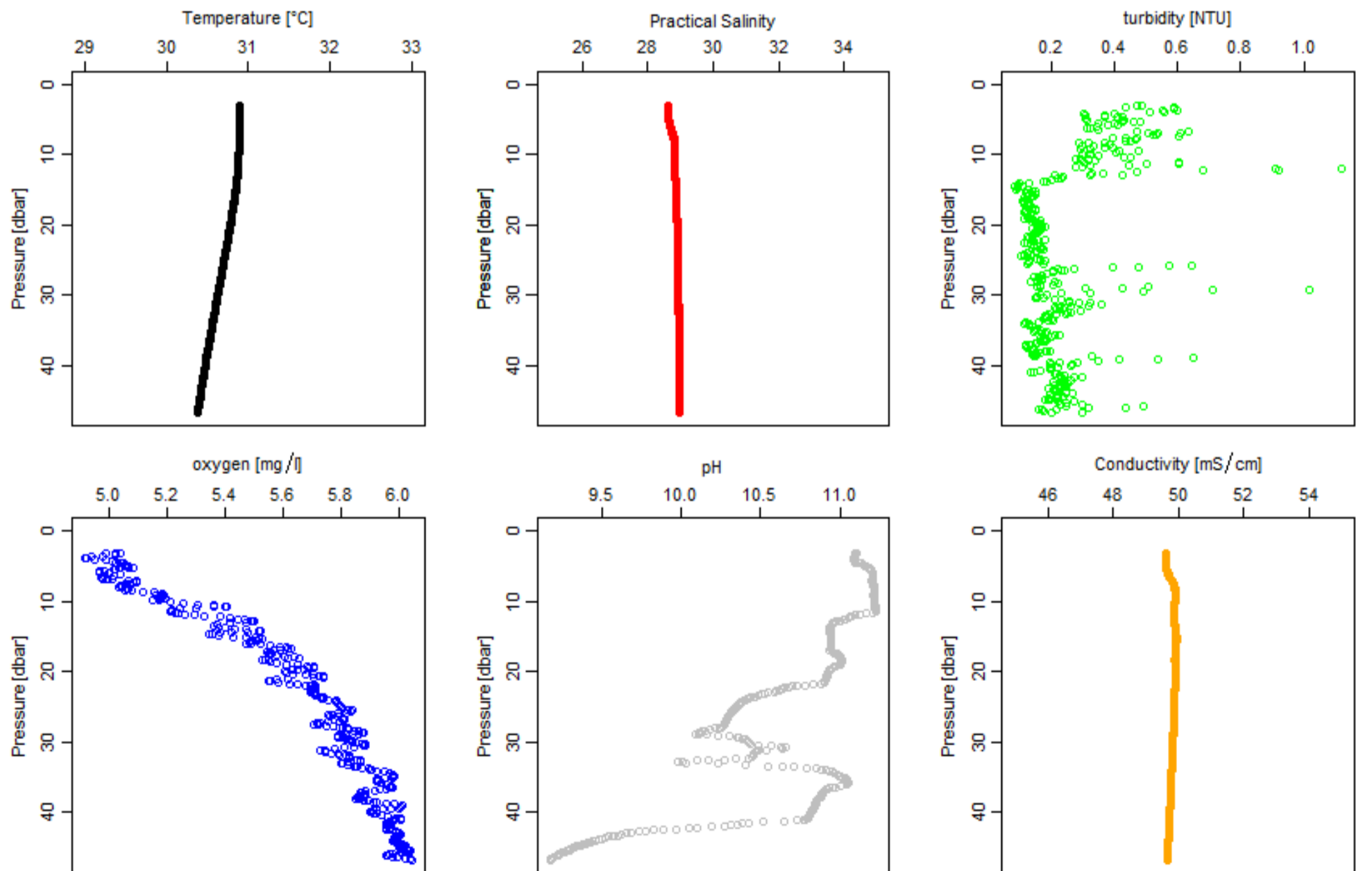


Figure 3-30: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP4

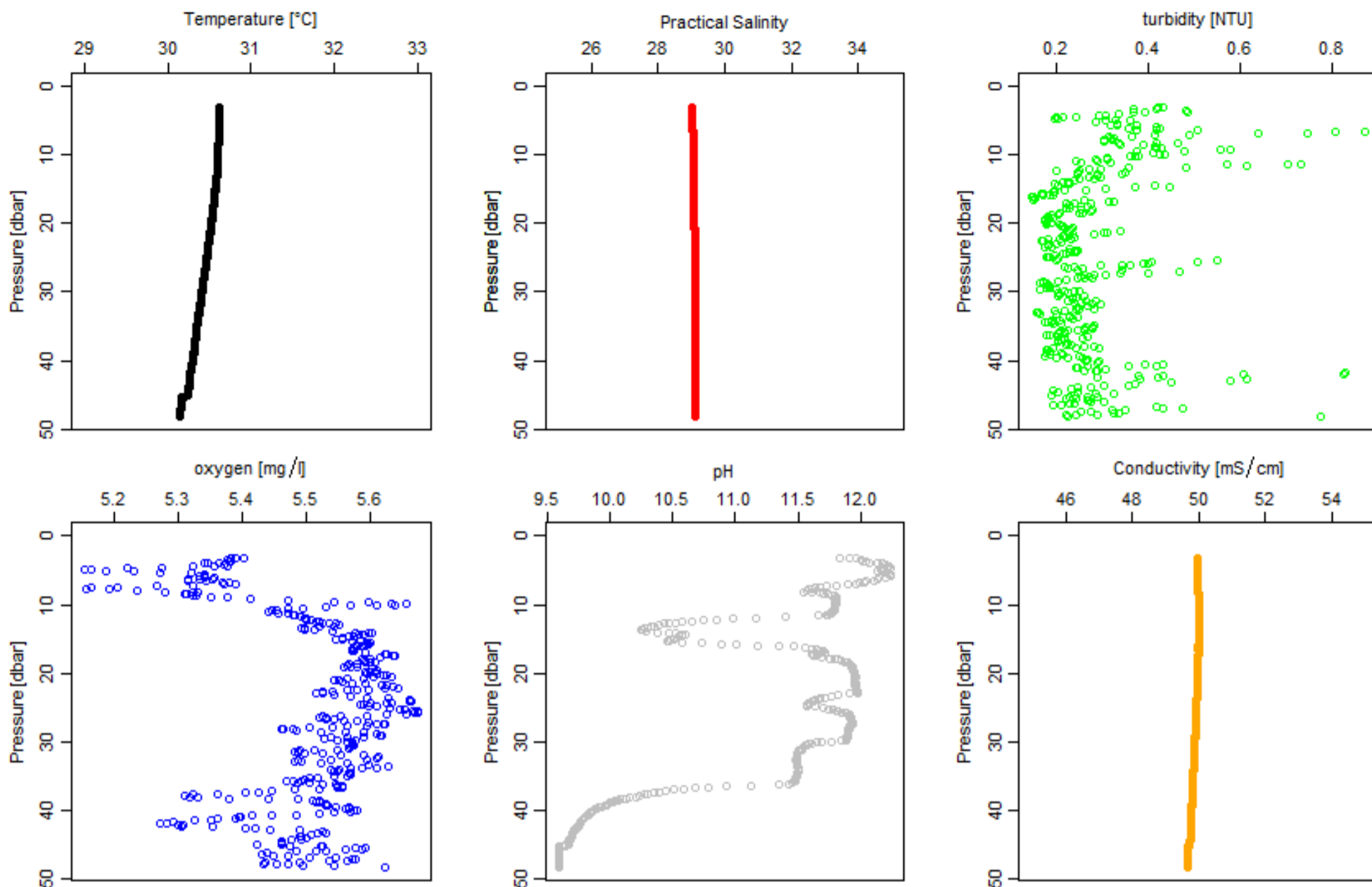


Figure 3-31: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP5

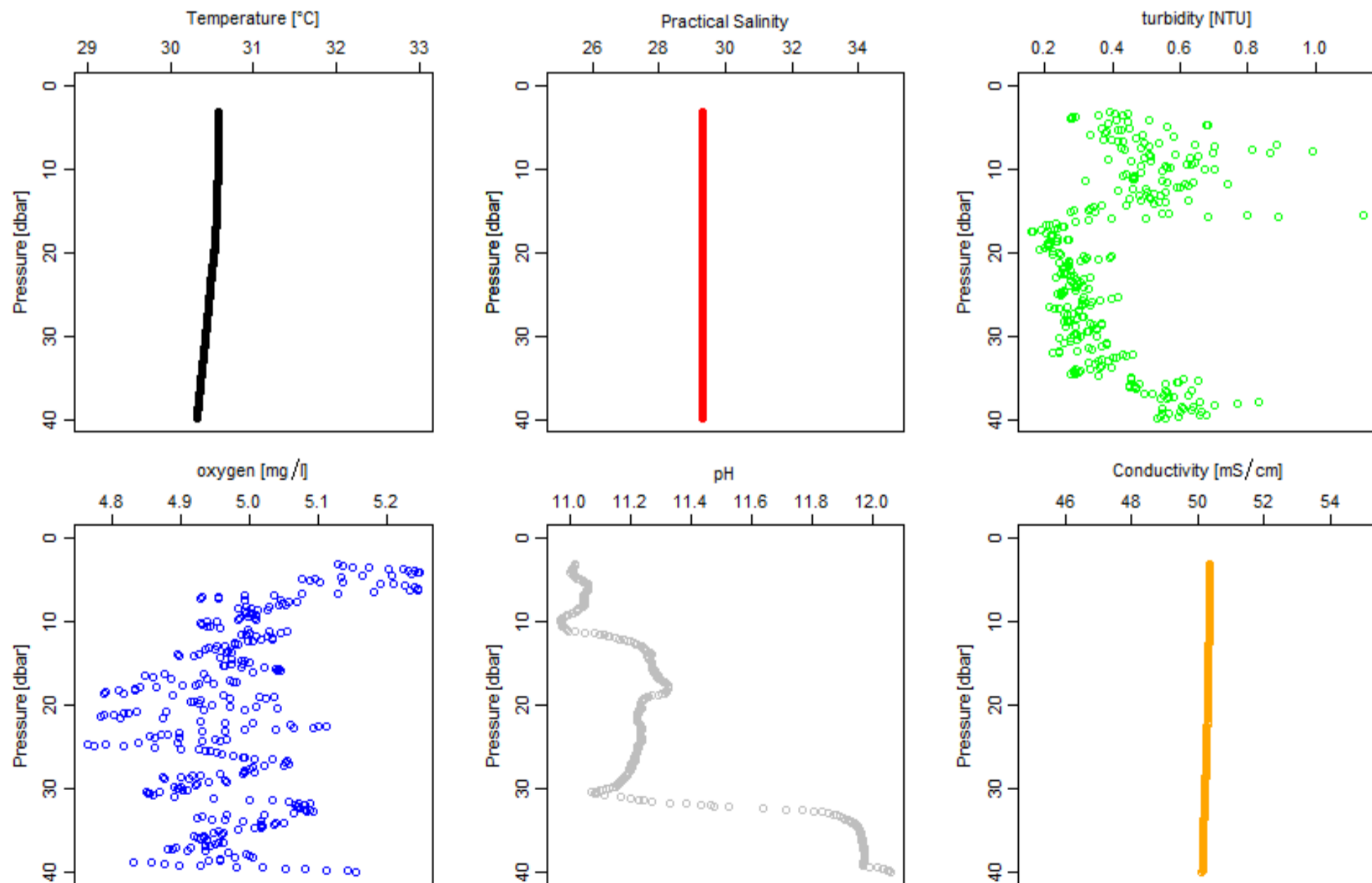


Figure 3-32: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP6

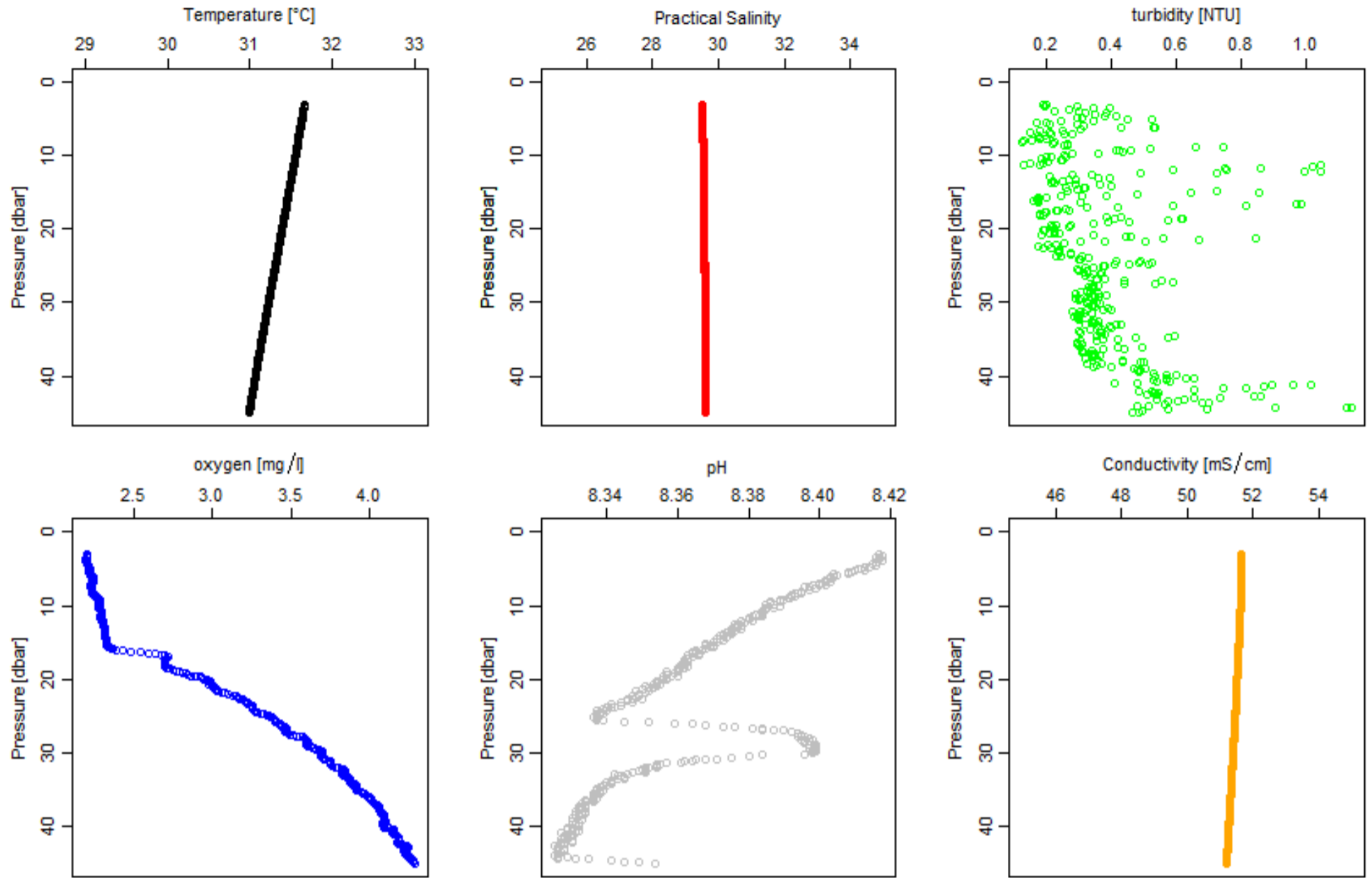


Figure 3-33: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP7

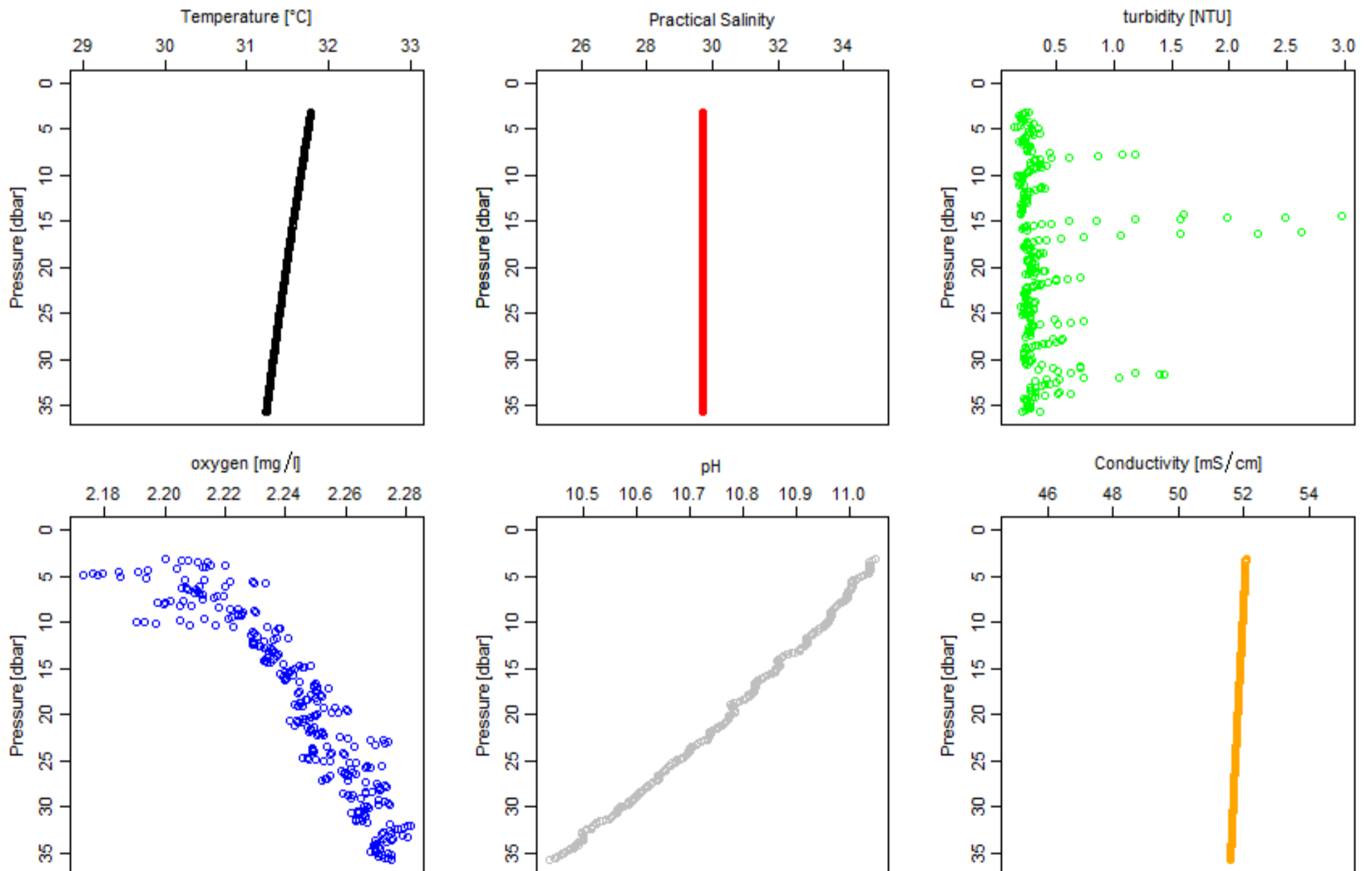


Figure 3-34: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP8

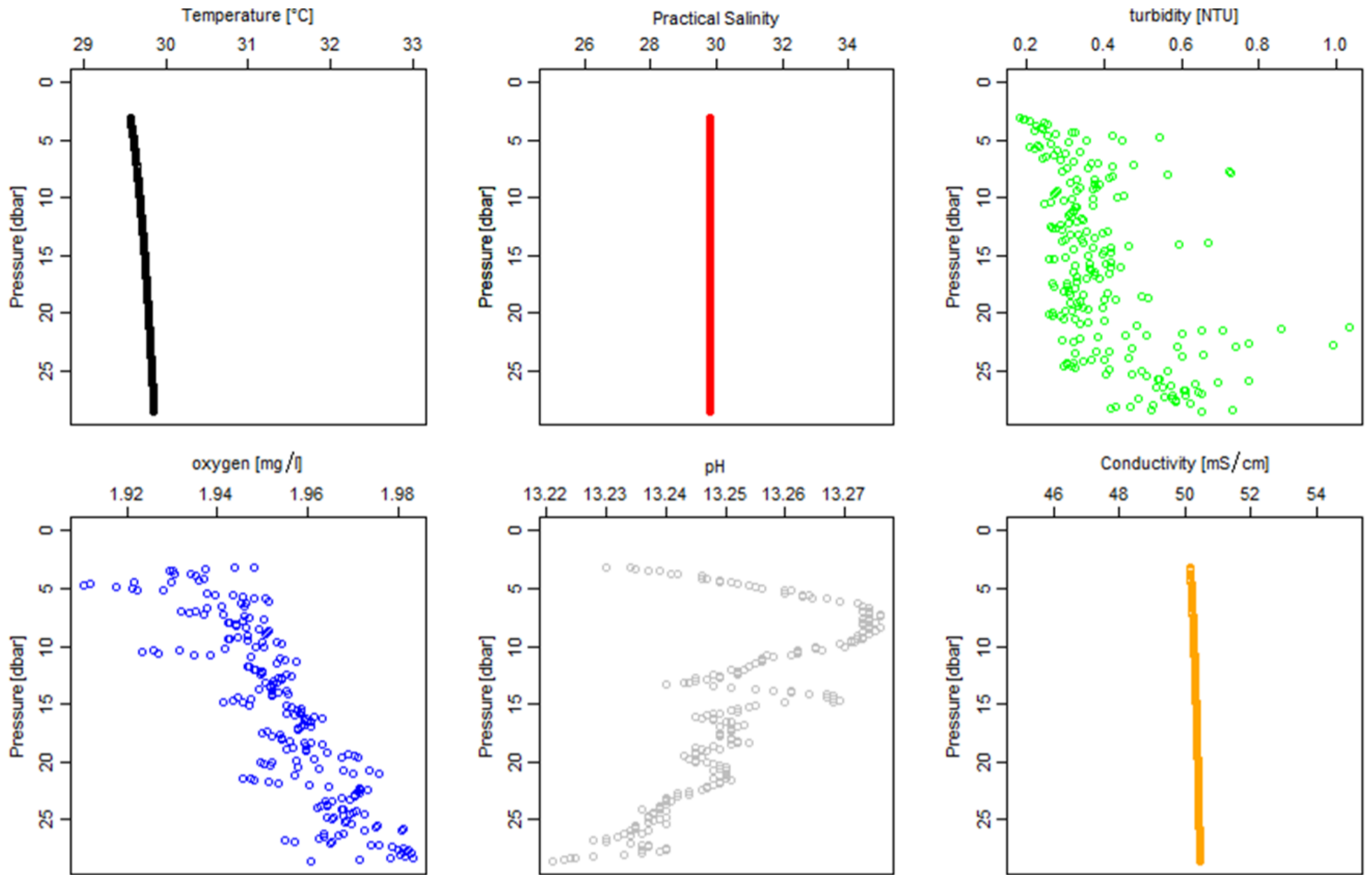


Figure 3-35: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP9

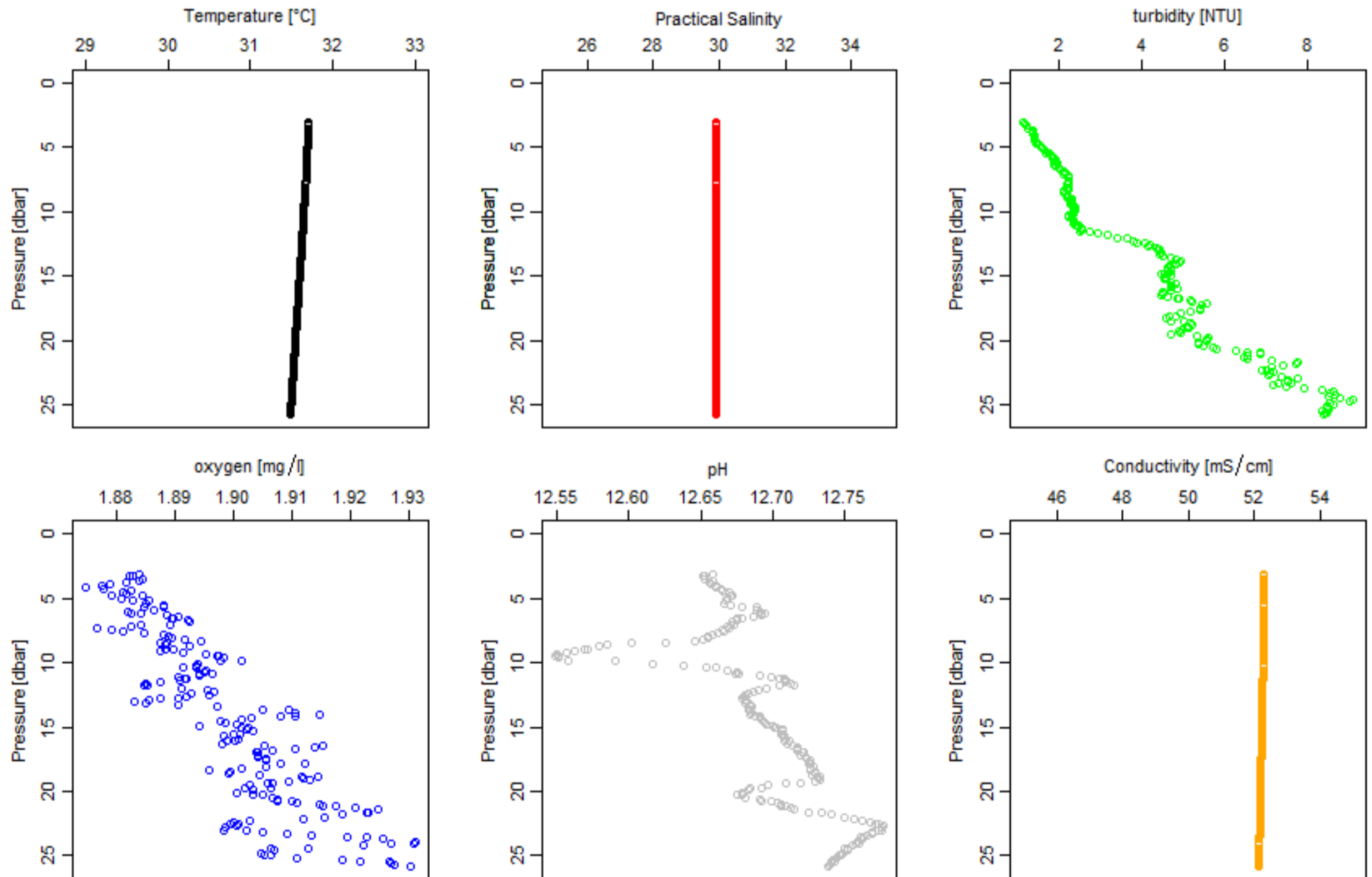


Figure 3-36: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site OP10

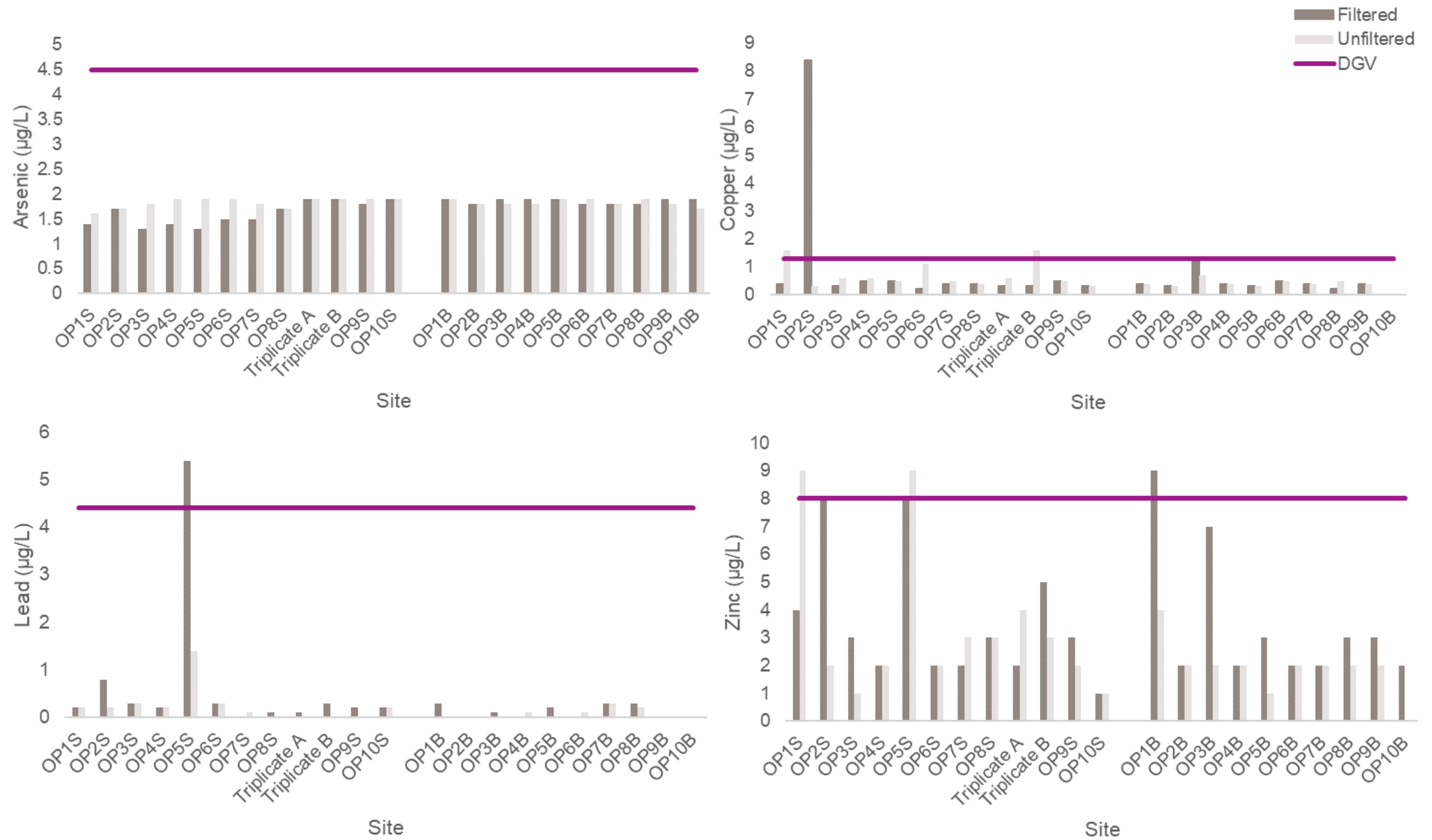


Figure 3-37: Filtered and unfiltered metal concentrations above LoRs from the offshore pipeline route (from south to north)

### **3.3.1.3 Nutrients and pigments**

#### **3.3.1.3.1 Nitrogen**

The test for total nitrogen provided data for all nitrogen compounds in the water samples, namely nitrite (NO<sub>2</sub>), nitrate (NO<sub>3</sub>), ammonia (NH<sub>4</sub><sup>+</sup>) and organic nitrogen compounds (Appendix G).

Nitrite and nitrate were recorded at detectable levels at all sites, except for site OP8S/B. Nitrite and nitrate were recorded at concentrations of <2 to 15 µg.N/L in the bottom water samples, with all surface samples being below the LoR. These values are below the ANZG (2018) DGV for physical and chemical stressors in the Anson Beagle bioregion for nitrate in summer of 0.181 µmol NO<sub>3</sub>-N/L (11.22 µg.N/L) in surface waters and 1.717 µmol NO<sub>3</sub>-N/L (106.46 µg.N/L) in bottom waters.

Ammonia was detected in 11 samples, with ten of those being bottom (near seabed) samples. Only one surface sample had detectable concentrations of Ammonia (OP5S), with a concentration of 7 µg.N/L being recorded from this sample. All samples were below the ANZG (2018) DGV (for slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level) of 910 µg.N/L.

Total nitrogen concentrations indicated the presence of other organic nitrogen compounds, with no samples (excluding the field and transport blanks) being below the LoR concentration of 50 µg.N/L. Total nitrogen concentrations ranged from 80 to 150 µg.N/L. There is no ANZG (2018) default guideline value for total nitrogen.

#### **3.3.1.3.2 Phosphorus**

The results for TP comprise the concentration of phosphorus that occurs in orthophosphate and organic phosphate compounds (Appendix G).

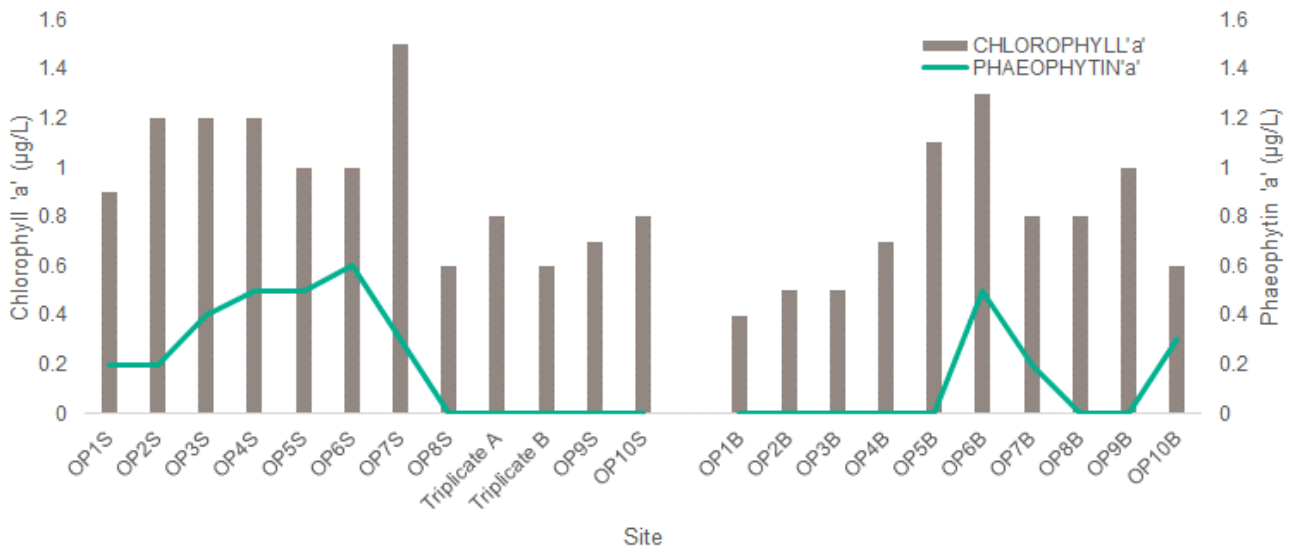
Orthophosphate (filterable reactive phosphorus) concentrations ranged from <2 to 8 µg.P/L. All but two samples were above the LoR, and both samples were surface samples (OP3S and OP4S). No samples exceeded the ANZG (2018) DGV for physical and chemical stressors in the Anson Beagle bioregion for phosphate of 0.209 µmol PO<sub>4</sub>-P/L (19.85 µg.P/L) in surface waters and 0.427 µmol PO<sub>4</sub>-P/L (40.55 µg.P/L) in bottom waters for summer.

TP concentrations ranged from 9 to 17 µg.P/L. There is no ANZG (2018) default guideline value for TP.

#### **3.3.1.3.3 Pigments**

Chlorophyll-a concentrations were used as an indicator of the likely level of phytoplankton biomass across the offshore pipeline area. Chlorophyll-a concentrations ranged from 0.4 to 1.5 µg/L (Figure 3-38; Appendix G). All concentrations were below the ANZG (2018) DGV for physical and chemical stressors in the Anson Beagle bioregion value for chlorophyll-a of 2.568 µg/L in summer. Concentrations were variable across surface and bottom samples.

Phaeophytin-a was also sampled as this pigment is a breakdown product of chlorophyll-a and can be used to indicate if phytoplankton are blooming or declining. Phaeophytin-a was detected in ten samples, the majority of which were at the surface (Figure 3-38). Concentrations ranged from <0.2 µg/L (i.e. below the LoR) to 0.6 µg/L. There is no ANZG (2018) default guideline value for phaeophytin-a.



**Figure 3-38: Surface and bottom chlorophyll-a and phaeophytin-a concentrations along the offshore pipeline route**

**3.3.1.3.4 Total suspended solids**

Total suspended solid (TSS) concentrations were all above the LoR (0.5 mg/L) and ranged from 1.7 to 8.6 mg/L (Appendix G). Most sites had TSS between 1.7 and 4 mg/L, however site OP10S/B was much higher, with 8.6 mg/L at the surface and 7.7 mg/L at the bottom. OP10S/B was the closest water quality site to Darwin Harbour but was sampled on an incoming tide. There was no correlation between depth and TSS.

**3.3.1.4 Hydrocarbons**

The offshore pipeline TRH and BTEXN concentrations were below the limit of reporting (LoR) for all samples (Appendix H). The offshore pipeline samples were, therefore, not tested for PAHs.

**3.3.1.5 Naturally occurring radioactive materials**

NORMS were detected in near-seabed samples at two of the offshore pipeline sites. Radium-226 was recorded at concentrations of 0.023 Bq/L in sample OP4B and 0.018 Bq/L in sample OP6B (Appendix F).

**3.3.2 Spoil ground**

**3.3.2.1 CTD data**

Data from the CTD profiles are presented in Figure 3-39 to Figure 3-45. Temperature was either consistent with depth or decreased by up to <0.5 degrees over ~20 m depth range. Salinity was generally consistent with depth or increased slightly (with no evidence of a halocline). Turbidity generally increased with increasing depth, with the most marginal change recorded at site SG1 and the greatest increase recorded at site SG8. Oxygen levels increased by 0.5 to 1 mg/l over a >20 m depth profile at all sites. The pH data from the spoil ground sites was inconsistent, and it was likely that the pH probe had developed a fault during these deployments.

**3.3.2.2 Metals**

Five of the filtered and unfiltered metals and metalloids were below the LoR concentrations for all sites. These were cadmium (Cd), chromium (Cr), cobalt (Co), nickel (Ni) and mercury (Hg) (Appendix G). Due to an issue with the sample jar, unfiltered metals were not analysed for Triplicate D.

## REPORT

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Filtered and unfiltered copper (Cu) concentrations ranged from <0.2 to 0.6 µg/L (Figure 3-46). Only two unfiltered copper samples were below the LoR (Triplicate C and SG7B), while five filtered copper samples were below the LoR (SG12S, Triplicate D, SG13S, SG4S and SG7B). None of the copper samples were above the ANZG (2018) DGV (for slightly to moderately disturbed marine offshore ecosystems, at the 9% species protection level) of 1.3 µg/L (Figure 3-46).

Unfiltered zinc (Zn) concentrations ranged from <1 to 2 µg/L and were below the ANZG (2018) DGV (for slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level) of 8 µg/L for all sites. Filtered zinc concentrations ranged from 2 to 18 µg/L, four of these samples were at or above the DGV (Figure 3-46). The highest zinc concentration was at SG4B.

The filtered and unfiltered arsenic (As) concentrations were above the LoR and were very similar. Samples ranged from 1.6 to 1.9 µg/L, with all recorded concentrations below the ANZG (2018) DGV (for slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level) of 4.5 µg/L (Figure 3-46).

Filtered and unfiltered lead (Pb) concentrations ranged from <0.1 to 0.4 µg/L (Figure 3-46). Only three unfiltered lead samples were below the LoR (Triplicate C, SG8S and SG1B), while six filtered lead samples were below the LoR (SG12S, Triplicate C, Triplicate D, SG8S, SG4S, SG13B and SG8B). All lead samples were well below the ANZG (2018) DGV (for slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level) of 4.4 µg/L.



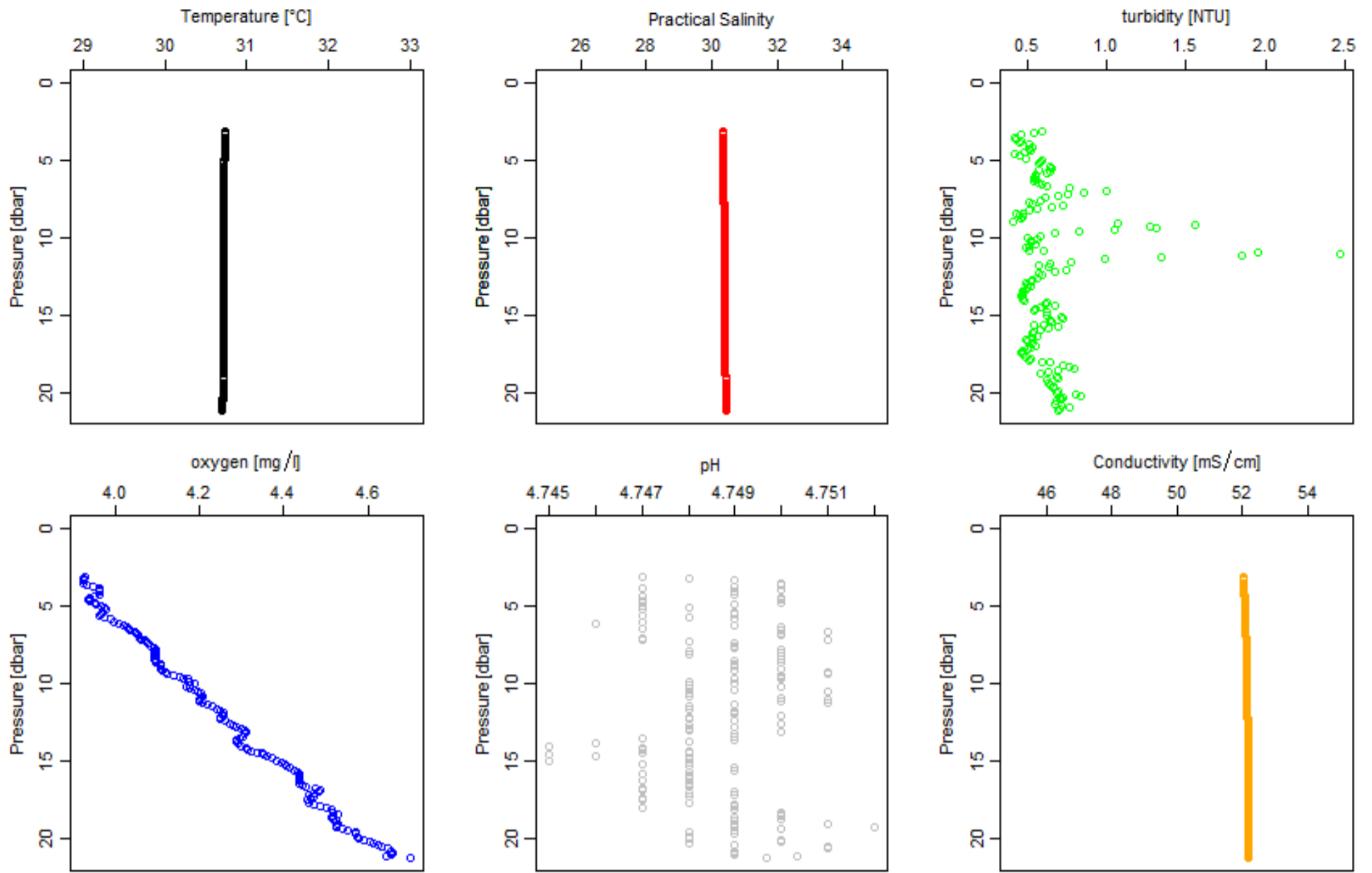


Figure 3-39: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site SG1

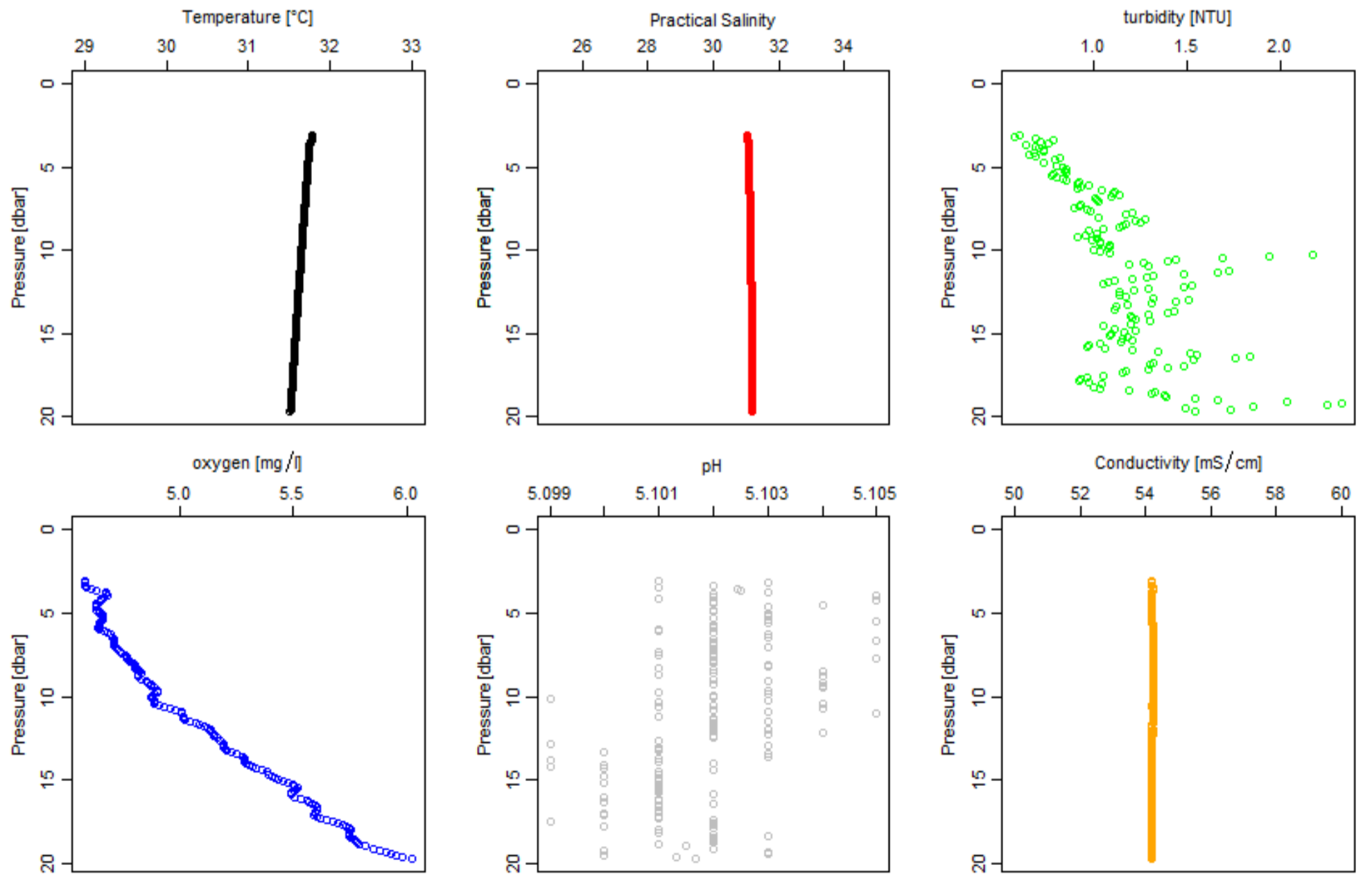


Figure 3-40: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site SG4

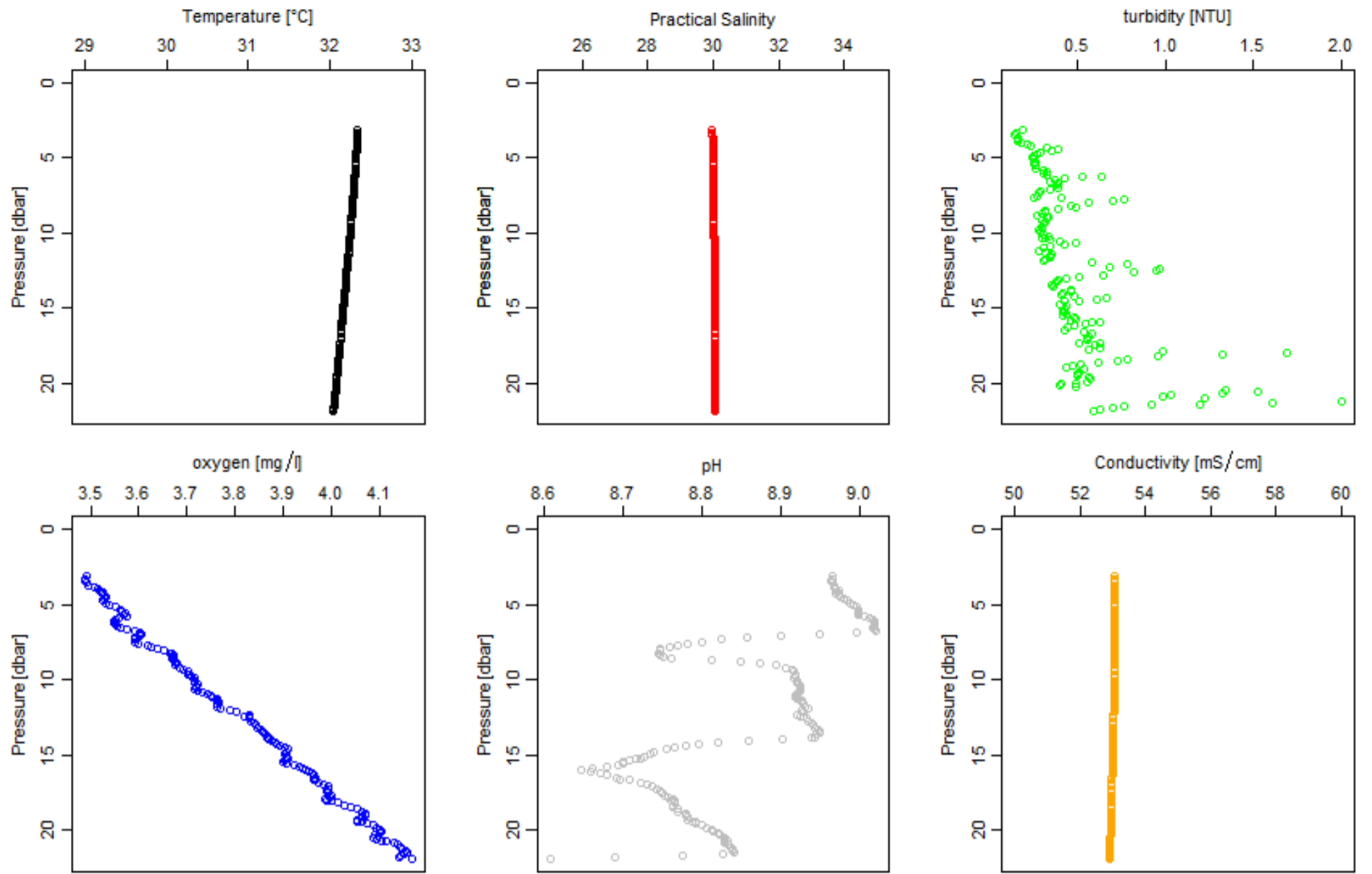


Figure 3-41: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site SG7

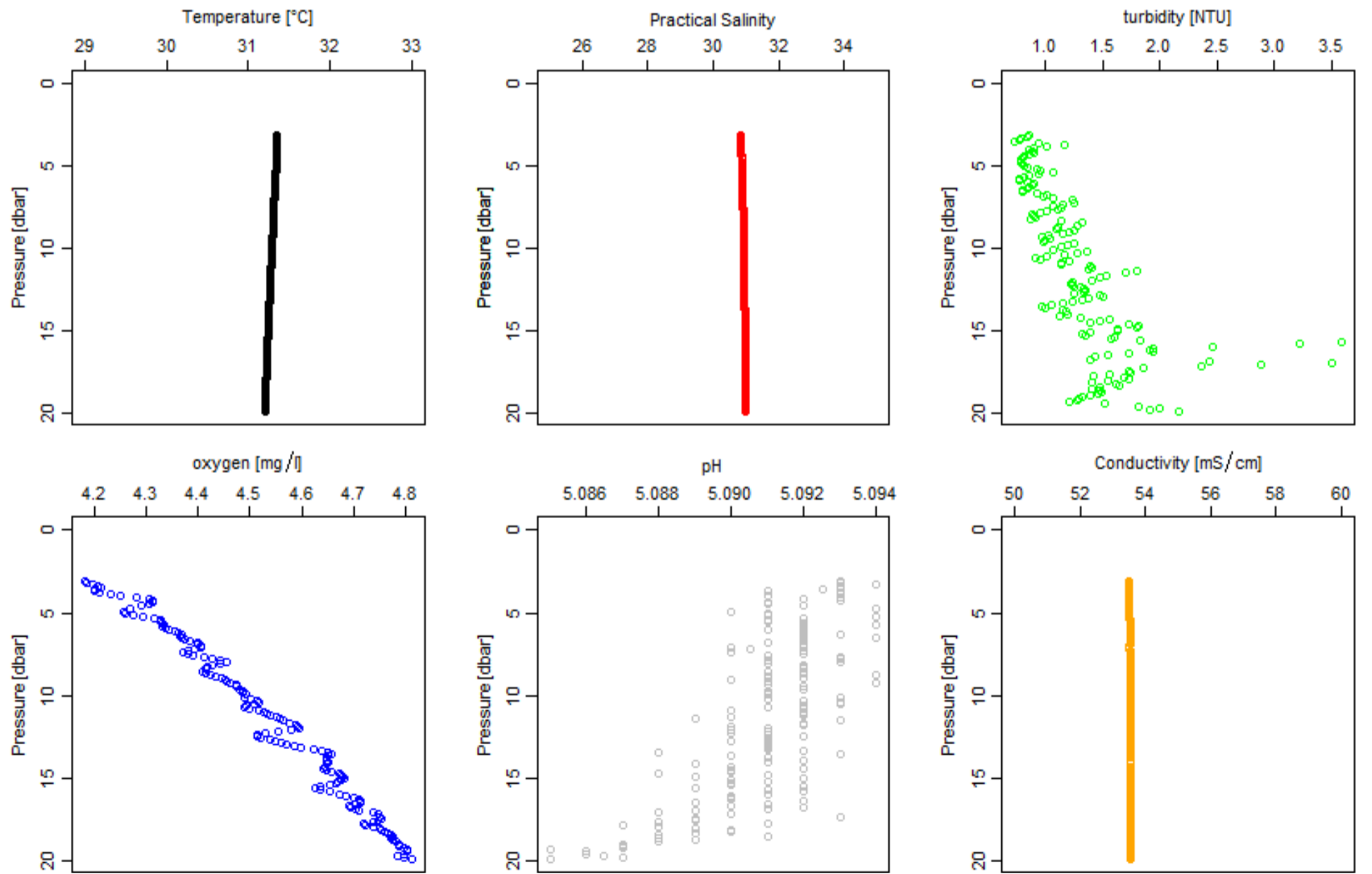


Figure 3-42: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site SG8

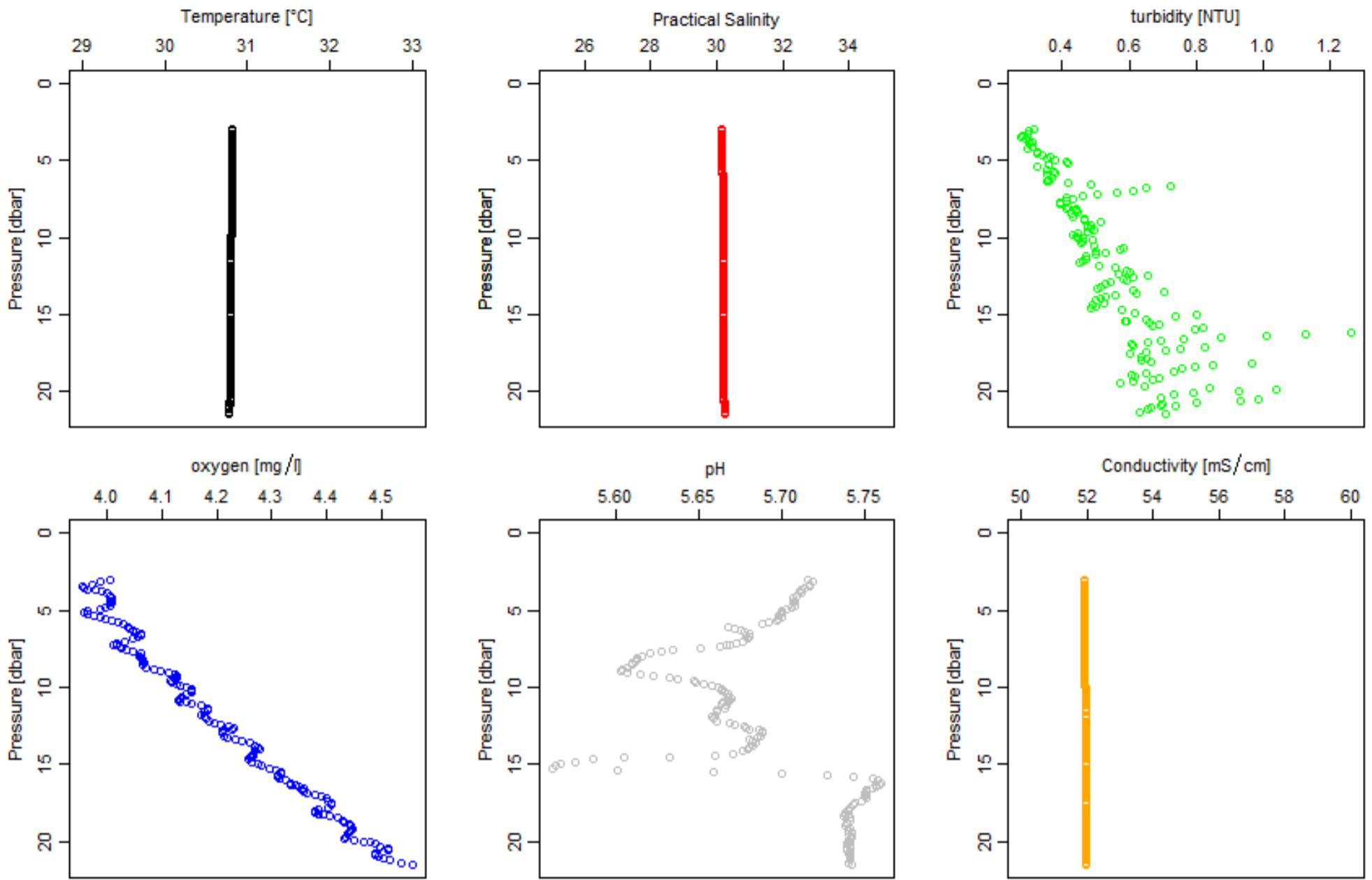


Figure 3-43: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site SG11

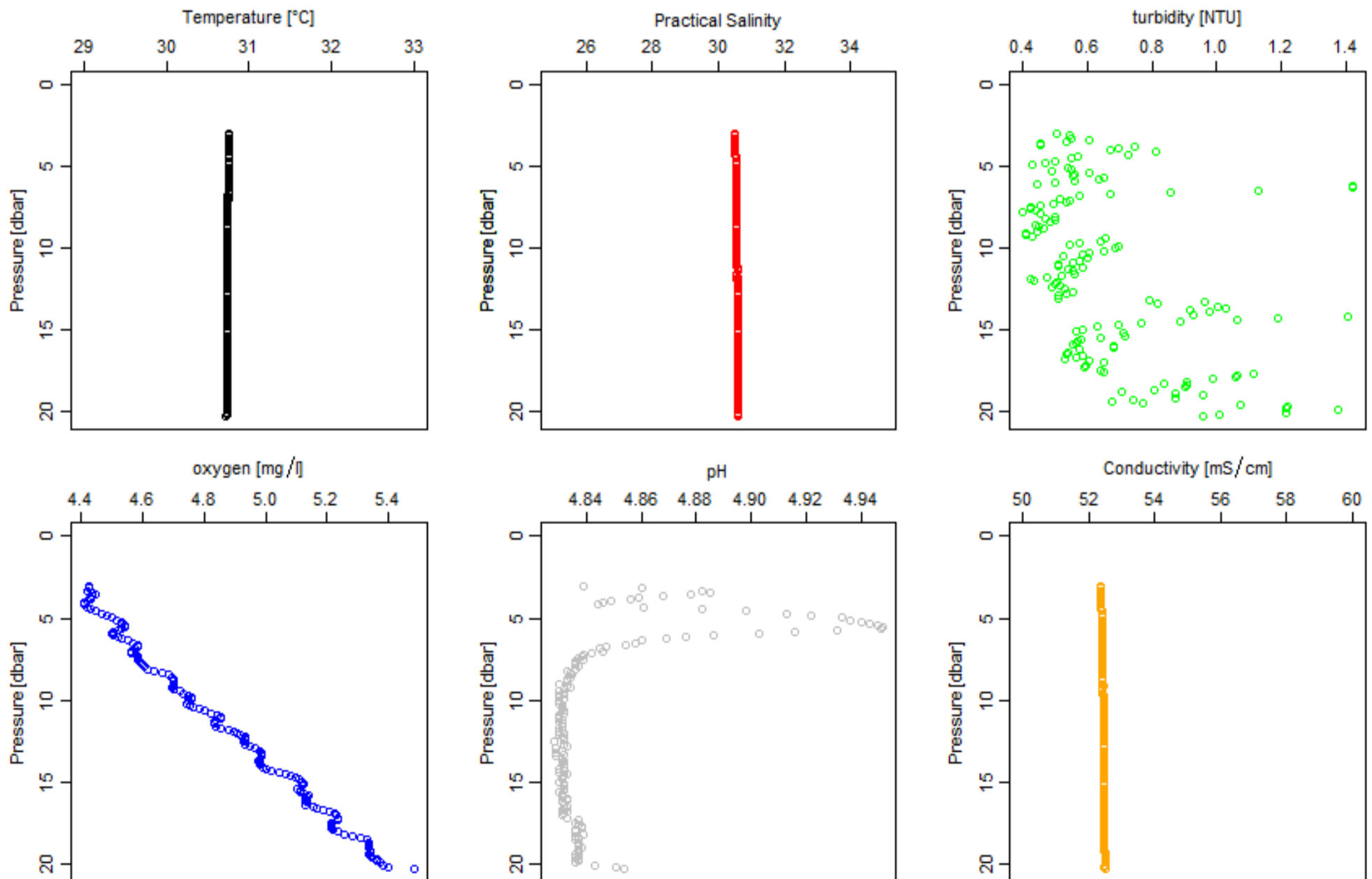


Figure 3-44: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site SG12

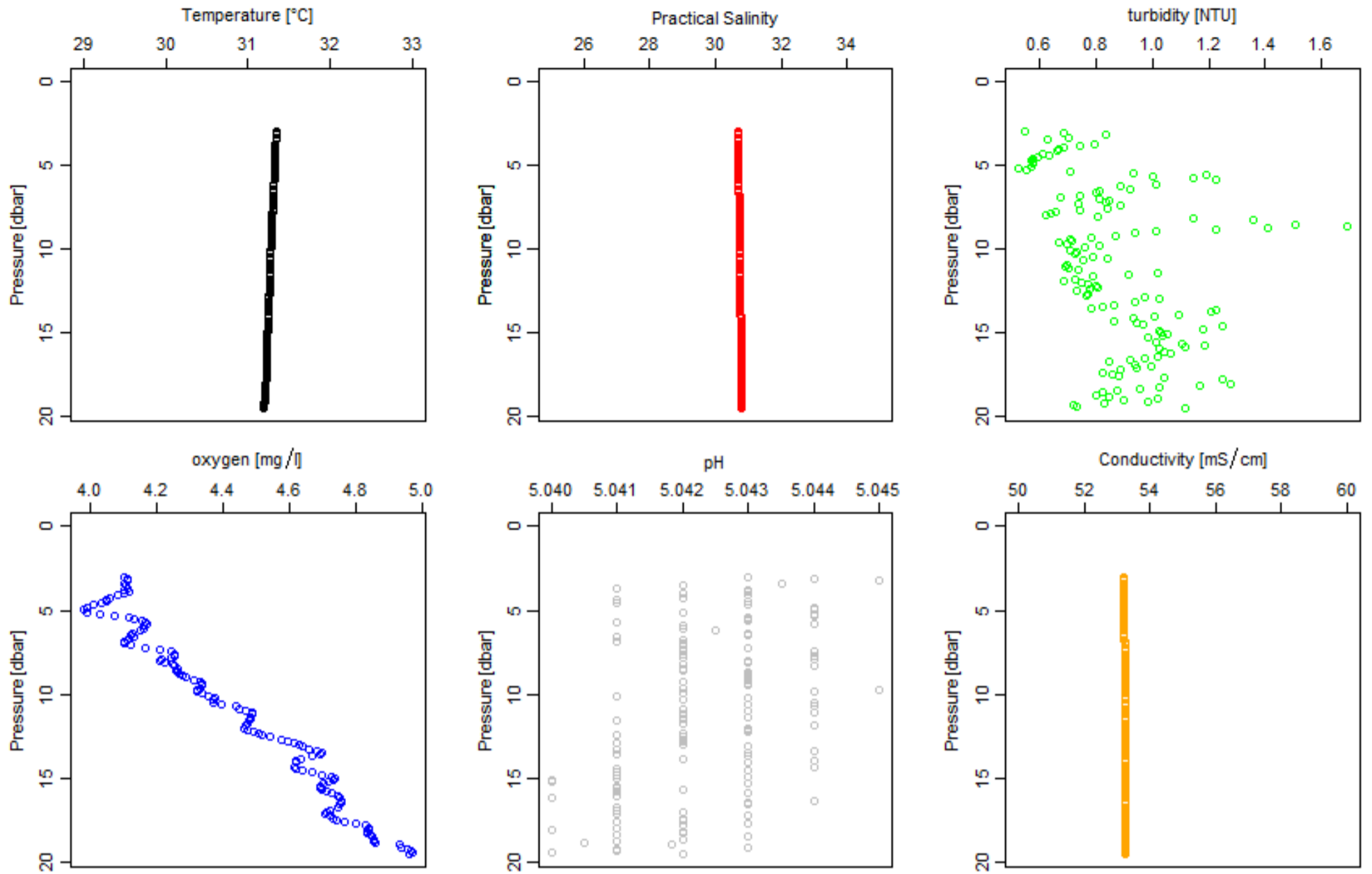


Figure 3-45: Seabird temperature, salinity, turbidity, oxygen, pH and conductivity (salinity) profiles from site SG13

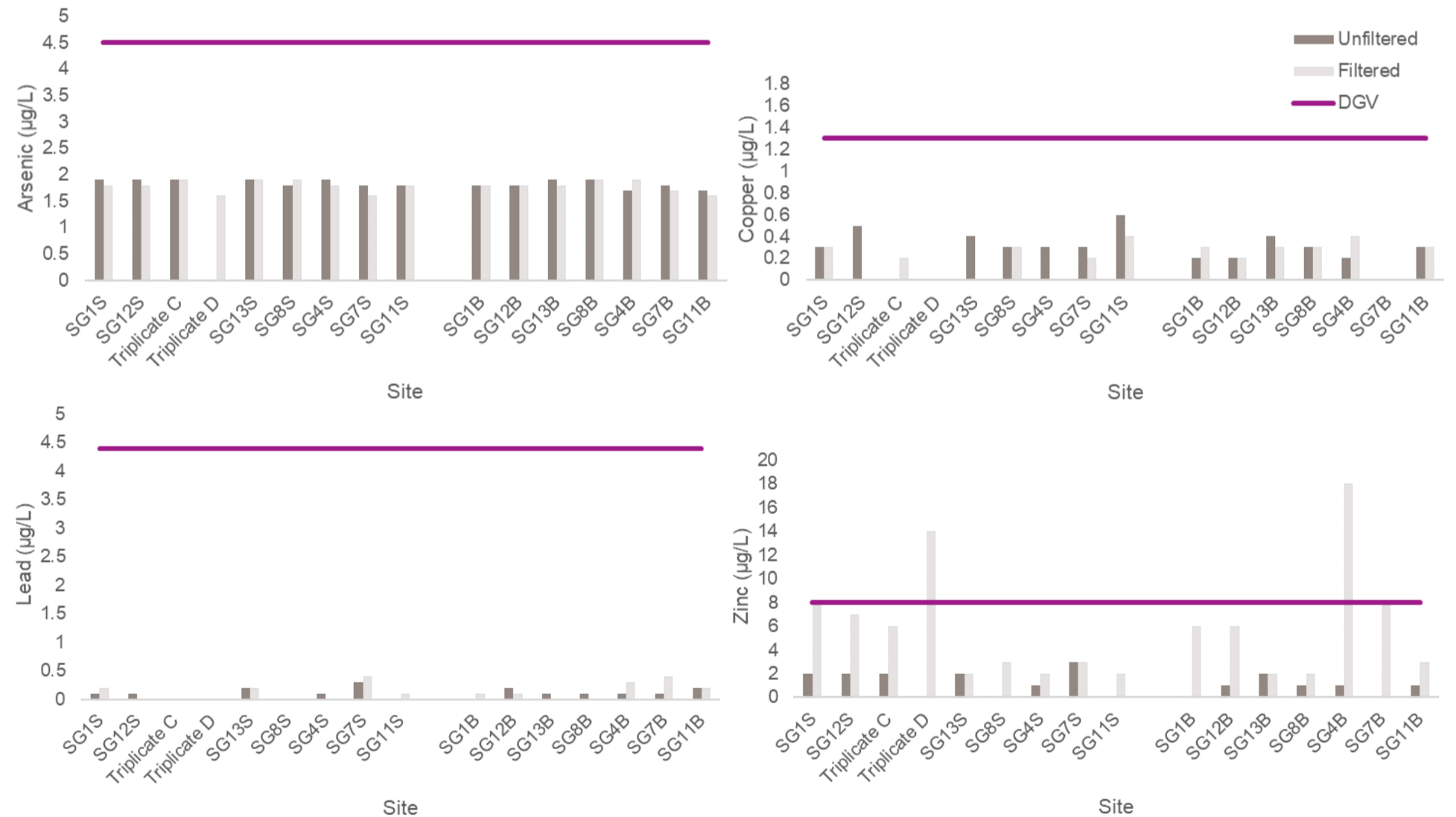


Figure 3-46: Filtered and unfiltered metal concentrations from the spoil ground

### 3.3.2.3 Nutrients and pigments

#### 3.3.2.3.1 Nitrogen

Nitrite and nitrate were only recorded at concentrations above the LoR at two of the spoil ground sites, with both being bottom samples (Appendix G). These nitrate concentrations were 12 µg.N/L at SG12B and 4 µg.N/L at SG11B. All surface samples were below the LoR. These values are below the ANZG (2018) DGV for physical and chemical stressors in the Anson Beagle bioregion for nitrate in summer 1.717 µmol NO<sub>3</sub>-N/L (106.46 µg.N/L) in bottom waters.

Ammonia concentrations were below the LoR for all but three samples. Ammonia was only detected in near-seabed water samples (SG12B, SG4B and SG11B). The ammonia concentrations in these samples ranged from 3 µg.N/L to 13 µg.N/L. All samples were below the ANZG (2018) DGV (for slightly to moderately disturbed marine offshore ecosystems, at the 95% species protection level) of 910 µg.N/L.

Total nitrogen concentrations indicated the presence of other organic nitrogen compounds, with no samples (excluding the field and transport blanks) being below the LoR of 50 µg.N/L. There is no ANZG (2018) default guideline value for total nitrogen. There is no ANZG (2018) default guideline value for total nitrogen.

#### 3.3.2.3.2 Phosphorus

Orthophosphate (filterable reactive phosphorus) concentrations ranged from 4 to 9 µg.P/L (Appendix G). All samples were above the LoR. No samples exceeded the ANZG (2018) DGV for physical and chemical stressors in the Anson Beagle bioregion for phosphate of 0.209 µmol PO<sub>4</sub>-P/L (19.85 µg.P/L) in surface waters and 0.427 µmol PO<sub>4</sub>-P/L (40.55 µg.P/L) in bottom waters for summer.

TP concentrations ranged from 11 to 16 µg.P/L. There is no ANZG (2018) default guideline value for TP.

#### 3.3.2.3.3 Pigments

Chlorophyll-a concentrations ranged from 0.2 to 0.5 µg/L at the spoil ground sites (Figure 3-47; Appendix G). All concentrations were below the ANZG (2018) DGV for physical and chemical stressors in the Anson Beagle bioregion value for chlorophyll-a of 2.568 µg/L in summer. Concentrations were variable across surface and bottom samples.

Phaeophytin-a was also sampled as this pigment is a breakdown product of chlorophyll-a and can be used to indicate if phytoplankton are blooming or declining. Phaeophytin-a was not detected above the LoR for any of the spoil ground sites.

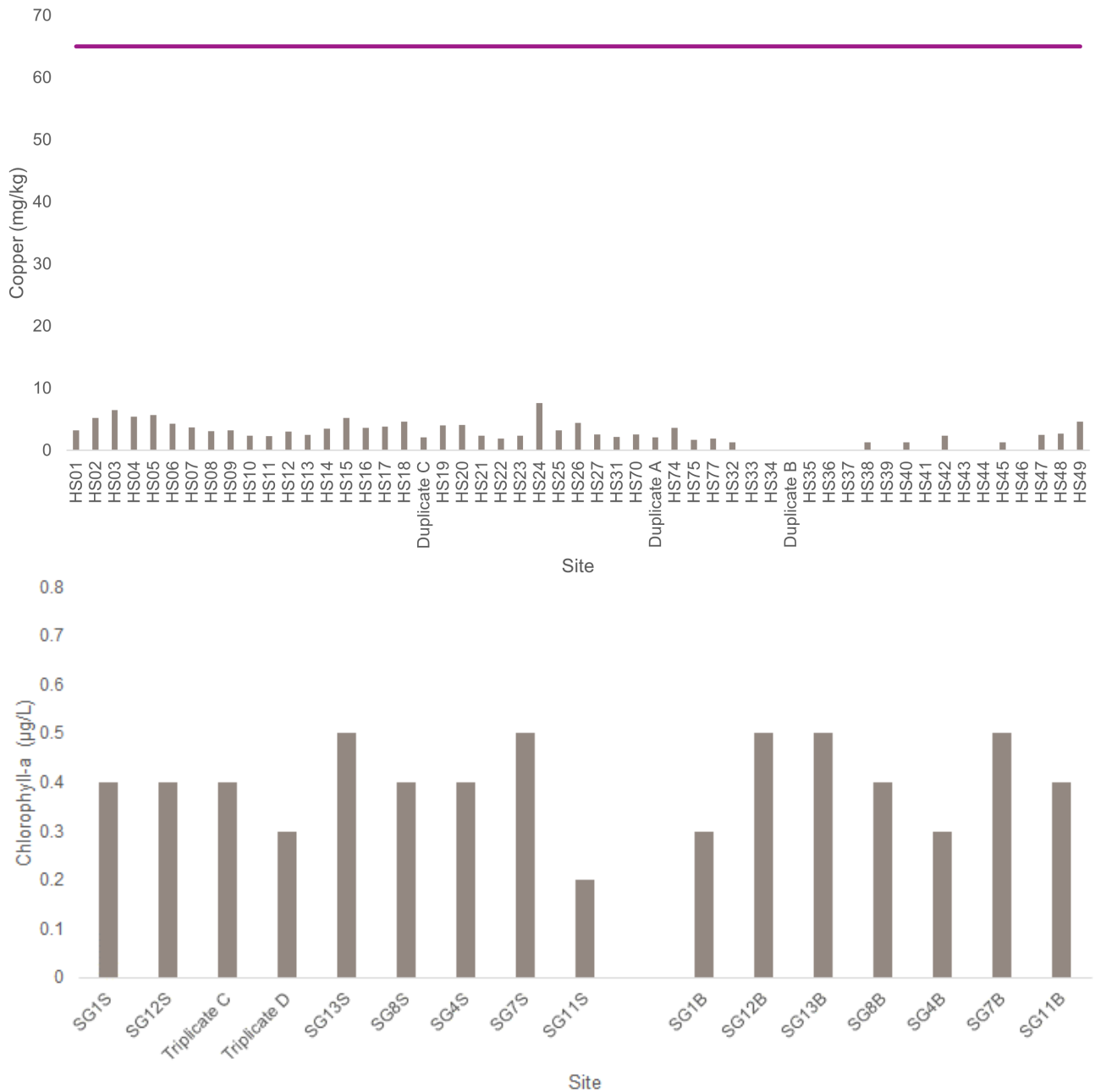


Figure 3-47: Surface and bottom chlorophyll-a concentrations at the spoil ground

### 3.3.2.3.4 Total suspended solids

Total suspended solid (TSS) concentrations were all above the LoR (0.5 mg/L) and ranged from 1.4 to 6.2 mg/L (Appendix G). There was no clear difference found in the TSS between surface and bottom samples.

### 3.3.2.4 Hydrocarbons

The spoil ground TRH and BTEXN concentrations were below the LoR for all samples (Appendix H). The offshore pipeline samples were, therefore, not tested for PAHs.

### 3.3.2.5 Naturally occurring radioactive materials

Naturally occurring radioactive materials (NORMS) were all below limits of detection in spoil ground water samples (Appendix F).

## 3.4 Quality control

### 3.4.1 Field quality control samples

Field QC samples were analysed to assess contamination of samples during sampling. The hydrocarbon concentrations for both water and sediment samples showed no difference between the triplicates and the original sample sites. All blank samples were below the limit of reporting for hydrocarbons. Therefore, there was no hydrocarbon contamination of samples during sampling. The equipment blank for sediment sampling indicated potential for contamination of nutrients (phosphorous and nitrogen) from the grab sampler, but analysis of the field samples showed that the contamination management processes had been effective and no notable cross-contamination was likely to have occurred. No other cross-contamination issues were identified.

### 3.4.2 Laboratory quality control compliance assessment

The laboratory quality control compliance assessments from all water and sediment samples identified the following:

- No method blank value outliers occurred
- Seven sediment sample duplicate, laboratory control and matrix spike outliers were recorded:
  - A total of four analytes (arsenic, chromium, manganese and monobutyltin) from three sediment samples were identified returned relative percentage differences which exceeded LOR-based limits or recovery was greater than the upper control limit.
  - Matrix spike recovery could not be determined for one analyte (TP) as background levels were  $\geq 4$  times the spike level.
  - Recovery was less than the lower data quality objective in one analyte test (TP) for one sample.
- Surrogate recovery outliers were identified for organotin surrogate tests for tripropyltin in eight sediment samples, where recovery was greater than the upper data quality objective.
- Holding time compliance – there were extraction/preparation holding time exceedances for seven water sample analytes from equipment blank samples (nutrients and hydrocarbons), though four of these were analysed within analysis holding times. None of the field test samples exceeded holding times.
- Parameter frequency compliance outliers were recorded for two analyte tests (TRH – semivolatiles fraction and total metals by ORC-ICPMS) from water samples, where recovery rate was below expected values.

## 4 DISCUSSION

The surveys described herein provided data characterising benthic habitats and sediment quality (physico-chemical characteristics) in areas along the Barossa DPD pipeline route and proposed spoil disposal area. Water quality and infauna analysis were also undertaken at selected locations along the offshore pipeline and spoil ground. Water depths of sampling sites ranged from 8.5 m in Darwin Harbour to 59.9 m at the westernmost sites.

### 4.1 Benthic habitats

#### 4.1.1 October 2021 survey

Eight high-level habitat types were identified along the Barossa DPD pipeline route and in the proposed spoil ground area. This comprised six soft substrate habitats and two hard substrate habitats. Soft sediment benthic habitats and communities were well represented across the whole survey area.

The offshore pipeline route was dominated by particulate silt/clay sediments with very sparse to sparse epibiota (1–5% cover), which mostly comprised soft corals and crinoids. Twenty-three video survey sites were characterised by this habitat type. Two other habitat types were also recorded towards the Darwin harbour end of the offshore pipeline route. These were: sand waves (~1 m) with silty sand in troughs and shelly sand at peaks and very sparse biota, and silt/clay with medium density biota (soft corals, algae and bryozoa). Conspicuous epibiota of soft sediment habitats included gorgonians, echinoderms, molluscs, crustaceans (including shrimp and the painted pebble crab, *Leucosia anatum*), with frequent bioturbation (burrows and polychaete tubes).

The benthic habitats in the spoil ground comprised silty/clay sediment with medium density biota (soft corals, algae and Bryozoa, 20–60% cover). Biota commonly associated with this habitat were soft corals (gorgonians, *Junceella* spp. and Alcyoniidae), branching and encrusting sponges, Bryozoa (lace corals), brown algae, bioturbation (invertebrate burrows and polychaete tubes) and occasional motile crinoids.

Darwin Harbour benthic habitats comprised soft sediment habitats and the only two hard substrate habitats were recorded during the surveys. Local fishers in Darwin target areas of the harbour identified as hard substrate. Hard substrates were recorded along the section of the pipeline route offshore from Fannie Bay (HS60 to HS68 and HS54 and HS55). Most of the hard substrate sites were consolidated rocks with a shelly coarse sediment veneer and sparse to medium conspicuous epibiota (mainly soft corals and bryozoans). Low profile reef was also recorded at sites HS61 and HSN2, with medium to high density epibiota. The epibiota associated with this habitat type included hydroids, soft corals (gorgonians, *Junceella* spp.), brown algae, bryozoans (lace corals), ascidians, and encrusting, digitate and globular sponges. The soft substrate habitat adjacent to hard substrate habitats in Darwin Harbour were generally silty, shelly sand with very sparse soft corals to no conspicuous epibiota. As this habitat was recorded both adjacent to and between hard substrate habitats, this soft substrate habitat is potentially a veneer overlying submerged geology. Other recorded soft sediment benthic habitats in Darwin Harbour included:

- Sand waves <1 m with coarse shelly sand and very sparse epibiota (HS78)
- Silt/clay, shelly sand, with very sparse to sparse biota (soft corals and crinoids) (sites HS50, HS52 and HS53, at the southern end of the pipeline, near the shore crossing)
- Silty, shelly sand with sparse epibiota (soft corals) and scattered bombora (site HS51, at the southern end of the pipeline, near the shore crossing).

#### 4.1.2 June 2022 survey

The June 2022 video transect survey was analysed and sorted into the same eight high-level habitat types that were used for the October 2021 (Table 3-1). Similar to the October 2021 study, soft sediment benthic habitats and communities were well represented across the entire survey area.

The June 2022 survey found that the outer offshore pipeline route was dominated by fine sand/silt with sparse epibiota and bioturbation with some sand waves (BACI\_6C; <1 m high). Occasional sponges and soft corals were present with below 5% cover. However, a fish aggregation site, outside of the project area, ~2.6 km from the proposed pipeline route, was found to support a rocky reef with medium density epibiota and bioturbation. The proposed sand waves dredge area (Sand waves) was found to contain rippled coarse sand with very little epibiota (<1% abundance), consisting of some sparse soft corals and crinoids.



The habitat just outside Darwin Harbour consisted mainly of coarse rippled sand, with low overall epibiota but increasing towards the harbour opening and increasing rocky substrate. The habitat sites outside the harbour (Hab1–Hab5) ranged from rippled sand to medium sand with gravel toward the harbour opening. These sites had epibiota less than 1% coverage, consisting mainly of sparse anemone, soft corals and macroalgae (Hab1). INPHCMAN and INPHCMAN\_1, closer to the western opening of the harbour, consisted of rocky/bedrock reefs with sediment veneer and medium to high density epibiota, consisting mainly of sponges and soft/hard corals. While epibiota increased towards the coast and opening of the harbour, the heritage sites (147, 031 and 241) did show some variety, as the dominant substrate was rocky/bedrock with sediment veneer and medium densities of epibiota (20–60% coverage), consisting mainly of sponges, soft corals, bryozoan turf with common fish sightings. This region represented a transition between the sand/silt low epibiota density habitats to the rocky high epibiota density habitats.

Epibiota continued to increase further into Darwin Harbour, as the majority of sites had medium to high epibiota density, with many also including reef habitats. The exceptions were the sites near Wickham point (Hab9, Hab10, BACI\_1C/P and BACI\_2C/P), as these consisted of only bedrock with a thin veneer of sediment unable to support large quantities of epibiota. Only sparse populations of sponges, soft corals and crinoids, though fish were often spotted in boroughs. The central portion of the harbour consisted of rocky/bedrock substrate with large patches of mobile sediment. Moderate density of epibiota was observed, consisting mainly of sponges, soft corals, hydroid/bryozoan turf, macroalgae and small quantities of hard coral (2–5% coverage). This central portion of Darwin Harbour had the greatest density and biodiversity of epibiota observed in the video transects within the project area.

Outside of the project area, INPHCWOD consisted of mainly rippled coarse sand with bioturbation and low-density seagrass. The other three sites (INPHCSSI, INPHCCHI and INPHCNEW) had moderate to high density epibiota with rocky/reef substrates. These sites were characterised by large soft corals and sponges, echinoderms, schools of fish and hard corals. These sites had the highest biodiversity and epibiota density observed in the video transect survey and were located in the shallower protected areas of the harbour, away from the project area.

### 4.1.3 Video transect surveys compared to AIMS 2021 habitat mapping

The Barossa DPD Darwin Harbour October 2021 and June 2022 benthic habitat data was overlaid on a composite habitat map of Darwin Harbour from AIMS (2021) (Figure 4-1, Figure 4-2 and Figure 4-3). The 2021 AIMS habitat map shows areas of seabed assigned by a predictive model to be suitable for the presence of different biota categories including seagrass, hard coral, macroalgae, filter feeders/octocorals and sponges. The comparison of datasets shows differences in habitat types, particularly with the level of information provided (approximate densities of biota, substrate types not available in AIMS data).

The Barossa DPD surveys recorded filter feeders at sparse densities across almost all soft substrate types whereas large areas of ‘sponges’ habitat with small patches of filter feeders/octocorals were predicted by AIMS only near the harbour entrance, which have been mapped based on emergent bedrock evident in geophysical (bathymetric) survey data (Figure 4-2). Barossa DPD video survey at the harbour entrance, however, identified habitat comprising consolidated rocks with a shell sediment veneer and sparse to medium density biota, mainly characterised by soft corals and bryozoa (though sponges were present). Moving north (in the AIMS predicted ‘sponges’ habitat), the seabed habitats were identified during the Barossa DPD survey as changing to silty, shelly sand, with very sparse to no conspicuous epibiota. This is potentially the area of transition from hard to soft substrates, as the soft sediment habitat continues in a northerly direction along the pipeline route.

Nearer the shoreline crossing, large areas of the AIMS map show ‘bare ground’, whereas the Barossa DPD survey found a mosaic of habitats (Figure 4-3), comprising ‘silty, shelly sand with very sparse to no conspicuous epibiota’, ‘consolidated rocks with a shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)’, and ‘silt/clay and shelly sand with sparse to very sparse epibiota (soft corals and crinoids)’.

Overall, the benthic habitat and communities survey revealed that the Barossa DPD pipeline route is a transitional environment, with soft sediment habitats along the offshore pipeline route and spoil ground, and with areas of both soft and hard substrate habitat within Darwin Harbour. The soft sediment habitats support very sparse to sparse epibiota, and the rocky substrates support low to medium density filter-feeder communities.

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Table 4-1: Comparison of habitat classifications of towed video surveys (October 2021 and June 2022) and AIMS habitat mapping (2021)

Site	AIMS habitat classification	Towed video habitat classification
<b>Oct-21</b>		
OP1	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP2	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP3	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP4	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP5	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP7	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP9	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP11	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
OP16	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
V3	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
V4	Not mapped	Silty, shelly sand, with sparse biota soft corals and crinoids).
V5	Not mapped	Silty, shelly sand, with sparse biota (soft corals and crinoids).
V6	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
V7	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V8	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
V9A	Not mapped	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
V10	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V11	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V12	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V13	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V14	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V15	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V16	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
V17	Not mapped	Sand waves ~ 1 m, with silty sand in troughs and shelly sand at the peaks. Very sparse epibiota
V18	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
V19	Not mapped	Silty/clay sediment with sparse biota (soft corals and crinoids).
SG1	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG2a	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG3	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG4	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG5	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG6	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG7	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG8	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG9	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG10	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG11	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG12	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
SG13	Not mapped	Silty/clay sediment with medium density biota (soft corals, algae and bryozoa).
HS79	Not mapped	Sand waves < 1 m, Coarse shelly sand. Very sparse epibiota
HS80	Not mapped	Sand waves < 1 m, Coarse shelly sand. Very sparse epibiota
HS78	Not mapped	Sand waves < 1 m, Coarse shelly sand. Very sparse epibiota
HS77	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
HS76/HS75	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
HS74	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
HS73	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
HS72	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
HS71/HS70	No data	Silty, shelly sand, with very sparse to no biota (soft corals).
HS69	Sponges	Silty, shelly sand, with very sparse to no biota (soft corals).
HS-A	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HS68	Filter feeders/octocorals	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HS65	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HS64	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HS63	Sponges	Silty, shelly sand, with very sparse to no biota (soft corals).
HS62	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)

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Site	AIMS habitat classification	Towed video habitat classification
HS61	No data	Low profile reef, with medium to high density biota
HS60	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HS-B/HS59	No data	Silty, shelly sand, with very sparse to no biota (soft corals).
HS58	No data	Silty, shelly sand, with very sparse to no biota (soft corals).
HS57	No data	Silty, shelly sand, with very sparse to no biota (soft corals).
HS56	Bare ground	Silty, shelly sand, with very sparse to no biota (soft corals).
HS55	Bare ground	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HS54	Bare ground	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HS53	Bare ground	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
HS52	Bare ground	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
HS51	Bare ground	Silty, shelly sand, with very sparse to no biota (soft corals) with scattered bombora
HS50	Macroalgae	Silty, shelly sand, with very sparse biota (soft corals and crinoids).
HSN1	Sponges	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa)
HSN2	No data	Low profile reef, with medium to high density biota
<b>Jun-22</b>		
BACI_1C	Bare ground	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_1P	Bare ground	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_2C	Bare ground	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_2P	Bare ground	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_3C	No data	Low profile reef, with medium to high density biota.
BACI_3P	No data	Low profile reef, with medium to high density biota.
BACI_4C	Sponges	Low profile reef, with medium to high density biota.
BACI_4P	Sponges	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_5C	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_5P	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
BACI_6C	Not mapped	Sand waves < 1 m, Course shelly sand. Very sparse epibiota.
BACI_6P	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
Fish aggregation site	Not mapped	Low profile reef, with medium to high density biota.
Hab1	Seagrasses	Silty, shelly sand, with very sparse to no biota (soft corals).
Hab2	No data	Sand waves ~ 1 m, with silty sand in troughs and shelly sand at the peaks. Very sparse epibiota.
Hab3	Macroalgae	Sand waves < 1 m, Course shelly sand. Very sparse epibiota.
Hab4	Macroalgae	Sand waves < 1 m, Course shelly sand. Very sparse epibiota.
Hab5	Macroalgae	Sand waves < 1 m, Course shelly sand. Very sparse epibiota.
Hab6	Hard corals	Silty, shelly sand, with very sparse biota (soft corals) with scattered bombora.
Hab7	Hard corals	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
Hab8	Hard corals	Low profile reef, with medium to high density biota (soft corals).
Hab9	Macroalgae	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
Hab10	Macroalgae	Sand waves ~ 1 m, with silty sand in troughs and shelly sand at the peaks. Very sparse epibiota.
Heritage_147	No data	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
Heritage_031	Sponges	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
Hertage_241	Sponges	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
INPHCCHI	Macroalgae	Low profile reef, with medium to high density biota.
INPHCNEW	Macroalgae	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
INPHCMAN	Sponges	Low profile reef, with medium to high density biota.
INPHCMAN_1	Sponges	Low profile reef, with medium to high density biota.
INPHCSSI	Sponges	Silty, shelly sand, with very sparse to no biota (soft corals) with bombora.
INPSGCPW	Hard corals	Low profile reef, with medium to high density biota.
INPHCWED2	Hard corals	Hard bottom (rocks) with shelly sediment veneer and sparse to medium biota (soft corals, bryozoa).
INPHCWOD	Seagrasses	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA1	Not mapped	Silt/clay, shelly sand, with very sparse to sparse biota (soft corals and crinoids).
RFPA2	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA3	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA4	Not mapped	Silty, shelly sand, with very sparse to no biota (soft corals).
RFPA5	Not mapped	Sand waves < 1 m, Course shelly sand. Very sparse epibiota.
RFPA6	Not mapped	Sand waves < 1 m, Course shelly sand. Very sparse epibiota.
RFPA8	Not mapped	Silt/clay, shelly sand, with very sparse to sparse biota (soft corals and crinoids).
Sand waves	Not mapped	Sand waves < 1 m, Course shelly sand. Very sparse epibiota.

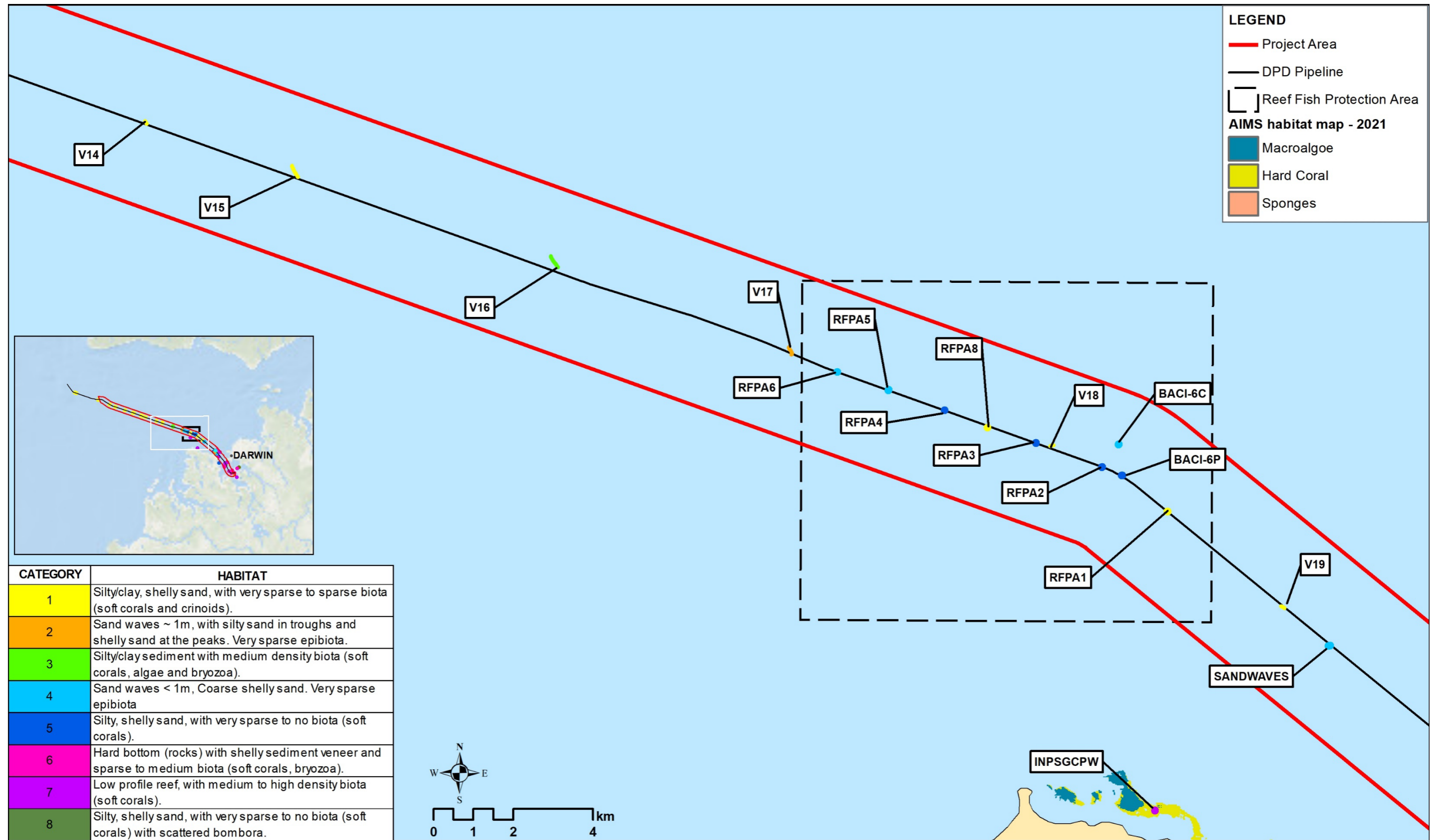


Figure 4-1: Benthic habitat types identified along the offshore pipeline route overlaid on AIMS 2021 habitat map, including the Reef Fish Protection Area

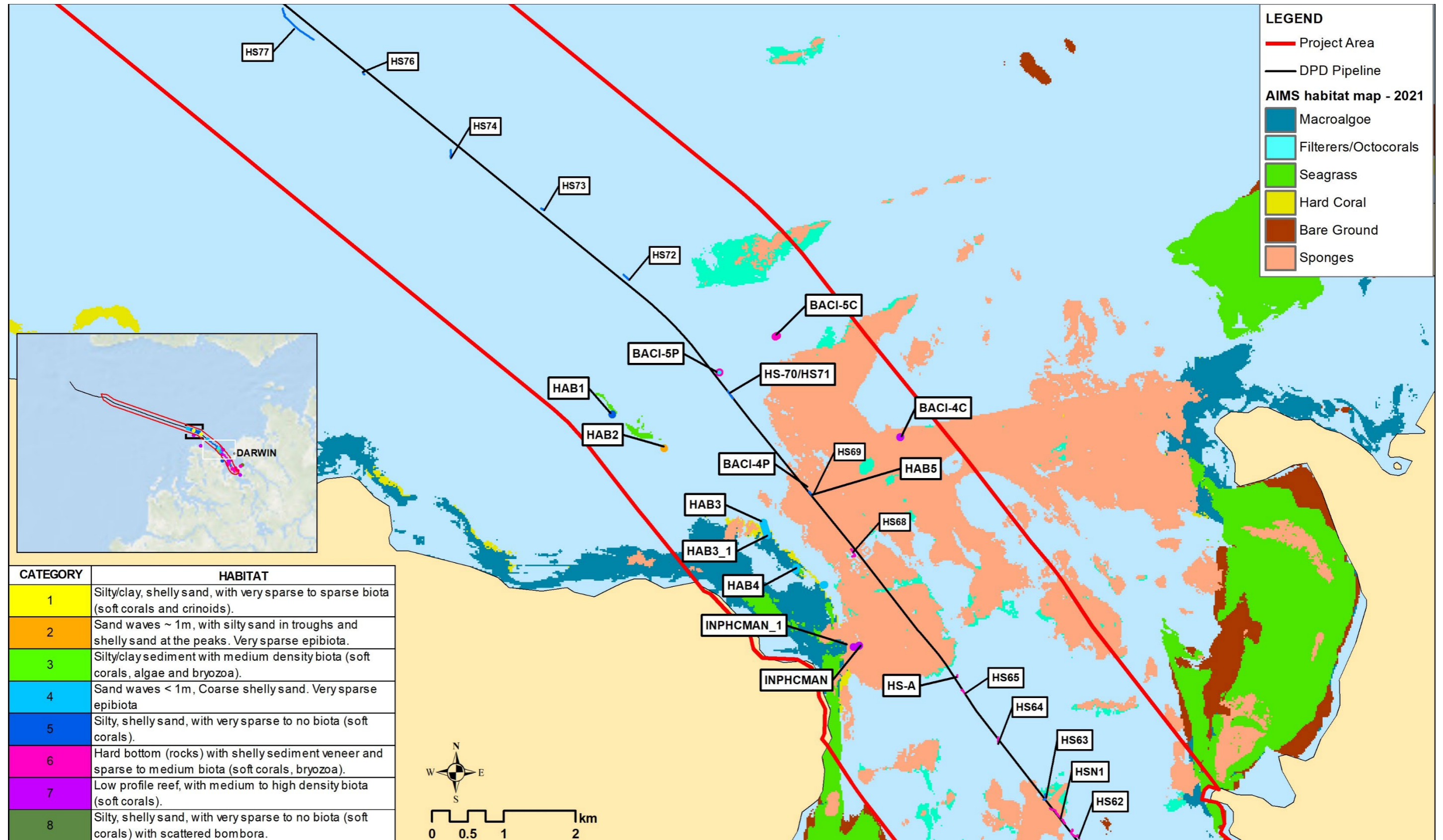


Figure 4-2: Benthic habitat types identified along the pipeline route and outer Darwin Harbour overlaid on AIMS 2021 habitat map

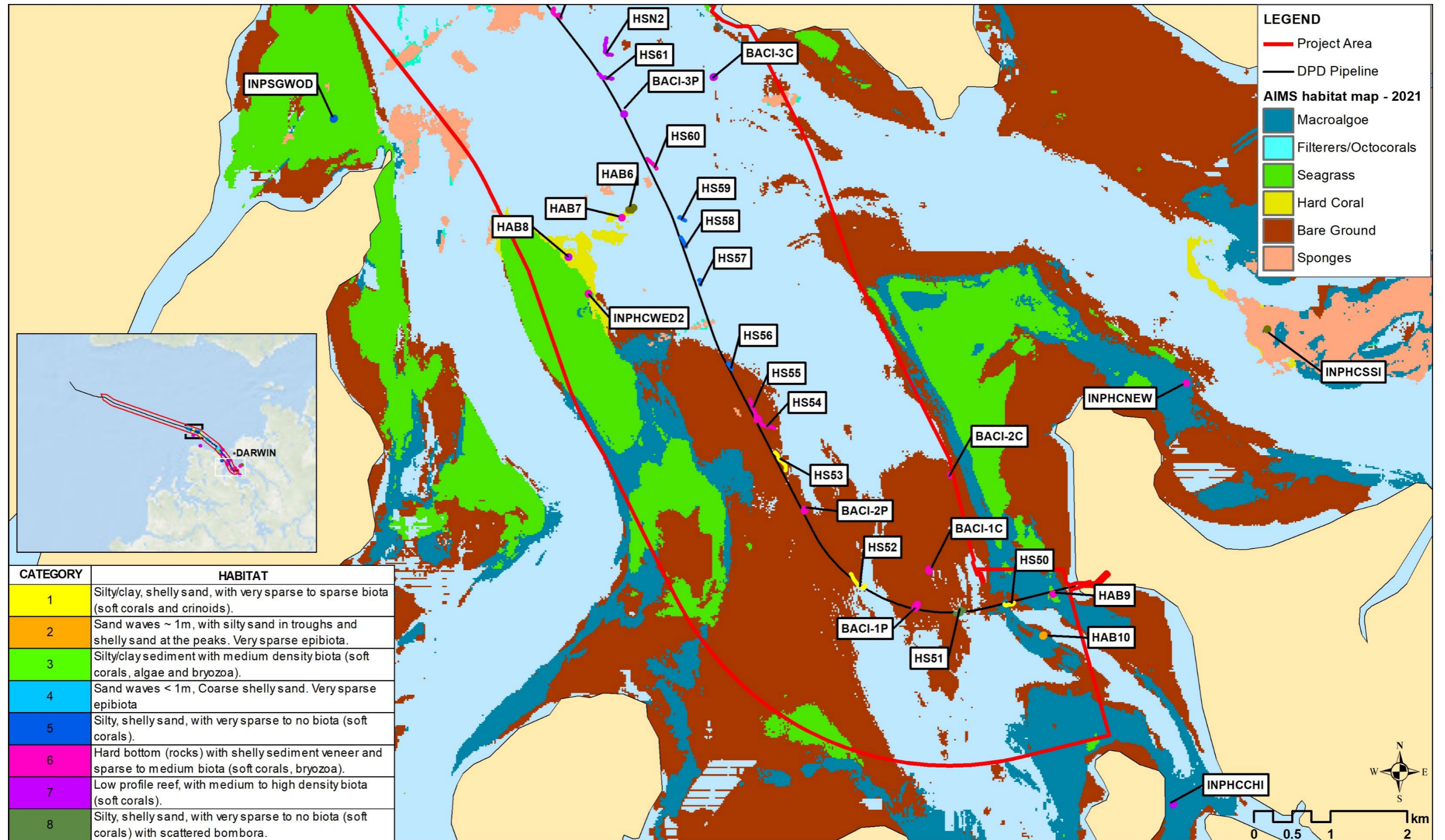


Figure 4-3: Benthic habitat types identified along the pipeline route and inner Darwin Harbour overlaid on AIMS 2021 habitat map

## 4.2 Infauna assemblages

The infauna analysis revealed a total of 744 individuals from ten phyla were recorded from the 29 offshore pipeline samples analysed. Infaunal assemblages were dominated by crustaceans (350 individuals) and annelids (polychaete worms; 313 individuals). Crustaceans were most abundant at more than half of the sites sampled (55.2%), and Annelids most abundant at the other 13 sites (44.8%). The next most numerous phyla were an order of magnitude lower in abundance (Sipuncula, Echinodermata, Mollusca and Chordata). Multivariate analysis identified that there were three main infaunal assemblage types along the offshore pipeline route, interspersed with patchy or transitional (heterogeneous) habitats:

- The furthest offshore soft sediment habitats (OP1–OP10, OP12–OP19, OP22 and OP24) were characterised by a much more diverse community, with 30 taxa comprising the top 90% of taxa characterising the biological assemblage. The crustaceans (mainly amphipods, tanaids and isopods) and polychaetes (mainly deposit-feeding tube worms and free-living taxa) were the dominant taxa, with echinoderms (Ophiuroidea) and sipunculids also represented. This habitat was characterised by coarse sediments with the lowest silt/clay component, which would have provided a more complex substrate and potentially better sediment oxygenation in surficial sediments.
- This next group (sites OP21, OP23 and OP27) around the central and southern section of the offshore pipeline route was dominated by brittlestars (Ophiuroidea) and polychaetes (*Lumbrineris* sp., spionids, *Nephtys* sp. and *Axiiothella* sp.). These taxa are generally surface deposit feeders and/or carnivores/scavengers, with several capable of interface feeding (switching between, e.g. deposit feeding and suspension/filter feeding), which is a trait often associated with harsh or nutrient-poor environments, such as the fine or sandy sediments characterising this habitat. This infaunal assemblage was much less biodiverse than the first grouping, with only five taxa comprising the top 90% of taxa characterising the group. Diversity scores (Shannon-Weiner) were generally lower than recorded for the first group.
- The final group was generally the most shoreward group (OP26, OP28 and OP29), but was also recorded at the offshore end of the pipeline route (OP11). This group was dominated by Anthuridea (elongate isopod crustaceans) and polychaete worms (*Eunice* sp. *Axiiothella* sp. and *Nephtys* sp.). The average abundance of these taxa is higher than the previous grouping, which is likely due to a greater range of particle sizes in the substrate. This aspect is indicated by the dominance of Anthuridea, which live in crevices, empty calcareous worm tubes or structurally complex epibiota. Sediments were characterised by a higher per cent gravel component and per cent silt component than the previous group.

A total of 185 individuals from five phyla were recorded from the 13 proposed spoil ground samples analysed. The dataset was dominated by crustaceans (107 individuals) and annelids (polychaete worms; 55 individuals), with the next most numerous phyla being Echinodermata, Sipuncula and Nematoda. Infaunal assemblages at the proposed spoil ground had fewer species and lower abundance, but both were greater than the infaunal assemblages recorded from previous studies in Darwin Harbour (INPEX Browse Ltd, 2010), most likely due to the different environmental conditions within the harbour (e.g. silt input, freshwater input, flushing rates). It is likely that other unmeasured factors, e.g. such as (but not limited to) current speeds/site energy, salinity profiles up the river and sediment chemistry, also contribute, and that there is likely to be seasonal variability in the distribution and composition of benthic faunal assemblages (Chalmers et al. 1976, Tweedley & Valesini 2008, Sheaves 2015, Silva & Barros 2015). No high conservation significant ecological values, habitats, communities of species were identified and the habitats and communities within the Barossa DPD survey area are very well represented in the region.

## 4.3 Sediment characteristics

Sediment sampling and analysis was conducted in line with the NAGD (CoA, 2009). Seabed sediment PSD data identified a transition in sediment grain sizes along the offshore pipeline route, with the per cent clay and silt contributions increasing from around 3% and 9%, respectively, at the offshore OP1 (slightly silty gravelly sands; near KP0) end of the survey area, to up to around 7% and 39%, respectively, at the OP30, near the Darwin Harbour limits (gravelly muddy sands; at ~KP90). The increase in silt from offshore (~KP0) to Darwin Harbour is likely due to the riverine input of fine material from the Darwin harbour catchment area and mudflats/mangrove areas. The PSD data for the spoil ground indicated some local heterogeneity in sediments but were generally gravelly sands and muddy gravelly sands (3–5% clay, 12–23% silt, 51–73% sand and 9–29% gravel). Darwin Harbour sediments ranged from sandy muds to muddy sandy gravels, with most sediments being muddy gravelly sands. There was also a sediment gradient from the harbour limits

(KP92) to near the shore crossing, with silty and slightly silty slightly gravelly sands at KP92 transitioning to silty sandy gravels from around KP102 to muddy sandy gravels and sandy muddy gravels near the shore crossing at KP120. Gravels in the study area comprise material from both geogenic (i.e. local rock formations) and biogenic (e.g. shell and potentially coral fragments) sources.

Comparison of the sediment composition of the offshore pipeline route, the spoil ground, the sand wave area in Darwin Harbour and the pipeline route south of the sand wave area to the shore crossing identified significant differences between all these areas. Sediments at the offshore sampling sites (offshore pipeline and spoil ground) were generally dominated by sands (average >50%), with pebbles (~27%), silt (11–15%) and clay (3–4%). There was no recorded hard substrate from subsea video survey, so the coarser fragments (pebble) are more likely to be of biogenic origin (e.g. shell fragments). The main difference between the offshore pipeline route and the spoil ground is the increased relative silt content and subsequent reduced sand content. This outcome may well be due to a combination of factor, such as the smaller survey area (relative to the offshore pipeline route) and hence reduced potential heterogeneity), the more eastern location of the spoil ground, and the greater potential for the influence of open ocean environmental conditions on seabed substrates at the western end of the offshore pipeline route (e.g. potentially greater energy and potential increased near-sed bed currents, increasing potential for winnowing of finer particle sizes).

The sediments inside the harbour were generally coarser and more characteristic of mixed sediments rather than the silty coarse sands recorded outside of Darwin Harbour. This is likely to be due to a combination of a range of factors, including the local geology and differences in hydrodynamic conditions of the semi-enclosed Darwin Harbour versus the more open ocean-influenced Beagle Gulf. However, the mobile sediments of the sand wave area were distinct with respect to the very low silt content. This is likely due to the sorting of sediment particle sizes during transport along the seabed and the winnowing (removal through resuspension) of the finer silt particles. It is also likely that the seabed underlying the mobile layer was more similar to nearby seabed substrates in Darwin Harbour.

Analysis of metals and metalloids in sediments along the pipeline route and at the spoil ground indicated arsenic concentrations in 74 samples greater than the relevant NAGD screening levels. Arsenic is considered to have become concentrated in sedimentary rocks through sedimentation processes. The fine-grained clastic sediments have higher arsenic concentrations than the coarse-grained sediments. Comparison of arsenic with iron showed strong positive results with spoil ground and Darwin Harbour surficial sediments. A weak result was identified with the offshore pipeline samples and Darwin Harbour core samples. The results indicate that the highest concentrations of arsenic and iron were recorded in the southerly section of the Darwin Harbour pipeline section, closest to the shore crossing. Geophysical data (both historic and contemporary), historic habitat mapping surveys and subsea video collected during the present study in Darwin Harbour have identified areas of emergent bedrock, often with a relatively thin veneer of sediment. The correlation between arsenic and iron in this area suggests that the underlying bedrock is likely the source of arsenic, which has previously been recorded in Darwin Harbour and is a well-known natural source in north-west Australia (e.g. INPEX Operations Australia Ltd 2014, DEC 2006). Arsenic in Darwin Harbour sediments is considered unlikely to be bioavailable to any significant extent, and therefore unlikely to cause toxic impacts to biota (INPEX Operations Australia Ltd 2014).

Despite a strong positive relationship between arsenic and iron in spoil ground samples, the concentrations of both analytes were much lower than recorded in the Harbour. This suggests that the source of the arsenic and iron is likely to be outside of the spoil ground, and spatial interpretation of arsenic concentrations at spoil ground sampling sites indicates that the source is likely to be to the north-north-west of the spoil ground (as there is an increasing transition in arsenic concentrations in this direction across the sampling array). The source is therefore unlikely to be dredged Darwin Harbour seabed material disposed of at the adjacent INPEX Ichthys spoil ground to the east of the proposed spoil ground location.

A general trend for many of the metals analysed was an increasing concentration towards and within Darwin Harbour, though with much lower concentrations (except manganese) recorded in the proposed sand wave dredging area towards the mouth of the harbour. This trend correlates with the silt content of sediments, which increased towards and within the harbour, except for the mobile sand waves from which the finer components were likely winnowed away by near seabed currents. Metals and metalloids are commonly associated with smaller particle sizes (Martincic et al. 1990).



TPH, TRH and BTEXN concentrations were below the laboratory LORs in sediment samples at all offshore pipeline and spoil ground sites. Consequently, no analysis of PAHs was required at these locations. TPH and TRH were detected at 35 of the Darwin Harbour sites at low levels. Normalised TPH and TRH concentrations were well below the Default Guideline Value (DGV) of 280 mg/kg across all sites, with the highest recorded concentration of C10–C36 (sum) being 45 mg/kg at site HS09. All PAH concentrations at these 35 sites were below the LoR.

NORMs were recorded above LoRs for all sediment samples long the offshore pipeline route. Levels of radium-226, radium-228 and thorium-228 were generally below 31, 33 and 37 Bq/kg, respectively, except at sites HS27 and HS31 in Darwin Harbour main channel between KP110 and KP112, where peak levels of 51.7–79.1, 46.8–59.5 and 43–63.8 Bq/kg were recorded, respectively. The combined value for radium-226, radium-228 and thorium-228 ('combined NORMs') were below the NAGD guideline value of 35,000 Bq/kg at all sites, even when considering upper confidence limits.

Pesticide concentration in all 27 of the Darwin Harbour sediment core samples retrieved were below the LoR.

TBT concentrations were below the limit of reporting in all samples from Darwin Harbour. No samples were analysed for TBT outside of the harbour.

There is low potential for acid sulfate soils as although inorganic sulfur is present in the sediments, there is significant ANC kinetically available to neutralise the oxidation products from the inorganic sulfur.

Overall, no contaminants of concern were found in the sediments along the pipeline route or at the potential spoil disposal ground, with elevated levels of arsenic considered to be naturally occurring. Therefore the sediments along the pipeline route are considered to be suitable for unconfined ocean disposal, as per the NAGD and NT EPA (2013) guidelines for dredging.

## 4.4 Water quality

Measurements of water quality profiles through the water column along the offshore pipeline route and at the proposed spoil ground indicated that water temperature was either consistent with depth or decreased slightly with depth. Salinity was either consistent or varied marginally over depth, except at the two westernmost offshore pipeline route sites, where an increase in salinity was recorded over the 0–10 m depth range. Turbidity at four sites along the offshore pipeline route decreased down to 15–20 m depth, then gradually increased with depth. Elsewhere along the pipeline route, turbidity was either relatively consistent with depth or increased with depth. At the proposed spoil ground turbidity generally increased with depth. Oxygen levels tended to increase with increasing depth in both study areas except at two sites along the offshore pipeline route. Oxygen levels decreased with depth below 20 m and at one and oxygen levels decreased down to ~10 m, then remained fairly consistent at the other site. pH decreased with increased depth at the majority of sites along the offshore pipeline route, increased with depth at two sites and at one site was consistent with depth except at ~15–20 m and ~35–>50 m where there was a relatively large drop from 11.5 to 9.5. The pH data from the spoil ground sites seemed to be inconsistent, and it was likely that the pH probe had developed a fault during these deployments. Overall, the CTD data indicate that there was no evidence of a halocline or thermocline and showed no indications of stratification of the water column.

Filtered and unfiltered cadmium (Cd), chromium (Cr), cobalt (Co), nickel (Ni) and mercury (Hg) were generally below LoRs at both offshore pipeline and spoil ground locations, except for one site, which had filtered nickel and unfiltered chromium concentrations that were above the LoR but well below the relevant guideline value. The filtered and unfiltered arsenic (As) concentrations were very similar in both offshore pipeline and spoil ground samples and were below the relevant ANZG (2018) DGV.

Filtered and unfiltered copper (Cu) concentrations at three sites were above the relevant ANZG (2018) DGV. The copper concentration in one sample OP2S was much higher than in other samples therefore it is likely that this sample is an outlier and sampled a potential contaminant. Filtered and unfiltered lead (Pb) concentrations ranged from <0.1 to 5.4 µg/L in the offshore pipeline samples but were much lower in the spoil ground samples (<0.1 to 0.4 µg/L). One sample had a filtered lead concentration above the relevant ANZG (2018) DGV. Unfiltered zinc (Zn) concentrations were at or above the relevant ANZG (2018) DGV of 8 µg/L in two samples, filtered zinc concentrations were at or above the DGV at six sites at the western end of the offshore pipeline route (between OP1 and OP5) and across the proposed spoil ground area (sites SG4, SG7 and SG12), with no clear trend in exceedances between surface and bottom waters.

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The results of the analysis of metals and metalloids identified DGV exceedances in cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), nickel (Ni), mercury (Hg) and zinc (n) in the surface waters of site OP1, though the source was not identified.

Nitrite and nitrate were recorded at concentrations at or above LoRs in bottom water samples only, at concentrations of up to 15 µg.N/L. Ammonia was detected in 14 samples, with 13 of those being bottom (near seabed) samples and were below the relevant ANZG (2018) DGV. The peak concentration of ammonia was 13 µg.N/L at the proposed spoil ground. Total nitrogen concentrations ranged from 80 to 150 µg.N/L; 35 samples were at or exceeded the relevant ANZG (2018) DGV. Nineteen orthophosphate (filterable reactive phosphorus) concentrations samples exceeded the relevant ANZG (2018) and total phosphorous concentrations in 35 samples were at or exceeded the relevant ANZG (2018) DGV. Nutrients (nitrogen, phosphorus and organic carbon) are released in the decay of organic matter, and the increased concentrations of nutrients in near-seabed samples likely correlate with decaying organic matter on the seabed at those locations.

Chlorophyll-a concentrations were used as an indicator of the likely level of phytoplankton biomass across the offshore pipeline area. Chlorophyll-a concentrations ranged from 0.4 to 1.5 µg/L. All concentrations were below the relevant ANZG (2018). Phaeophytin-a is a breakdown product of chlorophyll-a and can be used to indicate if phytoplankton are blooming or declining. Phaeophytin-a was only detected in 10 samples of the offshore pipeline sites, the majority of which were surface samples.

TSS concentrations ranged from 1.7 to 8.6 mg/L. There was no correlation between depth and TSS, and no clear difference found in the TSS between surface and bottom samples. There is no ANZG (2018) default guideline value for TSS.

Hydrocarbon concentrations were below LoRs for all samples at all sites. Radium-226 was detected at above LoRs in near-seabed samples at two of the offshore pipeline sites but none of the spoil ground sites.

## 5 REFERENCES

- AIMS (2021) Revised predicted benthic habitat map for Darwin Harbour. Prepared for the Department of Environment, Parks and Water Security, 136 pp.
- Anderson, M.J., Gorley, R.N. and Clarke, K.R. (2008) PERMANOVA+ for PRIMER: Guide to software and statistical methods. PRIMER-E: Plymouth, UK.
- ANZECC/ARMCANZ (2000) National Water Quality Management Strategy. Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
- ANZG (2018). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at [www.waterquality.gov.au/anz-guidelines](http://www.waterquality.gov.au/anz-guidelines).
- Chalmers, P.N., Hodgkin, E.P. and Kendrick, G.W. (1976). Benthic faunal changes in a seasonal estuary of south-western Australia. *Records of the Western Australian Museum* 4(4): 383-410.
- Clarke, K.R. and Gorley, R.N. (2015) PRIMER v7: User Manual/Tutorial. PRIMER-E: Plymouth.
- Commonwealth of Australia (2009) National assessment guidelines for dredging. Commonwealth of Australia, Canberra, Australian Capital Territory.
- DEC (2006). MTR1: Background quality of the marine sediments of the Pilbara coast. Marine Technical Report Series. Western Australia Department of Environment and Conservation, October 2006, 72 pp.
- Hafizt, M., Manessa, M., Adi, N., & Prayudha, B. 2017. 'Benthic Habitat Mapping by Combining Lyzenga's Optical Model and Relative Water Depth Model in Lintea Island, Southeast Sulawesi.' IOP Conference Series: Earth and Environmental Science, 98, 12037. <https://doi.org/10.1088/1755-1315/98/1/012037>.
- INPEX Browse Ltd (2010) Appendix 8: Nearshore marine ecology and benthic communities study. INPEX document no. C036-AH-REP-0025. Prepared by URS, 67pp.
- INPEX Browse Ltd (2011) Technical appendix S6: Ichthys gas field development project: benthic habitat mapping of the Darwin region – methods of data collection, collation and map production. INPEX document no. C036-AH-REP-0121. Prepared by GeoOceans, 39 pp.
- INPEX Operations Australia Ltd (2014). Ichthys project – Gas Export pipeline: Dredging and spoil disposal management plan. Document no. F281-AH-PLN-10009, 454 pp.
- Martincic, D., Kwokal, Z., and Branica M. (1990). Distribution of zinc, lead, cadmium and copper between different size fractions of sediments I. The Limski Kanal (North Adriatic Sea). *Science of the Total Environment* 95: 201–215.
- Norwegian Geological Institute (2017). Desktop study for Jack-up drilling campaign at the proposed Roc-1 and Dorado-1 locations. Prepared for Quadrant Energy by the Norwegian Geological Institute (Perth), 70 pp.
- NT EPA (2013) Guidelines for The Environmental Assessment of Marine Dredging in The Northern Territory, Northern Territory Environmental Protection Authority, Northern Territory.
- Sheaves, J. (2015). Influence of seasonal variability and salinity gradients on benthic invertebrate assemblages in tropical and subtropical Australian estuaries. Ph.D. thesis, James Cook University. Accessible online at: <https://researchonline.jcu.edu.au/48912/1/48912-sheaves-2015-thesis.pdf>.
- Silva, M. and Barros, F. (2015). Intertidal benthic macrofaunal assemblages: changes in structure along entire tropical estuarine salinity gradients. *Journal of the Marine Biological Association of the United Kingdom* 96(1): 5-15.
- Tweedley, J.R. and Valesini, F.J. (2008) Inter-relationships between benthic macroinvertebrates and habitat types in Broke Inlet, south-western Australia. Report to the Ernest Hodgkin Trust for Estuary Education and Research, September 2008. Centre for Fish and Fisheries Research, Murdoch University.

## Appendix A Survey sites



## APPENDIX A: SURVEY SITES

Table A-1: Offshore pipeline sampling sites

Site	Sample ID	Latitude	Longitude	Video	Water quality	Water (NORMS)	Infauna	PSD <sup>1</sup>	Sediment (contaminants)	Sediment (NORMS)
KP -2.7	OP1	-12.0093	129.8887	Y			Y	Y	Y	Y
KP 0	OP1S	-12.0315	129.9137		Y					
	OP1B	-12.0315	129.9137		Y	Y				
KP 1	OP2	-12.0315	129.9138	Y			Y	Y	Y	Y
KP 6.8	OP3	-12.0691	129.949	Y			Y	Y	Y	Y
KP 8	V3	-12.0738	129.9594	Y						
	OP2S				Y					
	OP2B	-12.074	129.9594		Y	Y				
KP 11	OP4	-12.0826	129.9854	Y			Y	Y	Y	Y
KP 16	OP5	-12.0974	130.0287	Y			Y	Y	Y	Y
KP 20	OP3S	-12.1081	130.064		Y					
	OP3B	-12.1079	130.064		Y	Y				
KP 22	V4	-12.1091	130.0822	Y						
	OP6						Y	Y	Y	Y
KP 27	OP7	-12.1212	130.1247	Y			Y	Y	Y	Y
KP 30	V5	-12.1374	130.1479	Y						
	OP4S				Y					
	OP4B	-12.1373	130.148		Y	Y				
KP 31	OP9	-12.1409	130.1558	Y			Y	Y	Y	Y
KP 33.7	OP10	-12.15	130.1792				Y	Y	Y	Y
	V6			Y						
KP 36	OP11	-12.1571	130.1997	Y			Y	Y	Y	Y
	OP5S	-12.1573	130.199		Y					
	OP5B	-12.1577	130.1989		Y	Y				
KP 40	OP12	-12.1691	130.2339				Y	Y	Y	Y
	V7			Y						
KP 42	OP13	-12.1756	130.252				Y	Y	Y	Y
KP 45	OP6S	-12.1844	130.2772		Y					
	OP6B	-12.1848	130.2772		Y	Y				
KP 45.2	OP14	-12.1856	130.2795				Y	Y	Y	Y
	V8			Y						
KP 45.8	OP15	-12.1862	130.2855				Y	Y	Y	Y
	V9			Y						
KP 48	OP16	-12.1932	130.3039	Y			Y	Y	Y	Y
KP 50.5	OP17	-12.2012	130.3246				Y	Y	Y	Y
	V10			Y						
KP 51.3	OP18	-12.2025	130.3323				Y	Y	Y	Y
	V11			Y						
KP 52.5	OP19	-12.2069	130.3419				Y	Y	Y	Y
	V12			Y						
KP 54	OP20	-12.2114	130.3553				Y	Y	Y	Y
	V13			Y						
KP 55	OP7S	-12.2143	130.364		Y					
	OP7B	-12.2145	130.3636		Y	Y				
KP 56	OP21	-12.2172	130.3722	Y			Y	Y	Y	Y
KP 61	OP22	-12.2323	130.4149				Y	Y	Y	Y
	V14			Y						
KP 65	OP23	-12.2447	130.4503				Y	Y	Y	Y
	V15			Y						
	OP8S	-12.2444	130.4504		Y					
	OP8B	-12.2446	130.4502		Y	Y				
KP 71.5	OP24	-12.2639	130.5069				Y	Y	Y	Y
	V16			Y						
KP 75	OP25	-12.2743	130.5364	Y			Y	Y	Y	Y
	OP9S	-12.2742	130.5374		Y					
	OP9B	-12.2741	130.5376		Y	Y				
KP 78	OP26	-12.2831	130.5636				Y	Y	Y	Y
	V17			Y						
KP 80	OP27	-12.2894	130.5801	Y			Y	Y	Y	Y
KP 85	OP28	-12.3047	130.6252				Y	Y	Y	Y
	V18			Y						
	OP10S	-12.3043	130.6243		Y					
	OP10B	-12.3043	130.6245		Y	Y				
KP 86	OP29	-12.3081	130.6354	Y			Y	Y	Y	Y
KP 89	OP30	-12.3221	130.6555	Y			Y	Y	Y	Y
KP 91	V19	-12.3397	130.6776	Y						

<sup>1</sup> 29 samples were used for Offshore Pipeline PSD with three duplicates

Table A-2: Spoil Ground sampling sites

Site	Sample ID	Latitude	Longitude	Video	Water quality	Water (NORMS)	Infauna	PSD	Sediment (contaminants and nutrients)	Sediment (NORMs)
SG1 (NE)	SG1	-12.2144	130.8069	Y			Y	Y	Y	Y
	SG1S	-12.2129	130.8062		Y					
	SG1B	-12.2124	130.8063		Y	Y				
SG2	SG2	-12.2188	130.802	Y			Y	Y	Y	Y
	SG2S									
	SG2B									
SG3	SG3	-12.2252	130.7957	Y			Y	Y	Y	Y
	SG3S									
	SG3B					Y				
SG4 (centre)	SG4	-12.2304	130.7908	Y			Y	Y	Y	Y
	SG4S	-12.2291	130.7906		Y					
	SG4B	-12.2294	130.7907		Y					
SG5	SG5	-12.2336	130.7861	Y			Y	Y	Y	Y
	SG51									
	SG5S					Y				
SG6	SG6	-12.2382	130.78	Y			Y	Y	Y	Y
	SG6S									
	SG6B									
SG7 (SW)	SG7	-12.2436	130.7744	Y			Y	Y	Y	Y
	SG7S	-12.2448	130.7759		Y					
	SG7B	-12.2447	130.7766		Y	Y				
SG8 (NW)	SG8	-12.2254	130.787	Y			Y	Y	Y	Y
	SG8S	-12.2258	130.786		Y					
	SG8B	-12.2259	130.7868		Y					
SG9	SG9	-12.2269	130.7898	Y			Y	Y	Y	Y
	SG9S									
	SG9B					Y				
SG10	SG10	-12.2304	130.7933	Y			Y	Y	Y	Y
	SG10S									
	SG10B									
SG11 (SE)	SG11	-12.2325	130.7951	Y			Y	Y	Y	Y
	SG11S	-12.2327	130.7946		Y					
	SG11B	-12.2329	130.7948		Y					
SG12	SG12	-12.2147	130.7933	Y			Y	Y	Y	Y
	SG12S	-12.2125	130.7918		Y					
	SG12B	-12.2123	130.7923		Y	Y				
SG13	SG13	-12.2256	130.7723	Y			Y	Y	Y	Y
	SG13S	-12.2253	130.7714		Y					
	SG13B	-12.2259	130.7716		Y	Y				

Table A-3: Barossa Darwin Harbour sampling sites

Sample ID	Latitude	Longitude	Video	PSD <sup>2</sup>	Sediment (contaminants and nutrients)	Sediment (NORMs)	Sediment (PAH) <sup>3</sup>
HS01	-12.5278	130.8538		Y	Y	Y	Y
HS02	-12.5298	130.8515		Y	Y	Y	Y
HS03	-12.5312	130.8422		Y	Y	Y	Y
HS04	-12.5283	130.8366		Y	Y	Y	Y
HS05	-12.5259	130.832		Y	Y	Y	Y
HS06	-12.5187	130.8297		Y	Y	Y	Y
HS07	-12.5169	130.8274		Y	Y	Y	Y
HS08	-12.5138	130.8272		Y	Y	Y	Y
HS44	-12.3429	130.6958		Y	Y	Y	Y
HS10	-12.5063	130.823		Y	Y	Y	Y
HS11	-12.5048	130.8209		Y	Y	Y	Y
HS12	-12.5016	130.8183		Y	Y	Y	
HS13	-12.4992	130.8191		Y	Y	Y	Y
HS14	-12.4959	130.8169		Y	Y	Y	Y
HS15	-12.493	130.8169		Y	Y	Y	Y
HS16	-12.4912	130.8151		Y	Y	Y	Y
HS17	-12.487	130.8149		Y	Y	Y	Y
HS18	-12.484	130.8142		Y	Y	Y	Y
HS19	-12.4824	130.8116		Y	Y	Y	Y
HS20	-12.4792	130.8121		Y	Y	Y	Y
HS21	-12.4777	130.8112		Y	Y	Y	Y
HS22	-12.4774	130.8091		Y	Y	Y	Y
HS23	-12.4754	130.8094		Y	Y	Y	Y
HS24	-12.474	130.8088		Y	Y	Y	Y
HS25	-12.4727	130.8066		Y	Y	Y	
HS26	-12.4705	130.8052		Y	Y	Y	Y
HS27	-12.4674	130.8056		Y	Y	Y	
HS31	-12.4609	130.7974		Y	Y	Y	Y
HS32	-12.3476	130.7006		Y	Y	Y	
HS33	-12.3473	130.6992		Y	Y	Y	
HS34	-12.3481	130.6948		Y	Y	Y	
HS35	-12.3477	130.6928		Y	Y	Y	Y
HS36	-12.3489	130.6869		Y	Y	Y	
HS37	-12.3483	130.6816		Y	Y	Y	
HS38	-12.3454	130.6748		Y	Y	Y	Y
HS39	-12.3451	130.6809		Y	Y	Y	
HS40	-12.3461	130.6826		Y	Y	Y	
HS41	-12.3461	130.6879		Y	Y	Y	
HS42	-12.3448	130.6903		Y	Y	Y	Y
HS44a	-12.3429	130.6958		Y	Y	Y	
HS44b	-12.3429	130.6958		Y	Y	Y	
HS45	-12.3436	130.6844		Y	Y	Y	
HS46	-12.3399	130.685		Y	Y	Y	
HS47	-12.3372	130.6844		Y	Y	Y	Y
HS48	-12.3382	130.671		Y	Y	Y	Y
HS49	-12.337	130.6679		Y	Y	Y	Y
HS50	-12.5278	130.8531	Y				
HS51	-12.5287	130.8482	Y				
HS52	-12.5258	130.8363	Y				
HS53	-12.5101	130.8254	Y				
HS54	-12.5059	130.8234	Y				
HS55	-12.5040	130.8224	Y				
HS56	-12.5004	130.8202	Y				
HS57	-12.4899	130.8162	Y				
HS58	-12.4849	130.8139	Y				
HS59	-12.4825	130.8137	Y				
HS60	-12.4756	130.8098	Y				
HS61	-12.4656	130.8039	Y				
HSN2	-12.4634	130.8055	Y				
HS62	-12.4580	130.7985	Y				
HSN1	-12.4572	130.7975	Y				
HS63	-12.4535	130.7950	Y				
HS64	-12.4464	130.7889	Y				
HS65	-12.4409	130.7846	Y				
HS-A	-12.4388	130.7836	Y				
HS68	-12.4228	130.7699	Y				
HS69	-12.4156	130.7650	Y				
HS70	-12.4029	130.7542	Y	Y	Y	Y	Y
HS72	-12.3889	130.7411	Y				
HS73	-12.3802	130.7299	Y				
HS74	-12.3717	130.7184	Y	Y	Y	Y	Y
HS75	-12.3634	130.7075	Y	Y	Y	Y	Y
HS76	-12.3631	130.7070	Y				
HS77	-12.3548	130.6968	Y	Y	Y	Y	Y
HS78	-12.3479	130.6874	Y				

<sup>2</sup> 50 samples were used for Darwin Harbour PSD with three duplicates<sup>3</sup> 35 samples were used for Darwin Harbour Sediment (PAH) with two duplicates

APPENDIX

Table A-4: Geotechnical survey sampling sites

Sample ID	Depth interval	Latitude	Longitude	PSD	Sediment (contaminants and nutrients)	Sediment (PAH)
KP92.75_L	0.5–1.0 m	-12.342	130.6808	Y	Y	
KP92.75_U	0–0.5 m			Y	Y	Y
KP92.85_L	0.5–1.0 m	-12.3426	130.6815	Y	Y	
KP92.85_U	0–0.5 m			Y	Y	
KP92.95_U	0–0.5 m	-12.3431	130.6823	Y	Y	Y
KP93.23_U	0–0.5 m	-12.348	130.6884	Y	Y	
KP93.7_U	0–0.5 m	-12.3447	130.6843	Y	Y	
KP93.8_L	0.5–1.0 m	-12.3473	130.6877	Y	Y	Y
KP93.8_U	0–0.5 m			Y	Y	Y
KP102.7_L	0.5–1.0 m	-12.3995	130.7511	Y	Y	Y
KP102.7_U	0–0.5 m			Y	Y	Y
KP103.1_L	0.5–1.0 m	-12.4023	130.7534	Y	Y	Y
KP103.1_U	0–0.5 m			Y	Y	Y
KP103.5_U	0–0.5 m	-12.4051	130.7556	Y	Y	Y
KP104.9_U	0–0.5 m	-12.4149	130.7638	Y	Y	Y
KP106.0_L	0.5–1.0 m	-12.4226	130.7702	Y	Y	Y
KP106.0_U	0–0.5 m			Y	Y	Y
KP110.4_U	0–0.5 m	-12.4541	130.7949	Y	Y	Y
KP112.4_U	0–0.5 m	-12.4541	130.7949	Y	Y	
KP119.7_L	0.5–1.0 m	-12.5263	130.8369	Y	Y	Y
KP119.7_U	0–0.5 m			Y	Y	Y
KP119.8_U	0–0.5 m	-12.5263	130.8369	Y	Y	Y
KP120.5_U	0–0.5 m	-12.5287	130.8438	Y	Y	Y
KP120.6_U	0–0.5 m	-12.5288	130.8447	Y	Y	Y

Table A-5: June 2022 video transect sites

Sample ID	Latitude	Longitude	Video Transect
BACI_1C	130°50'38.495"E	12°31'26.461"S	Y
BACI_1P	130°50'32.347"E	12°31'42.246"S	Y
BACI_2C	130°50'47.455"E	12°30'45.598"S	Y
BACI_2P	130°49'44.420"E	12°31'1.153"S	Y
BACI_3C	130°49'4.068"E	12°27'57.263"S	Y
BACI_3P	130°48'25.361"E	12°28'13.464"S	Y
BACI_4C	130°46'33.883"E	12°24'31.296"S	Y
BACI_4P	130°45'51.573"E	12°24'54.006"S	Y
BACI_5C	130°45'36.170"E	12°23'46.150"S	Y
BACI_5P	130°45'10.407"E	12°24'2.428"S	Y
BACI_6C	130°38'23.665"E	12°18'11.888"S	Y
BACI_6P	130°38'10.108"E	12°18'30.388"S	Y
FishAgg	-	-	Y
Hab1	130°44'21.026"E	12°24'21.864"S	Y
Hab2	130°44'45.192"E	12°24'37.033"S	Y
Hab3	130°45'31.175"E	12°25'10.634"S	Y
Hab4	130°45'46.168"E	12°25'31.971"S	Y
Hab5	130°45'59.052"E	12°25'38.552"S	Y
Hab6	130°48'29.669"E	12°28'53.056"S	Y
Hab7	130°48'24.629"E	12°28'57.356"S	Y
Hab8	130°48'1.701"E	12°29'14.268"S	Y
Hab9	130°51'32.011"E	12°31'35.792"S	Y
Hab10	130°51'28.072"E	12°31'53.329"S	Y
Heritage_147	130°45'10.407"E	12°24'2.428"S	Y
Heritage_031	130°45'51.573"E	12°24'54.006"S	Y
Heritage_241	130°45'51.573"E	12°24'54.006"S	Y
INPHCCHI	130°52'24.661"E	12°33'4.623"S	Y
INPHCNEW	130°52'24.661"E	12°33'4.623"S	Y
INPHCMAN	130°46'15.600"E	12°26'6.019"S	Y
INPHCMAN_1	130°46'13.174"E	12°26'6.581"S	Y
INPHCSSI	130°53'3.741"E	12°29'42.839"S	Y
INPSGCPW	130°38'55.643"E	12°23'10.346"S	Y
INPHCWED2	130°48'10.492"E	12°29'29.812"S	Y
INPHCWOD	130°46'19.792"E	12°28'16.331"S	Y
RFPA1	130°37'14.803"E	12°18'11.254"S	Y
RFPA2	130°39'4.227"E	12°19'6.433"S	Y
RFPA3	130°38'26.235"E	12°18'37.210"S	Y
RFPA4	130°35'58.805"E	12°17'44.931"S	Y
RFPA5	130°35'12.359"E	12°17'28.386"S	Y
RFPA6	130°34'29.483"E	12°17'14.219"S	Y
RFPA8	130°36'34.496"E	12°17'58.787"S	Y
Sand waves	130°41'20.443"E	12°20'54.969"S	Y



## Appendix B

### Sediment survey log



## APPENDIX B: SEDIMENT SURVEY LOG

Date	Site	Drop no.	Depth (m)	WP no.	Sample size (grab 1,2)	Successful	Sediment composition	Features	Conspicuous fauna	Metals/nutrients/ TOC	Hydrocarbons	NORMs	PSD	Infauna	TBT	Leachates	ASS	Photo	Duplicate	Triplicate	Comments
15-Oct-21	OP1	1	56	1036	3/4, 3/4	Y	shelly sand (fine)	No	Algae- Caulerpa	Y	Y	Y	Y					Y			
15-Oct-21	OP1	2	56.5	1037	1/2	Y	Shelly sand (fine)	Slight odour	Algae					Y							
15-Oct-21	OP2	1	52.1	1038	1/2 3/4	Y	Shelly sand	No	Gastropods, algae	Y	Y	Y	Y								
15-Oct-21	OP2	2	52.1	1039	3/4 3/4	Y	Shelly sand	No	Worm, gastropods					Y							
15-Oct-21	OP3	1	59.9	1040	3/4 1/2	Y	Shelly sand (muddy)	No	No	Y	Y	Y	Y								
15-Oct-21	OP3	2	59.8	1041	3/4	Y	Shelly sand/muddy	No	Lace coral					Y							
15-Oct-21	OP4	1	49.4	1042	3/4, 3/4	Y	Shelly sand (muddy)	No	Algae, fish	Y	Y	Y	Y					Y			
15-Oct-21	OP4	2	49.4	1043	3/4	Y	Shelly sand, clumps of clay	No	Worms, starfish					Y				Y			
15-Oct-21	OP5	1	47.2	1044	3/4,3/4	Y	Shelly sand with clumps of clay	No	Algae	Y	Y	Y	Y					Y			
15-Oct-21	OP5	2	47	1045	0	N		No	No												Failed grab/misfire
15-Oct-21	OP5	3	47.2	1046	1/2	Y	Shelly sand with clumps of clay	No	No					Y				Y			
15-Oct-21	OP6	1	47	1047	1/2, 1/2	Y	Shelly sand with clumps of clay. Rocks caught in 1 grab	No	Bryozoa	Y	Y	Y	Y					Y			
15-Oct-21	OP6	2	48	1048	3/4	Y	Shelly sand with muddy/clay clumps	Tubes	Crabs, polychaete tubes					Y				Y			
15-Oct-21	OP7	1	48	1049	3/4, 3/4	Y	Shelly sand with clumps of clay	No	Algae	Y	Y	Y	Y					Y			Triplicate A
15-Oct-21	OP7	2	47.3	1050	3/4	Y	Shelly sand with clay clumps	No	Brittle star					Y				Y			
15-Oct-21	OP9	1	48	1051	3/4	Y	Shelly sand with clumps of clay	No	No	Y	Y	Y	Y					Y			
15-Oct-21	OP9	2	47	1052		Y	Shelly sand with clumps of clay	No	No					Y				Y			
15-Oct-21	OP10	1	42.5	1053	Full	Y	Silty sand	No	No	Y	Y	Y	Y					Y			
15-Oct-21	OP11	1	44	1054	Full	Y	Silty mud	No	No	Y	Y	Y	Y								
15-Oct-21	OP11	2	46	1056	Full	Y	Sandy silt/mud. Lots of shells	No	No					Y							
15-Oct-21	OP12	1	39.9	1057	Full	Y	Sandy	No	Sea star	Y	Y	Y	Y								
15-Oct-21	OP12	2	42	1058	Full	Y	Sandy	No	No					Y							
15-Oct-21	OP13	1	38.7	1059	3/4, Full	Y	Silty sand/mud	No	No	Y	Y	Y	Y								
15-Oct-21	OP13	2	38.2	1060	1/2, 3/4	Y	Shelly silty sand	No	No					Y				Y			
15-Oct-21	OP14	1	38.4	1061	3/4	Y	Silty sand with lots of shells	No	No	Y	Y	Y	Y					Y			
15-Oct-21	OP14	2	38.5	1062	3/4	Y	Silty sand with lots of shells	No	No					Y							
15-Oct-21	OP15	1	40.4	1063	3/4	Y	Silty sand	No	Cauliflower species (photo)- Neptheidae)	Y	Y	Y	Y								
15-Oct-21	OP15	2	40.5	1064	3/4	Y	Silty sand	No	No					Y							
16-Oct-21	OP16	1	39.6	1065		Y	Silty sand	No	No	Y	Y	Y	Y								
16-Oct-21	OP16	2	39.9	1066	3/4	Y	Silty sand with lots of shells	No	No					Y							
16-Oct-21	OP17	1	38.2	1067	3/4	Y	Silty sand	No	Worms, starfish	Y	Y	Y	Y					Y			
16-Oct-21	OP17	2	38.1	1068	3/4	Y	Silty sand with lots of shells	No	Flat worm					Y							
16-Oct-21	OP18	1	38.8	1069	3/4	Y	Silty sand	No	Feather star	Y	Y	Y	Y								
16-Oct-21	OP18	2	39	1070	3/4	Y	Silty sand and shells	No	No					Y							
16-Oct-21	OP19	1	38.6	1072	3/4	Y	Silty sand	No	Hermit crab, brittle star	Y	Y	Y	Y								
16-Oct-21	OP19	2	38.8	1073	3/4	Y	Silty sediment and shells	No	No					Y				Y			
16-Oct-21	OP20	1	46	1074	Full	Y	Silty mud/sand	No	No	Y	Y	Y	Y					Y			

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16-Oct-21	OP20	2	45.6	1075	Medium	Y	Silty mud/clay	No	No					Y							
16-Oct-21	OP21	1	45.3	1076	Full	Y	Silty sand/mud	No	No	Y	Y	Y	Y								
16-Oct-21	OP21	2	45.7	1077	Med	Y	Silty sand/mud	No	No					Y							
16-Oct-21	PTS-57.5-GS	1	39.8	1097	Full	Y	Silty sand	No	No				Y					N			
16-Oct-21	OP22	1	31.5	1098	7/8	Y	Silty sand, gritty mud	No	Coral, tube worm	Y	Y	Y	Y					Y			
16-Oct-21	OP22	2	31.7	1099		Y	Sandy gritty mud, clay clumps	No	Brittle star, urchin, murex					Y							
16-Oct-21	PTS-62.5-GS	1	34.9	1100	Full	Y	Silty sand	No	No				Y					Y			
16-Oct-21	PTS-64.0-GS	1	32.5	1101	Full	Y	Silty soft sediment, with sand and grit	No	No				Y								Not sure if PSD bag labelled correctly. Data sheet called this PTS-57.5-gs
16-Oct-21	OP23	2	32	1102		Y	Sandy mud, silty soft sediment	No	No	Y	Y	Y	Y								
16-Oct-21	OP24	1	26.4	1103	Full	Y	Sandy mud, rubble/gravel	No	Fireweed, tubeworms	Y	Y	Y	Y								Some fumes in air during sampling
17-Oct-21	OP24	2	26.5	1104	Full	Y	Sandy mud, rubble/gravel	No	Fireweed, spanner crab, worm					Y							
17-Oct-21	OP25	1	28	1105	Full	Y	Gravelly sandy mud	No	Tube worms	Y	Y	Y	Y								
17-Oct-21	OP25	2	28.4	1106	Full	Y	Gravelly mud	No	Blood worm, brittle star					Y							
17-Oct-21	OP26	1	27	1107	Full	Y	Gravelly, sandy mud	No	No	Y	Y	Y	Y								
17-Oct-21	OP26	1	27.2	1108	Full	Y	Gravelly mud, clay clumps	No	Comb shells					Y							
17-Oct-21	OP27	1	28	1109		Y	Muddy sandy clay	No	Tube worms	Y	Y	Y	Y								
17-Oct-21	OP27	2	28	1110		Y	Gravelly mud, clay	No	Shells/worms					Y							
17-Oct-21	OP28	1	25.8	1111	Full	Y	Sandy clay	No	No	Y	Y	Y	Y					Y			
17-Oct-21	OP28	2	25.8	1112	Full	Y	Gritty mud/clay	No	No					Y				Y			
17-Oct-21	OP29	1	26.1	1113	Full	Y	Gritty mud	No	dead coral	Y	Y	Y	Y					Y			
17-Oct-21	OP29	2	26	1114		Y	Silty sand/mud	No	Lots of varieties of shells, bivalves					Y				Y			
17-Oct-21	OP30	1	21	1115	Full	Y	Silty sand/mud	Tubes	Polychaete tubers, worm (long)	Y	Y	Y	Y					Y			
17-Oct-21	OP30	2	21	1116		Y	Silty sand/mud	Tubes	No					Y				Y			
17-Oct-21	SG7	2	19.4	1136	Full	Y	Silty sand	No	No					Y							
17-Oct-21	SG6	1	18.3	1137	Full	Y	Silty sand	No	No	Y	Y	Y	Y								
17-Oct-21	SG6	2	18.2	1138		Y	NA	No	No					Y							
17-Oct-21	SG5	1	18	1139	Full	Y	NA	No	No	Y	Y	Y	Y								Photos have wrong label - says sg7
17-Oct-21	SG5	2	18	1140	NA	Y	NA	No	No					Y							
17-Oct-21	SG4	1	18.1	1141	1/3	1/2	Y	Sandy mud	No	No	Y	Y	Y	Y							
17-Oct-21	SG4	2	17.5	1142	NA	Y		No	No					Y							
17-Oct-21	SG3	1	19.1	1143	3/4	Y	go	No	No	Y	Y	Y	Y								
17-Oct-21	SG3	2	19.1	1144		Y	NA	No	No					Y							Triplicate B & C
17-Oct-21	SG2	1	17.7	1145	1/4	Y	NA	No	No	Y	Y	Y	Y					Y			
17-Oct-21	SG2	2	17.8	1146	1/2	Y	Sandy mud + shells	NA	Lots of shell fragments, cone shell					Y				Y			
18-Oct-21	SG1	1	18.5	1147	1/2	Y	Sandy mud/gritty	No	No	Y	Y	Y	Y					Y			
18-Oct-21	SG1	2	19	1148	Full	Y	NA	No	No					Y							

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18-Oct-21	SG12 (Control)	1	18.1	1149	1/2	Y	Sandy mud - doesn't look too shelly		Large cushion star in grab	Y	Y	Y	Y								
18-Oct-21	SG12 (Control)	2	19.7	1150	1/2	Y	Sandy mud	No	No					Y							
18-Oct-21	SG13 (Control)	1	21	1151	3/4	Y	Sandy mud	No	No	Y	Y	Y	Y								
18-Oct-21	SG13 (Control)	2	21	1152	3/4	Y	Gritty sandy mud, shell frags		Shrimp, spider crab, sponge, brittle star					Y							
18-Oct-21	SG8	1	22.4	1153	3/4	Y	Gritty mud	No	No	Y	Y	Y	Y								
18-Oct-21	SG8	2	22.5	1154	Full	Y	Sandy/gritty mud, shell frags	No	Coral, shells					Y							
18-Oct-21	SG9	1	22.7	1155	1/2 1/3	Y	Gritty mud, large coral pieces + rocks		Dead coral	Y	Y	Y	Y								
18-Oct-21	SG9	2	22.6	1156	3/4	Y	Gritty sandy mud, coral frags		Sponge, coral					Y							
18-Oct-21	SG10	1	21.7	1157	1/2 3/3	Y	Sandy mud		Coral, shells	Y	Y	Y	Y								
18-Oct-21	SG10	2	21.5	1158	2/3	Y	Sandy mud	No	No					Y							
18-Oct-21	SG11	1	21.1	1159		Y	Sandy mud	No	No	Y	Y	Y	Y								
18-Oct-21	SG11	2	21	1160		Y		No	No					Y							
19-Oct-21	HS49	1	20	1179	Full	Y	Clay	No	No	Y	Y	Y	Y		Y	Y	Y				
19-Oct-21	HS48	1	19.8	1180	Full	Y	Silty sandy clay	No	No	Y	Y	Y	Y		Y	Y	Y				
19-Oct-21	HS47	1	20.8	1181	Full	Y	Sandy mud		Tube worms	Y	Y	Y	Y		Y	Y	Y				
19-Oct-21	HS46	1	13.8	1182	1/4	N		No	No												One grab did not fire, other just 1/4 full. No sample taken
19-Oct-21	HS46	2	11	1183		N		No	No												Both grabs did not trigger
19-Oct-21	HS46	3	11	1184	1/2, 1/3	Y	Coarse sand, shell grit	No	Worm	Y	Y	Y	Y		Y	Y	Y				
19-Oct-21	HS45	1	11.2	1185		Y	Shell gravel/grit	No	No	Y	Y	Y	Y		Y	Y	Y				
19-Oct-21	HS38	1	16.9	1186		Y	Silty sand	No	No	Y	Y	Y	Y		Y	Y	Y				
19-Oct-21	HS39	1	11.4	1187	1/2, 0	N		No	No												One grab did not fire
20-Oct-21	HS39	2	11.4	1188	3/4, 3/4	Y	Sandy grit, shell fragments	No	No	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS40	1	16.1	1189	1/2, 2/3	Y	Medium coarse sand	No	Sea spider, feather star, worms	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS41	1	15.7	1190	1/4, 1/2	Y	Silty sand	No	Feather star	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS42	1	15.8	1191	1/2	Y	Silty sand/mud	Smell-Pungent (sour smell)	No	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS44	1	15.6	1192	3/4	Y	Sandy shell grit	No	Worm	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS43	1	17.4	1193	3/4	Y	Sandy grit with shell fragments	No	No	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS37	1	18	1194	3/4	Y	Sandy grit with shell fragments	No	No	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS36	1	19.1	1195		Y		No	No	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS35	1	15	1196	3/4, 3/4,	Y	Coarse shelly sand with clumps of clay	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
20-Oct-21	HS34	1	17	1197	Full	Y	Coarse shelly sand, with some mud	No	No	Y	Y	Y	Y		Y	Y	Y	Y	Duplicate B		
20-Oct-21	HS33	1	16	1198	Full	Y	Coarse shelly sand	No	100+ small hermit crabs (photo)	Y	Y	Y	Y		Y	Y	Y	Y			
20-Oct-21	HS32	1	16	1199	1/2, 3/4	Y	Coarse sand, with some mud	No	sand dollar (photo)	Y	Y	Y	Y		Y	Y	Y	Y			
20-Oct-21	HS77	1	15	1200	Full	Y	Muddy sand with some shells	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
20-Oct-21	HS75	1	13	1201	1/2, 3/4	Y	Muddy sand with some shells	No	Coral (photo)	Y	Y	Y	Y		Y	Y	Y	Y			
20-Oct-21	HS74	1	16	1202	1/2, 3/4	Y	Coarse sand with some silt	No	No	Y	Y	Y	Y		Y	Y	Y	Y			

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20-Oct-21	HS70	1	24	1203	Full	Y	Coarse sand with small rocks and clumps of clay	No	Heart Urchin	Y	Y	Y	Y		Y	Y	Y	Y	Duplicate A		
20-Oct-21	HS31	1	15	1204	1/5	N		No	No									Y			Rocks caught in grab
20-Oct-21	HS31	2	15	1205	3/4, 1/2	Y	Muddy shelly sand	No	Algae, red sponge	Y	Y	Y	Y		Y	Y	Y	Y			Rock caught in grab- some fine sediments lost
20-Oct-21	HS31	3	15	1206	0	N		No	Algae, granite, sponges									Y			Rocks caught in grab
20-Oct-21	HS30	1	25	1207	1/5, 0	N		No	No									Y			Rocks caught in grab
20-Oct-21	HS30	2	25	1208	0, 1/8	N	Sandy shell	No	Heart Urchin (photo)									Y			Hard bottom- no grab
20-Oct-21	HS30	3	22	1209	0	N	Rocks	No	encrusting coral, polychaete tubes (photo)									Y			Moved 50 m s of hs30 ** site abandoned
20-Oct-21	HS29	1	20	1210	0	N	Rocks	No	Sponge, coral, Bryozoa, granite rocks, heart urchin									Y			Rocky bottom- no sediment in grab
20-Oct-21	HS29	2	20	1211	0	N	Rocks	No	No									N			Rocky bottom- no sediment in grab
20-Oct-21	HS29	3	25	1212	0	N	Rocks	No	No									Y			Rocks **site abandoned
20-Oct-21	HS28	1	18	1213	0	N	Rocks	No	No									Y			Rocks in grab- geophysics shows hard bottom
20-Oct-21	HS28	2	18	1214	0	N	Rocks	No	Sponge, Bryozoa (lace coral), crabs x4									Y			**Site abandoned
20-Oct-21	HS27	1	25	1215	1/4	Y	Silty shelly sand with rocks	No	Gastropods				Y								
20-Oct-21	HS27	2	25	1216	3/4	Y	Silty shelly sand	Tubes	No	Y	Y	Y			Y	Y	Y	Y			
20-Oct-21	HS26	1	20	1217	1/2, 0	Y	Silty shelly sand	No	No	Y	Y		Y		Y	Y	Y	Y			No norms
20-Oct-21	HS26	2	20	1218	0	N	Rock and sponge	No	No									Y			No sample
20-Oct-21	HS26	3	20	1219	0	N	Rocks in grab	No	Gorgonian									Y			No sample
20-Oct-21	HS25	1	17.5	1220	1/3, 1/3	Y	Rocks, rubble, bit of silty sand		Crabs, worms, sponges, coral	Y	Y		Y				Y				Only 3 samples taken- small sample
20-Oct-21	HS25	2	17	1221	0	N	Coral, Rocks	No	Sponge, crabs, worms												No sample
20-Oct-21	HS25	3	17.5	1222	0	N	Coral, Rocks	No	sponges, crabs												No sample
20-Oct-21	HS24	1	17.2	1223	1/4	Y	Corals/Rocks	No	Sponge, gorgonian	Y	Y						Y				Small sample
20-Oct-21	HS24	2	16.2	1224	1/4	N	Rocks	No	Gorgonian, sponge												Fail
20-Oct-21	HS24	3	18.8	1225	1/5	N	Rocks	No	Fan coral												Fail
20-Oct-21	HS23	1	22.6	1226	1/4, 1/2	Y	Gravel/coarse sediment- silty with rocks	No	No	Y	Y	Y	Y		Y	Y	Y				
20-Oct-21	HS22	1	15.9	1227	1/4, 1/2	Y	Rock substrate	No	Coral and epibiota	Y	Y				Y						Partial sample
20-Oct-21	HS22	2	17	1229	1/4, 1/2	Y	Coarse sand, shell fragments	No	No			Y	Y		Y	Y	Y				
20-Oct-21	HS21	1	19.3	1230	1/5	N	Grainy sand	No	No												Whole sample touching bottom of grab- not used
20-Oct-21	HS21	2	19.1	1231	NA	Y	Silty sand/mud and rocks	No	Large sponge on rocks with epibiota, brittle star, tube worms	Y	Y		Y		Y	Y	Y				No norms
20-Oct-21	HS21	3	18.9	1232	0	N	Silty sand/mud and rocks	No	NA												Not enough
20-Oct-21	HS20	1	17.7	1233	1/5	N	NA		Coral/sponge									Y			
20-Oct-21	HS20	2	17.3	1234	1/2	Y	Silty sand/mud/gravel	No	Flat worm	Y	Y				Y	Y	Y				
20-Oct-21	HS20	3	17.5	1235	1/2	Y	Silty sand/mud/gravel	No	No			Y	Y		Y	Y					
20-Oct-21	HS14	1	14.3	1236	Full	Y	Silty grainy mud	No	Crab, coral	Y	Y	Y	Y		Y	Y	Y				
21-Oct-21	HS15	1	14.8	1237		Y	Silty mud with rocky rubble	No	No	Y	Y		Y		Y						

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21-Oct-21	HS15	2	15.1	1238		Y	Silty sand	No	No			Y				Y	Y				
21-Oct-21	HS16	1	14.8	1239		Y	Silty sand/mud with rocky rubble	No	No	Y	Y		Y		Y	Y	Y				
21-Oct-21	HS16	2	15.3	1240	1/2, 1/4	Y	Silty sand/mud with rocky rubble	No	Coral			Y			Y	Y	Y				
21-Oct-21	HS17	1	16.6	1241	1/2, 1/2	Y	Gritty, silty mud	No	Coral, sponge	Y	Y	Y	Y		Y	Y	Y				
21-Oct-21	HS18	1	18.9	1242	3/4, 3/4	Y	Gritty mud	No	No	Y	Y	Y	Y		Y	Y	Y		Duplicate C		
21-Oct-21	HS19	1	19.8	1243		N	Large rocks	No	Coral, sponge												Large rocks caught in jaws, no sediment
21-Oct-21	HS19	2	21.5	1244		Y	Silty sand with pebbles/rubble	No	crab	Y	Y		Y		Y	Y	Y				
21-Oct-21	HS19	3	21.1	1245		N	Silty coarse sand/rubble and shell fragments	No	coral, feather star												
21-Oct-21	HS19	4	19.8	1246	1/2	Y	Silty coarse sand/rubble	No	No			Y					Y				
21-Jan-21	HS01	1	11	1247	Full	Y	Silty shelly sand	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS03	1	20	1248	1/4	N	Rock		Urchin- small									Y			Rock in grab
21-Oct-21	HS03	2	20	1249	1/2, 3/4	Y	Silty shelly sand with rocks	No	Lace coral, crab	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS02	1	15	1250	Full	Y	Silty sand with shells and rocks	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS04	1	18	1251	Full	Y	Muddy sand with some shells	No	Small octopus (photo)	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS05	1	13	1252	Full	Y	Muddy sand with some shells	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS06	1	10	1253	1, 3/4	Y	Silty shelly sand. Coarse sand on surface	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS07	1	10	1254	3/4	Y	Silty shelly sand	No	Worm	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS08	1	12	1255	Full	Y	Silty shelly sand	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS09	1	9	1256	1/2, 1/4	N		No	Corals									Y			Corals hanging out of grab, sample lost
21-Oct-21	HS09	2	9	1257	1/2, 1/2	N	Muddy, shelly sediment	No	No									Y			Grab partly open
21-Oct-21	HS09	3	9	1258	3/4, 3/4	Y	Muddy shelly sand	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS10	1	8.5	1259	3/4, 1/4	Y	Silty shelly sand	No	No	Y	Y	Y	Y		Y	Y	Y	Y			Rocks caught in one grab; sample taken from other grab
21-Oct-21	HS11	1	9	1260	3/4, 3/4	Y	Silty sand with shells and rocks	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS12	1	9	1261	Full	Y	Muddy/silty sand with shells and rocks	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
21-Oct-21	HS13	1	12	1262	Full	Y	Muddy/silty sand with shells and rocks	No	No	Y	Y	Y	Y		Y	Y	Y	Y			
15-Oct-21	OP10	2	42.8	NR	Full	Y	Silty sand	No	No					Y							
17-Oct-21	SG7	1	19.4	See note	Full	Y	NA	No	Crab	Y	Y	Y	Y								12°14.632's, 130°46.482'e
16-Oct-21	OP23	1	32.2	See note	Full	Y	Gravelly silty mud	No	No					Y							12°14.658's, 130°26.962'e

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP92.75			
<b>Job Number:</b> 1001175						<b>Date:</b> 10/01/2022			
<b>Coordinates (Attempt A):</b> 682 764.090 m E, 8 635 053.557 m N						<b>Attempt B:</b>			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 14.24				<b>Penetration (m):</b> 1.80 (A)			<b>Recovery (m):</b> 1.80 (A)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	0930	1	0-100	M	M	10YR 5/4 (yellowish Brown)	Sand	~20% shell	Some clay/slit mixed in
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- 1 m core sampled (upper and lower)</li> <li>- Shelly sand throughout core</li> <li>- Small amounts of silt and clay mixed in</li> <li>- Only 1 attempt required</li> <li>- Poor recovery at same site for Geotech samples</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP92.85			
<b>Job Number:</b> 1001175						<b>Date:</b> 10/01/2022			
<b>Coordinates (Attempt A):</b> 682 841.553 m E, 8 634 991.945 m N						<b>Attempt B:</b> 682 841.086 m E, 8 634 991.847 m N			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 13.09				<b>Penetration (m):</b> 1 (A), 0.5 (B)			<b>Recovery (m):</b> 0.77 (A), 0.43 (B)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	0948	1	0-77	M	W	10 YR 5/3 Brown	Sand	~20% shell	
B (rep)	1005	1	0-43	M	W	10 YR 5/3 Brown	Sand	~20% shell	
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- For attempt A core: <ul style="list-style-type: none"> <li>o 0-0.5 m sampled with all jars full (upper)</li> <li>o 0.5-0.77m sampled with all but elutriate jars full (lower)</li> </ul> </li> <li>- For attempt B core: <ul style="list-style-type: none"> <li>o 0-0.43 m core sampled as replicate (upper only)</li> </ul> </li> <li>- Shelly sand throughout (higher shell content at surface ~30%)</li> <li>- Silt visible in water within liner</li> <li>- Both cores were temporarily stored upright before processing due to a build-up of samples</li> <li>- Lower part of sample appeared shellier</li> </ul>									



<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP92.95			
<b>Job Number:</b> 1001175						<b>Date:</b> 10/01/2022			
<b>Coordinates (Attempt A):</b> 682 918.538 m E, 8 634 929.023 m N						<b>Attempt B:</b> 682 918.437 m E, 8 634 928.888 m N			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 15.58				<b>Penetration (m):</b> 0.56 (A), 0.6 (B)			<b>Recovery (m):</b> 0.56 (A), 0.54 (B)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	1021	1	0-15	M	M	10 YR 4/1 Dark grey	Sand	~5% shells	
		2	15-56	VF-M	M	10 YR 4/2 Dark greyish brown	Sandy Clay	~5% shells	
B (rep)	1040	1	0-15	VF-M	M	2.5 Y 4/1 Dark grey	Clayey sand	~5% shells	
		2	15-40	VF-M	M	2.5 Y 4/1 Dark grey	Sandy Clay	~5% shells	
		3	40-54	VF-M	M	2.5 Y 4/1 Dark grey	Clayey sand	~5% shells	
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- For attempt A core: <ul style="list-style-type: none"> <li>o 0-0.5 m sampled with all jars full (upper)</li> </ul> </li> <li>- For attempt B core: <ul style="list-style-type: none"> <li>o 0-0.5 m core sampled as replicate (upper only)</li> <li>o Clay layer in between two sandy layers</li> </ul> </li> <li>- Sample was stored in liner before processing</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP93.23				
<b>Job Number:</b> 1001175						<b>Date:</b> 08/01/2022				
<b>Coordinates (Attempt A):</b> 683 134.336 m E, 8 634 752.961 m N						<b>Attempt B:</b> 683 137.628 m E, 8 634 749.041 m N				
<b>Attempt C:</b> 683 134.857 m E, 8 634 752.218 m N						<b>Attempt D:</b> 683 133.776 m E, 8 634 750.419 m N				
<b>Water depth LAT (m):</b> 12.94				<b>Penetration (m):</b> 0 (A), 0.2 (B), 0.1 (C), 0.4 (D)			<b>Recovery (m):</b> 0 (A), 0.18 (B), 0.05 (C), 0.4 (D)			
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>	
B	0421	1	0-18	M	W	10 YR 5/4 Yellowish brown	Sand	~10% shells		
D	0511	1	0-40	M	M	10 YR 5/4 Yellowish brown	Sand	~20% shells	Patches of clayey sand	
<b>Log notes:</b>										
<ul style="list-style-type: none"> <li>- For attempt A core no sediment was collected and attempt 3 minimal sediment was collected</li> <li>- Sample was collected from attempt B and D after homogenising (upper only)</li> <li>- Samples were stored in liners before for several hours before processing</li> </ul>										

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP93.7			
<b>Job Number:</b> 1001175						<b>Date:</b> 07/01/2022			
<b>Coordinates (Attempt A):</b> 683 505.450 m E, 8 634 457.619 m N						<b>Attempt B:</b> 683 503.140 m E, 8 634 460.490 m N			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 15.81				<b>Penetration (m):</b> 0 (A), 0.65 (B)			<b>Recovery (m):</b> 0 (A), 0.65 (B)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
B	2257	1	0-50	M	M	10 YR 5/4 Yellowish brown	Sand	~30% shells	Grey/blue clay band at 30cm and patches throughout
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- For attempt A had no penetration or recovery</li> <li>- Attempt B was sampled for 0-0.5m (upper only)</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP93.8			
<b>Job Number:</b> 1001175						<b>Date:</b> 07/01/2022			
<b>Coordinates (Attempt A):</b> 683 578.871 m E, 8 634 392.984 m N						<b>Attempt B:</b> 683 578.584 m E, 8 634 390.045 m N			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 12.47				<b>Penetration (m):</b> 0 (A), 1.57 (B)			<b>Recovery (m):</b> 0 (A), 1.57 (B)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
B	2257	1	0-100	M	W	10 YR 6/4 Light yellowish brown	Sand	~30% shells	
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Attempt A was unsuccessful</li> <li>- Attempt B was sampled for upper (0-0.5m) and lower (0.5-1m)</li> <li>- Sandy ridge/crest</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP102.7			
<b>Job Number:</b> 1001175						<b>Date:</b> 07/01/2022			
<b>Coordinates (Attempt A):</b> 690 363.030 m E, 8 628 648.399 m N						<b>Attempt B:</b>			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 27.09				<b>Penetration (m):</b> 2.65 (A)			<b>Recovery (m):</b> 1.6 (A)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	1704	1	0-25	F	P	5 Y 4/1 Dark grey	Sandy clay	Some shells	Fine-medium gravel
		2	25-100	VF	P	5 Y 5/1 Grey	Clay	Some shells	Fine-medium gravel
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Attempt A core was sampled for upper (0-0.5m) and lower (0.5-1m)</li> <li>- Less large gravel compared with other gravelly sites</li> <li>- Alive worm caught in liner</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP103.1			
<b>Job Number:</b> 1001175						<b>Date:</b> 07/01/2022			
<b>Coordinates (Attempt A):</b> 690 613.997 m E, 8 628 335.991 m N						<b>Attempt B:</b>			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 25.23				<b>Penetration (m):</b> 2.3 (A)			<b>Recovery (m):</b> 1.73 (A)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	1603	1	0-11	VF	P	5 Y 5/1 Grey	Light clay	~30% shell	Medium-coarse gravel
		2	11-40	VF	P	5 Y 5/2 Olive grey	Sandy clay	Some shells	Medium-coarse gravel Patchy sand and clay
		3	40-100	VF	P	5 Y 4/2 Olive grey	Clay		Medium-coarse gravel Patchy sand and clay
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- 1m core sampled from attempt A (upper and lower)</li> <li>- Dense clay with patches of sandy clay</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP103.5			
<b>Job Number:</b> 1001175						<b>Date:</b> 07/01/2022			
<b>Coordinates (Attempt A):</b> 690 850.349 m E, 8 628 017.285 m N						<b>Attempt B:</b> 690 851.951 m E, 8 628 020.097 m N			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 20.42				<b>Penetration (m):</b> 0.28 (A), 0.23 (B)			<b>Recovery (m):</b> 0.28 (A), 0.23 (B)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	0934	1	0-18	VF-M	P	2.5 Y 5/3 Light olive brown	Clayey sand	~30% shell Coral and worm tubes	
		2	18-28	VF-M	P	5 Y 5/2 Olive grey	Sandy clay	Coral and worm tubes	Medium-coarse gravel
B	1011	1	0-13	VF-M	P	2.5 Y 5/2 Greyish brown	Clayed sand		Medium-coarse gravel
		2	13-23	VF-M	P	2.5 Y 5/2 Greyish brown	Clay		Medium-coarse gravel Red mottles (40%) Green mottles (10%)
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Upper sample collected from homogenised sediment from both attempts A and B</li> <li>- Sample stored before homogenising and processing</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP104.9			
<b>Job Number:</b> 1001175						<b>Date:</b> 06/01/2022			
<b>Coordinates (Attempt A):</b> 691 730.097 m E, 8 626 931.141 m N						<b>Attempt B:</b>			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 22.08				<b>Penetration (m):</b> 0.7 (A)			<b>Recovery (m):</b> 0.59 (A)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	2231	1	0-40	VF-M	P	5 Y 5/3 Olive	Sandy clay	Some shells in upper portion	Medium gravel
		2	40-59	VF-M	P	5 Y 5/3 Olive	Sandy clay		Medium-coarse gravel Orange mottles (25%) Grey/blue mottles (20%) Red mottles (2%)
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Upper sample collected from homogenised sediment from both attempts A and B</li> <li>- Sample stored before homogenising and processing</li> <li>- Orange, blue/grey and red mottles 0.4-0.59m</li> </ul>									



<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP106			
<b>Job Number:</b> 1001175						<b>Date:</b> 06/01/2022			
<b>Coordinates (Attempt A):</b> 692 426.006 m E, 8 626 073.362 m N						<b>Attempt B:</b> 692 420.161 m E, 8 626 076.814 m N			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 21.92				<b>Penetration (m):</b> 1 (A), 0.53 (B)			<b>Recovery (m):</b> 1 (A), 0.53 (B)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	2024	1	0-100	F-M	P	5 Y 5/2 Olive Grey	Sandy clay	Some shells	
B (dupe)	2122	1	0-53	F-M	P	5 Y 5/2 Olive Grey	Sandy clay	Some shells	
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Upper 0.5m of attempt A core homogenised with upper 0.5m of attempt B core and sampled for KP106 upper and duplicate</li> <li>- Lower 0.5m of attempt A core sampled</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP110.4			
<b>Job Number:</b> 1001175						<b>Date:</b> 06/01/2022 (Attempts A & B) & 10/01/2022 (Attempts C & D)			
<b>Coordinates (Attempt A):</b> 695 083.793 m E, 8 622 573.793 m N						<b>Attempt B:</b> 695 090.535 m E, 8 622 571.582 m N			
<b>Attempt C:</b> 695 085.691 m E, 8 622 571.271 m N						<b>Attempt D:</b> 695 085.769 m E, 8 622 575.183 m N			
<b>Water depth LAT (m):</b> 23.64				<b>Penetration (m):</b> 0.2 (A), 0.2 (B), 0.1 (C), 0.28 (D)			<b>Recovery (m):</b> 0.2 (A), 0.2 (B), 0.1 (C), 0.28 (D)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	1450 (6/1)	1	0-20	VF-F	P	2.5 Y 4/2 Dark greyish brown	Sandy clay	High shell content Green shell mesh at surface	Medium-coarse gravel
C	2229 (10/1)	1	0-10	M	P	2.5 Y 5/2 Greyish brown	Sand	Some shells	High medium-coarse gravel content
D	2253 (10/1)	1	0-19	VF-M	P	5 Y 5/2 Olive grey	Clayey sand	Some shells	High fine-coarse gravel content
		2	19-28	VF-M	P	5 Y 5/2 Olive grey	Sandy clay	Some shells	High fine-coarse gravel content
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Two attempts (A &amp; B) conducted on the 6/1/22</li> <li>- Attempt A core only enough sediment to fill: <ul style="list-style-type: none"> <li>o 2x 250mL and 2x 150mL glass jars for ALS</li> <li>o 1x 150mL glass jars for MAFRL</li> </ul> </li> <li>- Attempt B core only gravel</li> <li>- Several differing collection techniques trialled to maximise sample retention</li> <li>- Two attempts (C &amp; D) conducted on the 10/1/22 and homogenised to fill: <ul style="list-style-type: none"> <li>o 3x 250mL jars, 1x 150mL jar and 1 bag for ALS</li> <li>o 1x 150mL jar and 2 bags for MAFRL</li> <li>o Sample containers filled according to remaining requirements for missing containers from previous sample</li> </ul> </li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP112.4			
<b>Job Number:</b> 1001175						<b>Date:</b> 06/01/2022 (Attempts A & B) & 10/01/2022 (Attempts C & D)			
<b>Coordinates (Attempt A):</b> 696 267.828 m E, 8 620 958.932 m N						<b>Attempt B:</b> 696 267.058 m E, 8 620 956.578 m N			
<b>Attempt C:</b> 696 265.258 m E, 8 620 960.969 m N						<b>Attempt D:</b> 696 264.954 m E, 8 620 963.672 m N			
<b>Water depth LAT (m):</b> 19.74				<b>Penetration (m):</b> 0.1 (A), 0.25 (B), 0.2 (C), 0 (D)			<b>Recovery (m):</b> 0.1 (A), 0.25 (B), 0 (C), 0 (D)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	1609	1	0-10	VF	P	5 Y 5/1 Gray	Clay	Shells and corals present	Medium-coarse gravel
B	1644	1	0-25	VF	P	2.5 Y 8/1 White	Clay		Fine-medium gravel 30% mica
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Two attempts (A &amp; B) conducted on the 6/1/22</li> <li>- Attempt A core was predominantly gravel with some clay</li> <li>- Attempt B core was a mix of mica, gravel and white clay (very different from first attempt)</li> <li>- Sampled from attempt B however there was only enough sediment to fill some of the required jars/bags</li> <li>- Two extra attempts (C &amp; D) were conducted on the 10/1/22</li> <li>- Attempt C had 0.2m penetration but only recovered gravel</li> <li>- Attempt D was unsuccessful</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP119.7			
<b>Job Number:</b> 1001175						<b>Date:</b> 06/01/2022 (Attempts A & B) & 8/01/2022 (Attempt C)			
<b>Coordinates (Attempt A):</b> 699 601.077 m E, 8 614 551.150 m N						<b>Attempt B:</b> 699 601.245 m E, 8 614 551.849 m N			
<b>Attempt C:</b> 699 601.148 m E, 8 614 550.346 m N						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 19.89				<b>Penetration (m):</b> 1.5 (A), 1.5 (B), 1.06 (C)			<b>Recovery (m):</b> 0 (A), 0.05 (B), 1 (C)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
C	1545	1	1-100	VF	P	5 Y 4/1 Dark grey	Clay	Some shells at surface	Fine-medium gravel
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Two attempts (A &amp; B) conducted on the 6/1/22</li> <li>- Attempt A and B had over a metre penetration but very little recovery and mostly only gravel collected</li> <li>- Attempt C (conducted on 10/1/22) was sampled for upper and lower as a 1m was collected</li> <li>- Liner had to be cut open using a grinder as clay was dense and stuck in liner and could not be tipped out</li> <li>- The side of the sample along where the grinder was used was scrapped off before sampling</li> <li>- Linear trend from coarser grains to finer from surface to bottom (slight sandiness at top)</li> <li>- Heavy clay</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP119.8			
<b>Job Number:</b> 1001175						<b>Date:</b> 06/01/2022 (Attempts A & B) & 11/01/2022 (Attempts C & D)			
<b>Coordinates (Attempt A):</b> 699 687.918 m E, 8 614 502.655 m N						<b>Attempt B:</b> 699 688.574 m E, 8 614 503.248 m N			
<b>Attempt C:</b> 699 688.317 m E, 8 614 500.820 m N						<b>Attempt D:</b> 699 686.599 m E, 8 614 500.582 m N			
<b>Water depth LAT (m):</b> 18.99				<b>Penetration (m):</b> 1.2 (A), 1 (B), 1 (C), 0.25 (D)			<b>Recovery (m):</b> 0 (A), 0.05 (B), 0.1 (C), 0.23 (D)		
Attempt	Time (Local)	Horizon	Depth (cm)	Grainsize	Sorting	Colour (Munsell Soil Colour Charts)	Texture	Presence of shells/organics	Properties/comments/inclusions
B	0813	1	-	VF	P	2.5 Y 5/3 Light olive brown	Clay	Some shells	Medium-coarse gravel
D	0101	1	0-10	VF-M	P	5 Y 4/2 Olive grey	Sandy clay	Some shells	Medium gravel
		2	10-18	VF-M	P	5 Y 4/1 Dark grey	Sandy clay	Some shells	Fine-medium gravel Sandy layer
		3	18-23	VF-F	P	5 Y 4/1 Dark grey	Sandy clay	Some shells	Fine-medium gravel Clay layer
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Penetration achieved however only gravel recovered on attempt A and B (06/01/2022)</li> <li>- Sediment smear from attempt B used for colour and texture</li> <li>- Attempt C and D conducted on the 11/01/2022</li> <li>- From attempt D core only enough sediment recovered to fill the following: <ul style="list-style-type: none"> <li>o 2x 250mL jars + 1x 150mL jar + 1x bag for ALS</li> <li>o 2x bags + 1x 150mL jar for MAFRL</li> </ul> </li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP120.5			
<b>Job Number:</b> 1001175						<b>Date:</b> 06/01/2022 (Attempts A & B) & 11/01/2022 (Attempts C & D)			
<b>Coordinates (Attempt A):</b> 700 350.348 m E, 8 614 279.140 m N						<b>Attempt B:</b> 700 351.208 m E, 8 614 282.322 m N			
<b>Attempt C:</b>						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 15.21				<b>Penetration (m):</b> 0.3 (A), 0.25 (B)			<b>Recovery (m):</b> 0.21 (A), 0.25 (B)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	1426	1	0-21	VF-M	P	2.5 Y 4/1 Dark grey	Sandy clay	Some shells	Medium-coarse gravel
B	1453	1	0-25	VF-M	P	2.5 Y 4/1 Dark grey	Sandy clay	Some shells Coral and crab present	Medium-coarse gravel
<b>Log notes:</b>									
<ul style="list-style-type: none"> <li>- Two attempts taken and homogenised before filling sample jars and bags</li> <li>- Coral and a crab pulled up in the core</li> </ul>									

<b>Job Name:</b> Pipeline to Shore Marine Sediment Sampling						<b>Site ID:</b> KP120.6			
<b>Job Number:</b> 1001175						<b>Date:</b> 08/01/2022			
<b>Coordinates (Attempt A):</b> 700 449.348 m E, 8 614 269.568 m N						<b>Attempt B:</b> 700 447.842 m E, 8 614 272.682 m N			
<b>Attempt C:</b> 700 448.914 m E, 8 614 273.365 m N						<b>Attempt D:</b>			
<b>Water depth LAT (m):</b> 14.11				<b>Penetration (m):</b> 0.38 (A), 0 (B), 0.4 (C)			<b>Recovery (m):</b> 0.38 (A), 0 (B), 0.4 (C)		
<b>Attempt</b>	<b>Time (Local)</b>	<b>Horizon</b>	<b>Depth (cm)</b>	<b>Grainsize</b>	<b>Sorting</b>	<b>Colour (Munsell Soil Colour Charts)</b>	<b>Texture</b>	<b>Presence of shells/organics</b>	<b>Properties/comments/inclusions</b>
A	1307	1	0-10	VF	P	5 Y 4/2 Olive grey	Sandy clay	Some shell	
		2	10-30	VF	W	7.5 YR 4/3 Brown	Clay		Medium-coarse gravel 50% red mottles
		3	30-38	VF	P	5 Y 4/3 Olive	Clay		
C	1347	1	0-40	VF	P	2.5 Y 5/1 Grey	Clay	Some shell and coral	30% red mottles 15% orange mottles
<b>Log notes:</b>									
- Two attempts taken and homogenised before filling sample jars and bags									

## Appendix C

### Sediment sample photographs





## APPENDIX C: SEDIMENT PHOTOGRAPHS

### Offshore pipeline



Plate C-1: Sediment sample from OP1



Plate C-2: Sediment sample from OP2

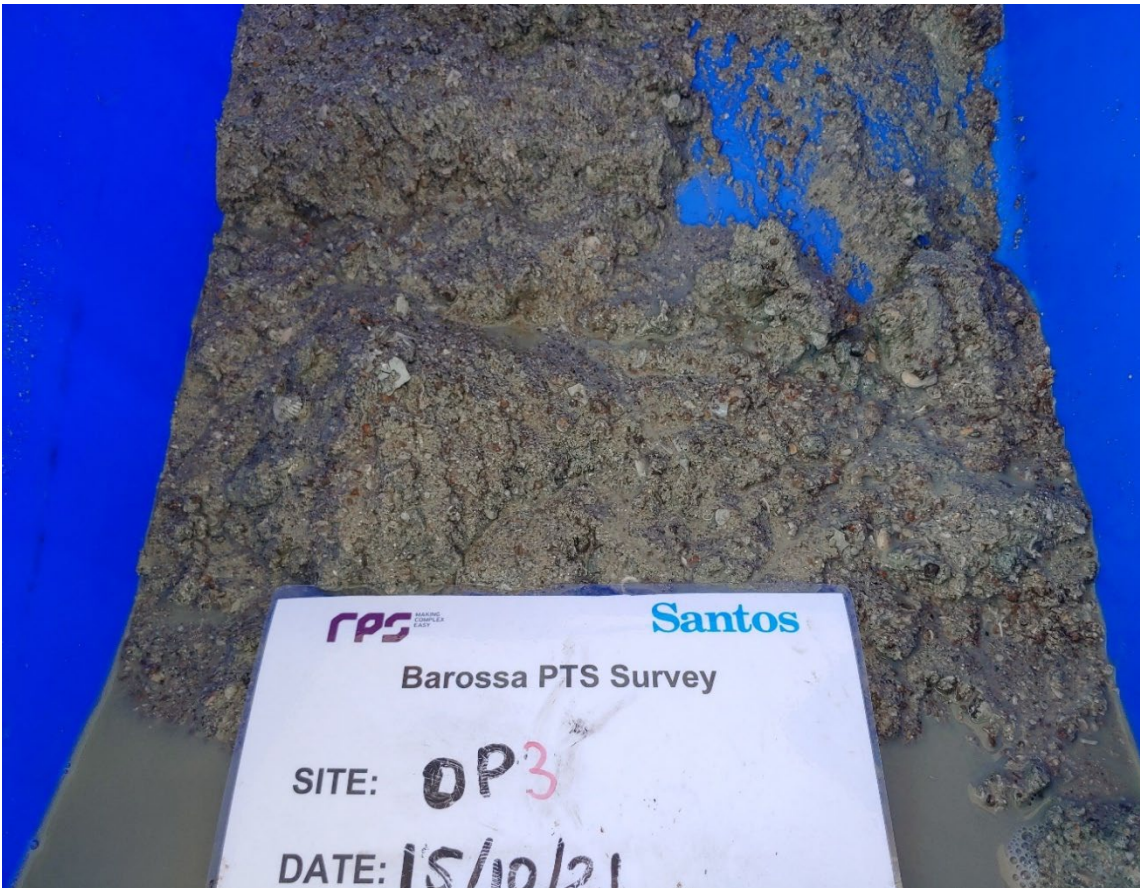


Plate C-3: Sediment sample from OP3



Plate C-4: Sediment from site OP4

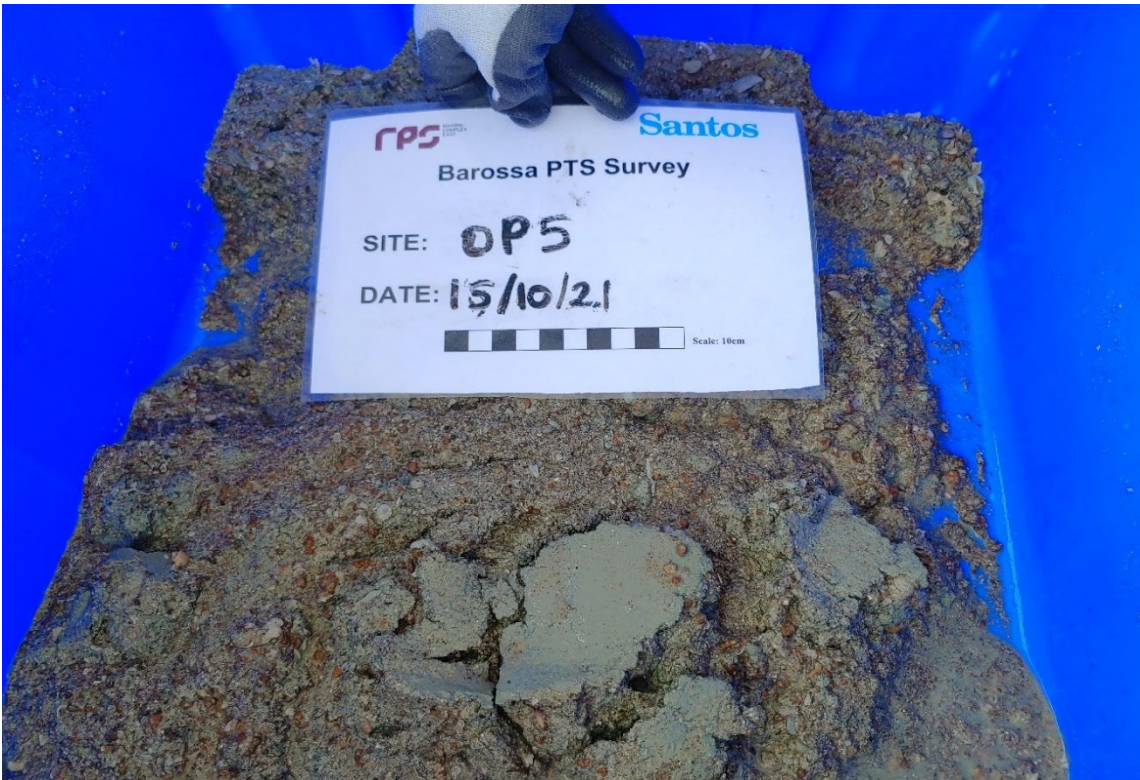


Plate C-5: Sediment from site OP5

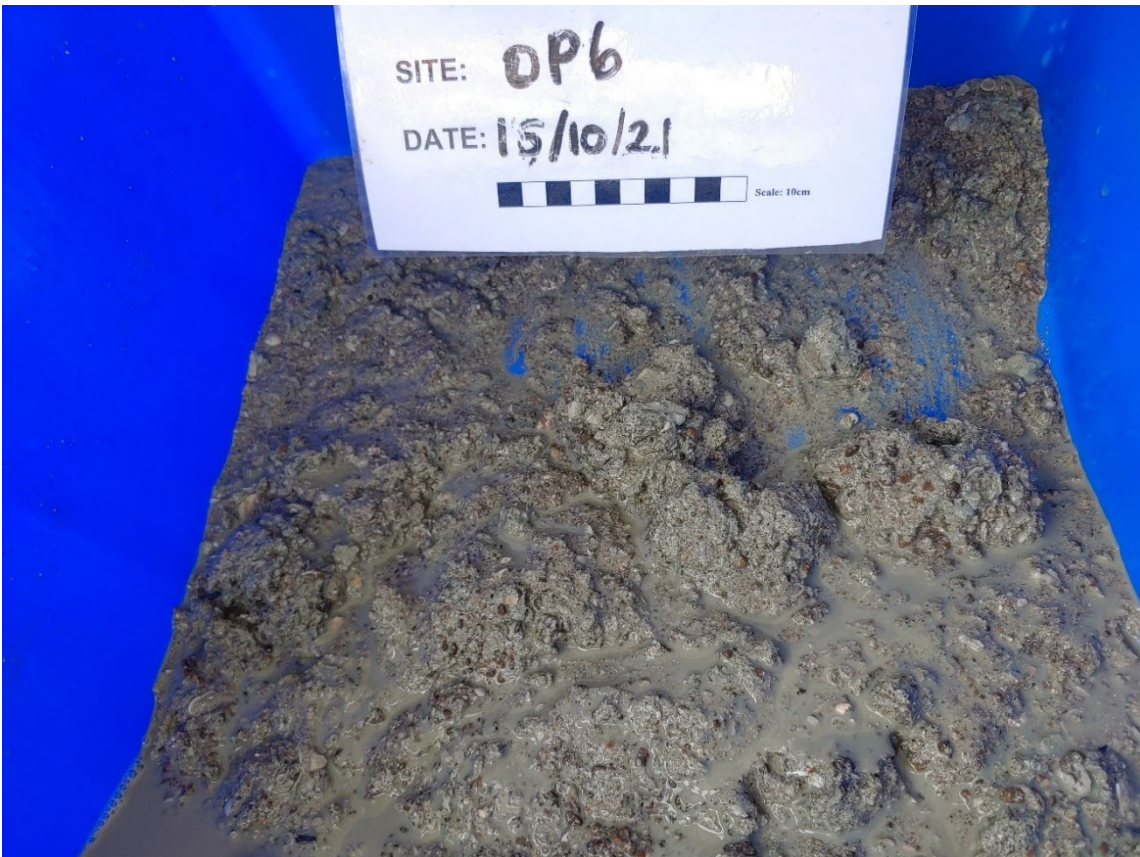


Plate C-6: Sediment from site OP6



Plate C-7: Sediment from site OP7

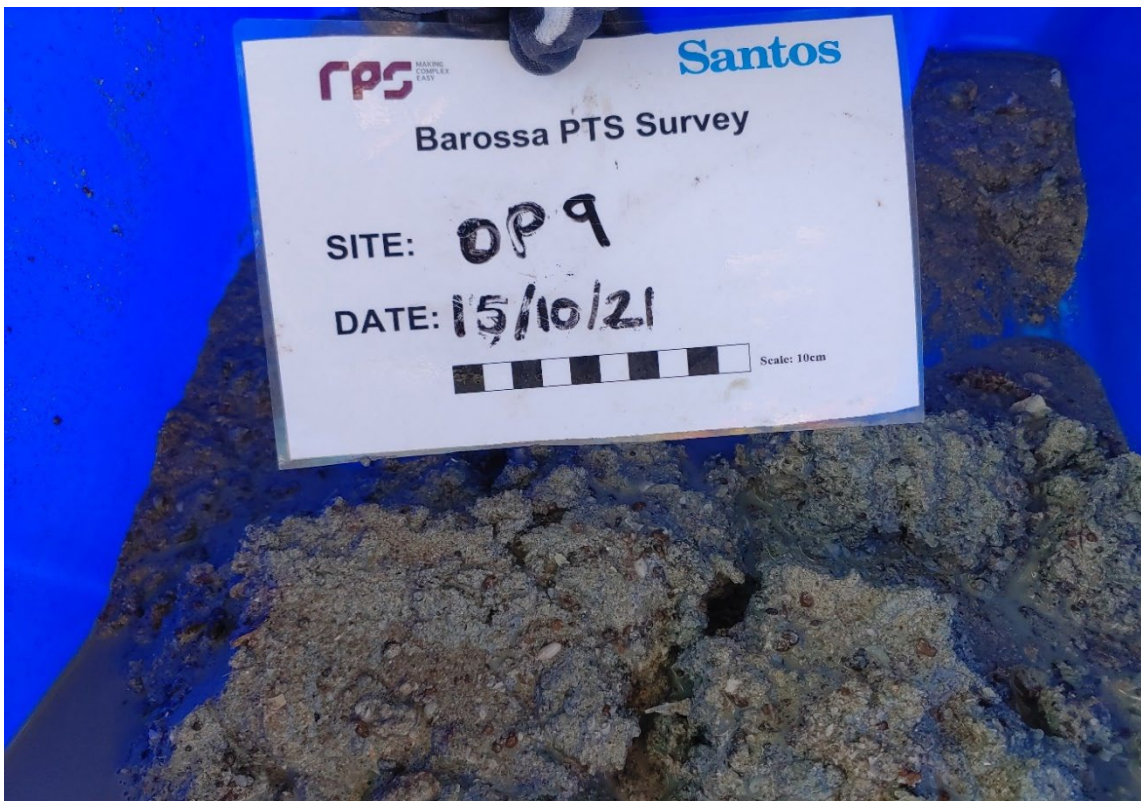


Plate C-8: Sediment from site OP9



Plate C-9: Sediment from site OP10



Plate C-10: Sediment from site OP11



**Plate C-11: Sediment from site OP12**



**Plate C-12: Sediment from site OP13**



**Plate C-13: Sediment from site OP14**



**Plate C-14: Sediment from site OP15**



**Plate C-15: Sediment from site OP16**



**Plate C-16: Sediment from site OP17**





**Plate C-17: Sediment from site OP18**



**Plate C-18: Sediment from OP19**



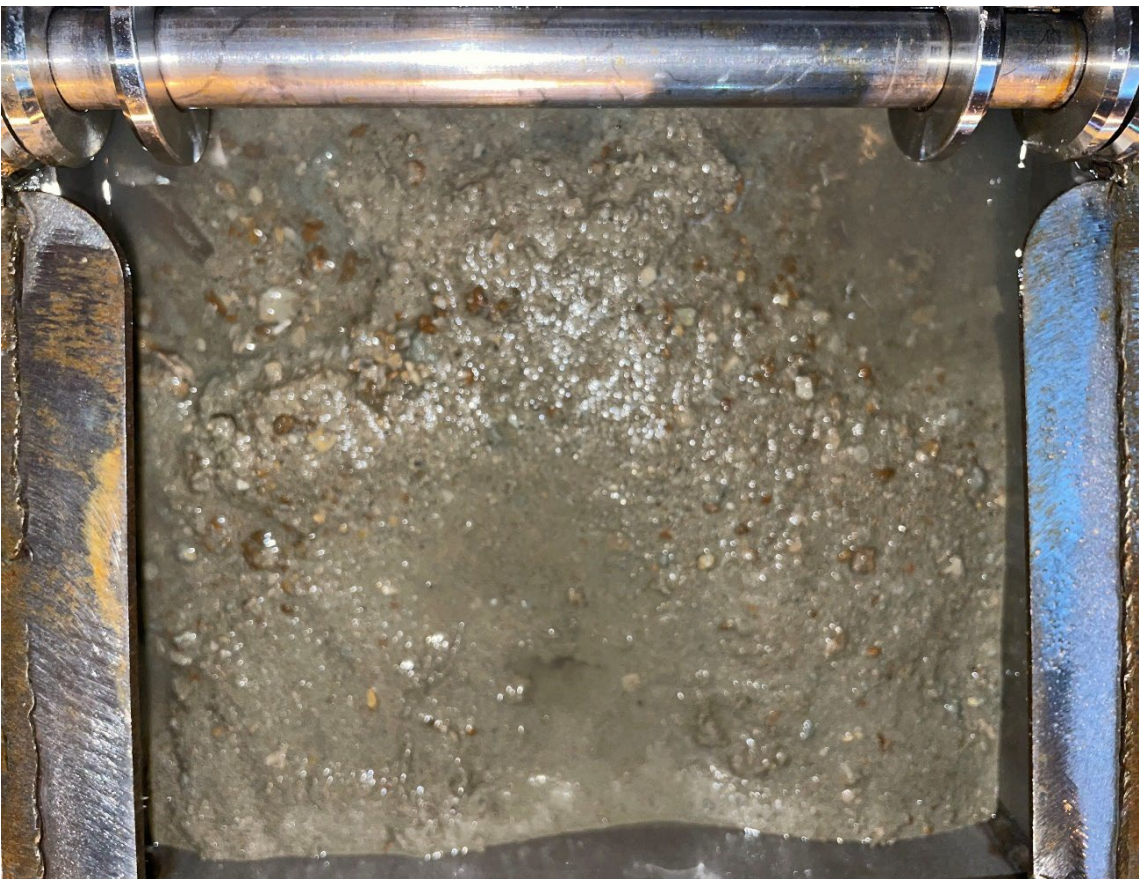
Plate C-19: Sediment from site OP20



Plate C-20: Sediment from site OP21



**Plate C-21: Sediment from site OP22**



**Plate C-22: Sediment from site OP23**



**Plate C-23: Sediment from site OP24**



**Plate C-24: Sediment from site OP25**



**Plate C-25: Sediment from site OP26**



**Plate C-26: Sediment from site OP27**



**Plate C-27: Sediment from site OP28**



**Plate C-28: Sediment from site OP29**

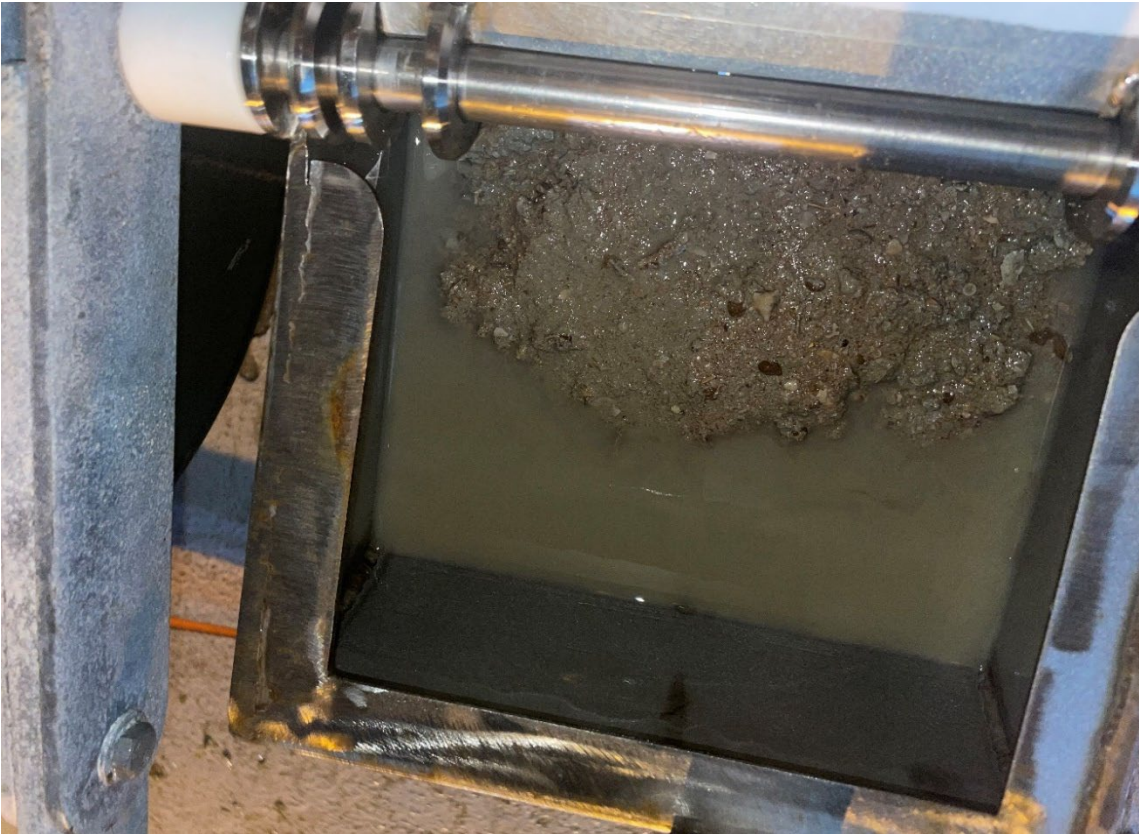


Plate C-29: Sediment from site OP30

**Spoil ground**



Plate C-30: Sediment from site SG1



**Plate C-31: Sediment from site SG2**



**Plate C-32: Sediment from site SG3**





**Plate C-33: Sediment from site SG4**



**Plate C-34: Sediment from site SG5**



**Plate C-35: Sediment from site SG6**



**Plate C-36: Sediment from site SG7**

## January 2022 core samples



**Plate C-37: Sediment from site KP92.75 A1**



**Plate C-38: Sediment from site KP92.75 A2**



Plate C-39: Sediment from site KP92.85 A1



Plate C-40: Sediment from site KP92.85 A2



**Plate C-41: Sediment from site KP92.85 B1**



**Plate C-42: Sediment from site KP92.85 B2**



Plate C-43: Sediment from site KP92.95 A1



Plate C-44: Sediment from site KP92.95 A2



**Plate C-45: Sediment from site KP92.95 B1**



**Plate C-46: Sediment from site KP92.95 B2**



**Plate C-47: Sediment from site KP92.95 B3**



**Plate C-48: Sediment from site KP93.7 A1**





Plate C-49: Sediment from site KP93.7 A2



Plate C-50: Sediment from site KP93.7 B1



Plate C-51: Sediment from site KP93.7 B2



Plate C-52: Sediment from site KP93.7 B3



Plate C-53: Sediment from site KP93.7 B4



Plate C-54: Sediment from site KP93.8 A1



**Plate C-55: Sediment from site KP93.8 A2**



**Plate C-56: Sediment from site KP93.8 A3**



Plate C-57: Sediment from site KP93.8 A4



Plate C-58: Sediment from site KP93.23 A1



**Plate C-59: Sediment from site KP93.23 B1**



**Plate C-60: Sediment from site KP93.23 B2**



**Plate C-61: Sediment from site KP93.23 B3**



**Plate C-62: Sediment from site KP93.23 D1**

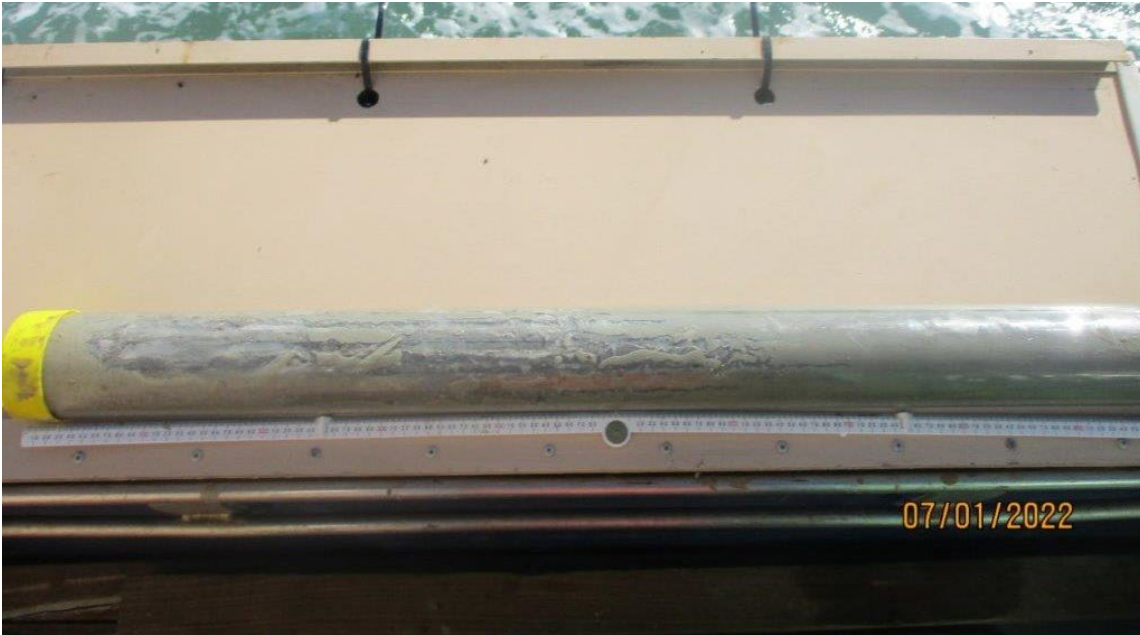


Plate C-63: Sediment from site KP93.23 D2



Plate C-64: Sediment from site KP102.7 A1





**Plate C-65: Sediment from site KP102.7 A2**



**Plate C-66: Sediment from site KP102.7 A3**



**Plate C-67: Sediment from site KP102.7 A4**



**Plate C-68: Sediment from site KP103.1 A1**



**Plate C-69: Sediment from site KP103.1 A2**



**Plate C-70: Sediment from site KP103.1 A3**



Plate C-71: Sediment from site KP103.1 A4



Plate C-72: Sediment from site KP103.1 A5



Plate C-73: Sediment from site KP103.1 A6



Plate C-74: Sediment from site KP103.1 A7



Plate C-75: Sediment from site KP103.1 A8



Plate C-76: Sediment from site KP103.1 A1



Plate C-77: Sediment from site KP103.5 A1



Plate C-78: Sediment from site KP103.5 A2



**Plate C-79: Sediment from site KP103.5 A3**



**Plate C-80: Sediment from site KP103.5 B1**





Plate C-81: Sediment from site KP104.9 A1



Plate C-82: Sediment from site KP104.9 A2



Plate C-83: Sediment from site KP106 A1



Plate C-84: Sediment from site KP106 A2



**Plate C-85: Sediment from site KP110.4 A1**



**Plate C-86: Sediment from site KP110.4 A2**



**Plate C-87: Sediment from site KP110.4 A3**



**Plate C-88: Sediment from site KP110.4 A4**



Plate C-89: Sediment from site KP110.4 B1



Plate C-90: Sediment from site KP110.4 C1



Plate C-91: Sediment from site KP110.4 C2



Plate C-92: Sediment from site KP110.4 D1



Plate C-93: Sediment from site KP110.4 a1D2



Plate C-94: Sediment from site KP112.4 A1



Plate C-95: Sediment from site KP112.4 A2



Plate C-96: Sediment from site KP112.4 B1





Plate C-97: Sediment from site KP112.4 B2



Plate C-98: Sediment from site KP112.4 B3

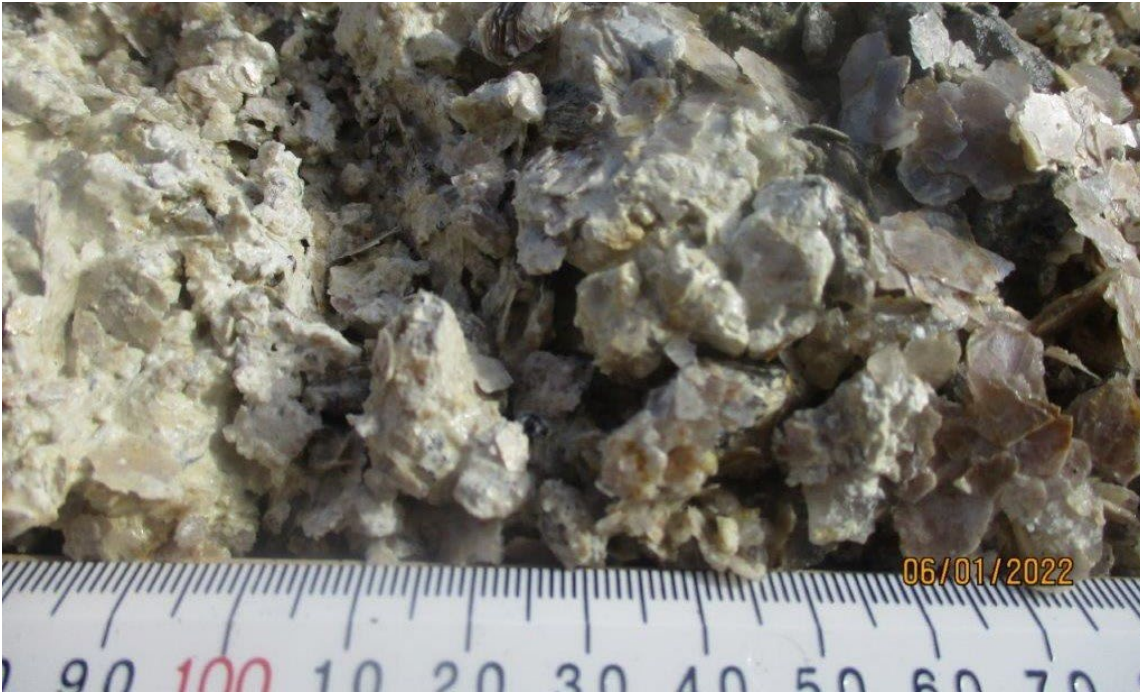


Plate C-99: Sediment from site KP112.4 B4



Plate C-100: Sediment from site KP112.4 C1



Plate C-101: Sediment from site KP112.4 C2



Plate C-102: Sediment from site KP112.4 C3



Plate C-103: Sediment from site KP119.7 A1



Plate C-104: Sediment from site KP119.7 C1



**Plate C-105: Sediment from site KP119.7 C2**



**Plate C-106: Sediment from site KP110.8 B1**



Plate C-107: Sediment from site KP119.8 B2



Plate C-108: Sediment from site KP119.8 C1



**Plate C-109: Sediment from site KP119.8 C2**



**Plate C-110: Sediment from site KP119.8 D1**



**Plate C-111: Sediment from site KP120.5 A1**



**Plate C-112: Sediment from site KP120.5 B1**





**Plate C-113: Sediment from site KP120.6 A1**



**Plate C-114: Sediment from site KP120.6 A2**



Plate C-115: Sediment from site KP120.6 A3



Plate C-116: Sediment from site KP120.6 B1



**Plate C-117: Sediment from site KP120.6 B2**

## Appendix D

### Laboratory sediment particle size data






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP1	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 349.88 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 100.94 Time for 50% of particles to settle over 1 m (hours) 0.003 D10 ( $\mu$ m) 42.11 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.46 Time for 90% of particles to settle over 1 m (hours) 0.190
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.92</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.56	
Fine Silt % (8-16 $\mu$ m)	1.72	
Medium Silt % (16-31 $\mu$ m)	2.24	
Course Silt % (31-63 $\mu$ m)	3.77	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>9.29</b>	
Very Fine sand % (63-125 $\mu$ m)	3.13	
Fine sand % (125-250 $\mu$ m)	18.33	
Medium sand % (250-500 $\mu$ m)	31.01	
Coarse sand % (500-1000 $\mu$ m)	10.35	
Very Coarse sand % (1000-2000 $\mu$ m)	8.76	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>71.59</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>16.20</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	10.35	
1000	8.76	
2000	11.35	
4000	4.85	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP2	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 510.60 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 214.99 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 104.54 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 9.01 Time for 90% of particles to settle over 1 m (hours) 0.031
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.99</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.08	
Fine Silt % (8-16 $\mu$ m)	1.20	
Medium Silt % (16-31 $\mu$ m)	1.57	
Course Silt % (31-63 $\mu$ m)	2.72	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.57</b>	
Very Fine sand % (63-125 $\mu$ m)	2.20	
Fine sand % (125-250 $\mu$ m)	13.57	
Medium sand % (250-500 $\mu$ m)	25.41	
Coarse sand % (500-1000 $\mu$ m)	11.77	
Very Coarse sand % (1000-2000 $\mu$ m)	9.90	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>62.85</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>28.58</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.77	
1000	9.90	
2000	13.09	
4000	8.10	
8000	7.39	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell, mud and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP3	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 997.18 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 819.97 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 29.63 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.72 Time for 90% of particles to settle over 1 m (hours) 0.384
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.45</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.79	
Fine Silt % (8-16 $\mu$ m)	2.06	
Medium Silt % (16-31 $\mu$ m)	2.96	
Course Silt % (31-63 $\mu$ m)	4.78	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.58</b>	
Very Fine sand % (63-125 $\mu$ m)	4.87	
Fine sand % (125-250 $\mu$ m)	9.46	
Medium sand % (250-500 $\mu$ m)	12.47	
Coarse sand % (500-1000 $\mu$ m)	8.21	
Very Coarse sand % (1000-2000 $\mu$ m)	8.23	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.23</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>41.73</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.21	
1000	8.23	
2000	12.37	
4000	11.53	
8000	17.83	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP4	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 399.46 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 131.58 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 98.61 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 8.02 Time for 90% of particles to settle over 1 m (hours) 0.035
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.87</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.05	
Fine Silt % (8-16 $\mu$ m)	1.13	
Medium Silt % (16-31 $\mu$ m)	1.50	
Course Silt % (31-63 $\mu$ m)	2.77	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.46</b>	
Very Fine sand % (63-125 $\mu$ m)	3.31	
Fine sand % (125-250 $\mu$ m)	17.96	
Medium sand % (250-500 $\mu$ m)	27.98	
Coarse sand % (500-1000 $\mu$ m)	13.85	
Very Coarse sand % (1000-2000 $\mu$ m)	11.41	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>74.52</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>17.15</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.85	
1000	11.41	
2000	11.80	
4000	5.35	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell, mud, coral and plant material present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP5	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 655.43 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 354.24 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m ) 70.38 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 4.08 Time for 90% of particles to settle over 1 m (hours) 0.068
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.23</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.19	
Fine Silt % (8-16 $\mu$ m)	1.31	
Medium Silt % (16-31 $\mu$ m)	1.76	
Course Silt % (31-63 $\mu$ m)	3.04	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>7.30</b>	
Very Fine sand % (63-125 $\mu$ m)	3.39	
Fine sand % (125-250 $\mu$ m)	12.74	
Medium sand % (250-500 $\mu$ m)	20.21	
Coarse sand % (500-1000 $\mu$ m)	13.32	
Very Coarse sand % (1000-2000 $\mu$ m)	13.55	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>63.21</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>27.27</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.32	
1000	13.55	
2000	17.34	
4000	9.93	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP6	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1074.24 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 951.59 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 65.88 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 3.58 Time for 90% of particles to settle over 1 m (hours) 0.078
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.30</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.25	
Fine Silt % (8-16 $\mu$ m)	1.38	
Medium Silt % (16-31 $\mu$ m)	1.84	
Course Silt % (31-63 $\mu$ m)	3.04	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>7.50</b>	
Very Fine sand % (63-125 $\mu$ m)	3.42	
Fine sand % (125-250 $\mu$ m)	9.79	
Medium sand % (250-500 $\mu$ m)	15.77	
Coarse sand % (500-1000 $\mu$ m)	10.37	
Very Coarse sand % (1000-2000 $\mu$ m)	11.54	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>50.88</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>39.32</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	10.37	
1000	11.54	
2000	15.77	
4000	13.93	
8000	9.62	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
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Our Reference: RPS21-4

Sample Name:	OP7	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 515.84 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 219.42 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 51.51 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.19 Time for 90% of particles to settle over 1 m (hours) 0.127
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.56</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.38	
Fine Silt % (8-16 $\mu$ m)	1.52	
Medium Silt % (16-31 $\mu$ m)	2.05	
Course Silt % (31-63 $\mu$ m)	3.65	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.60</b>	
Very Fine sand % (63-125 $\mu$ m)	4.85	
Fine sand % (125-250 $\mu$ m)	13.12	
Medium sand % (250-500 $\mu$ m)	20.28	
Coarse sand % (500-1000 $\mu$ m)	18.29	
Very Coarse sand % (1000-2000 $\mu$ m)	17.05	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>73.60</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.24</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	18.29	
1000	17.05	
2000	12.38	
4000	2.86	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
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Our Reference: RPS21-4

Sample Name:	OP9	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 636.62 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 334.20 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m ) 86.50 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 6.17 Time for 90% of particles to settle over 1 m (hours) 0.045
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.86</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.02	
Fine Silt % (8-16 $\mu$ m)	1.11	
Medium Silt % (16-31 $\mu$ m)	1.57	
Course Silt % (31-63 $\mu$ m)	2.84	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.55</b>	
Very Fine sand % (63-125 $\mu$ m)	4.60	
Fine sand % (125-250 $\mu$ m)	14.90	
Medium sand % (250-500 $\mu$ m)	19.35	
Coarse sand % (500-1000 $\mu$ m)	10.02	
Very Coarse sand % (1000-2000 $\mu$ m)	13.16	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>62.04</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>29.55</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 10.02	
	1000 13.16	
	2000 19.05	
	4000 8.85	
	8000 1.65	
	16000 0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell, mud and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Date of Issue: 6/12/2021  
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Our Reference: RPS21-4

Sample Name:	OP10	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 432.70 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 154.39 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m ) 54.53 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.45 Time for 90% of particles to settle over 1 m (hours) 0.113
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	24/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.51</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.30	
Fine Silt % (8-16 $\mu$ m)	1.46	
Medium Silt % (16-31 $\mu$ m)	2.03	
Course Silt % (31-63 $\mu$ m)	3.46	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.25</b>	
Very Fine sand % (63-125 $\mu$ m)	5.19	
Fine sand % (125-250 $\mu$ m)	16.78	
Medium sand % (250-500 $\mu$ m)	20.58	
Coarse sand % (500-1000 $\mu$ m)	13.95	
Very Coarse sand % (1000-2000 $\mu$ m)	13.45	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>69.95</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>19.29</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.95	
1000	13.45	
2000	14.75	
4000	4.54	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP11	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 483.19 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 192.52 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 48.43 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.93 Time for 90% of particles to settle over 1 m (hours) 0.144
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.73</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.39	
Fine Silt % (8-16 $\mu$ m)	1.56	
Medium Silt % (16-31 $\mu$ m)	2.13	
Course Silt % (31-63 $\mu$ m)	3.58	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.68</b>	
Very Fine sand % (63-125 $\mu$ m)	4.63	
Fine sand % (125-250 $\mu$ m)	15.27	
Medium sand % (250-500 $\mu$ m)	19.42	
Coarse sand % (500-1000 $\mu$ m)	11.60	
Very Coarse sand % (1000-2000 $\mu$ m)	13.33	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>64.24</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>24.36</b>	
<b>Settings</b>		SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
<b>Extended range by sieving</b>		
Extended size, $\mu$ m	Extended percent retained at size	
500	11.60	
1000	13.33	
2000	15.34	
4000	6.59	
8000	2.42	
16000	0.00	
<b>Sample visual assessment</b>		

  
Signatory: Jamie Woodward  
Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP12	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1579.68 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 2057.71 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 54.19 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.42 Time for 90% of particles to settle over 1 m (hours) 0.115
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.48</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.32	
Fine Silt % (8-16 $\mu$ m)	1.47	
Medium Silt % (16-31 $\mu$ m)	2.03	
Course Silt % (31-63 $\mu$ m)	3.60	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.41</b>	
Very Fine sand % (63-125 $\mu$ m)	5.06	
Fine sand % (125-250 $\mu$ m)	8.94	
Medium sand % (250-500 $\mu$ m)	9.98	
Coarse sand % (500-1000 $\mu$ m)	8.96	
Very Coarse sand % (1000-2000 $\mu$ m)	10.62	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.57</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>45.53</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.96	
1000	10.62	
2000	17.11	
4000	19.41	
8000	9.01	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP13	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 424.16 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 148.36 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 66.17 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 3.61 Time for 90% of particles to settle over 1 m (hours) 0.077
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.37</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.24	
Fine Silt % (8-16 $\mu$ m)	1.33	
Medium Silt % (16-31 $\mu$ m)	1.77	
Course Silt % (31-63 $\mu$ m)	3.09	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>7.43</b>	
Very Fine sand % (63-125 $\mu$ m)	4.06	
Fine sand % (125-250 $\mu$ m)	17.75	
Medium sand % (250-500 $\mu$ m)	22.26	
Coarse sand % (500-1000 $\mu$ m)	11.43	
Very Coarse sand % (1000-2000 $\mu$ m)	12.30	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>67.80</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>22.40</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.43	
1000	12.30	
2000	15.78	
4000	6.62	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP14	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 352.89 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 102.69 Time for 50% of particles to settle over 1 m (hours) 0.003 D10 ( $\mu$ m ) 50.04 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.06 Time for 90% of particles to settle over 1 m (hours) 0.135
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.83</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.43	
Fine Silt % (8-16 $\mu$ m)	1.54	
Medium Silt % (16-31 $\mu$ m)	1.94	
Course Silt % (31-63 $\mu$ m)	3.38	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.30</b>	
Very Fine sand % (63-125 $\mu$ m)	3.88	
Fine sand % (125-250 $\mu$ m)	19.68	
Medium sand % (250-500 $\mu$ m)	26.69	
Coarse sand % (500-1000 $\mu$ m)	10.36	
Very Coarse sand % (1000-2000 $\mu$ m)	10.73	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>71.35</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>17.53</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	10.36	
1000	10.73	
2000	12.27	
4000	5.26	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP15	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 307.49 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 77.97 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m) 55.66 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.56 Time for 90% of particles to settle over 1 m (hours) 0.109
Sampling Date:	15/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.57</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.33	
Fine Silt % (8-16 $\mu$ m)	1.42	
Medium Silt % (16-31 $\mu$ m)	1.87	
Course Silt % (31-63 $\mu$ m)	3.42	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.04</b>	
Very Fine sand % (63-125 $\mu$ m)	5.07	
Fine sand % (125-250 $\mu$ m)	23.78	
Medium sand % (250-500 $\mu$ m)	30.47	
Coarse sand % (500-1000 $\mu$ m)	7.87	
Very Coarse sand % (1000-2000 $\mu$ m)	6.44	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>73.63</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.76</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 7.87	
	1000 6.44	
	2000 9.62	
	4000 6.14	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP16	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 292.05 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 70.33 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m ) 32.68 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.88 Time for 90% of particles to settle over 1 m (hours) 0.315
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.54</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.79	
Fine Silt % (8-16 $\mu$ m)	1.91	
Medium Silt % (16-31 $\mu$ m)	2.50	
Course Silt % (31-63 $\mu$ m)	4.07	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>10.26</b>	
Very Fine sand % (63-125 $\mu$ m)	6.23	
Fine sand % (125-250 $\mu$ m)	23.17	
Medium sand % (250-500 $\mu$ m)	24.47	
Coarse sand % (500-1000 $\mu$ m)	5.84	
Very Coarse sand % (1000-2000 $\mu$ m)	5.22	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>64.94</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>21.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 5.84	
	1000 5.22	
	2000 9.22	
	4000 10.32	
	8000 1.72	
	16000 0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP17	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 302.82 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 75.62 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m) 85.94 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 6.09 Time for 90% of particles to settle over 1 m (hours) 0.046
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.19</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.12	
Fine Silt % (8-16 $\mu$ m)	1.13	
Medium Silt % (16-31 $\mu$ m)	1.56	
Course Silt % (31-63 $\mu$ m)	2.60	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.41</b>	
Very Fine sand % (63-125 $\mu$ m)	5.73	
Fine sand % (125-250 $\mu$ m)	26.08	
Medium sand % (250-500 $\mu$ m)	29.02	
Coarse sand % (500-1000 $\mu$ m)	8.74	
Very Coarse sand % (1000-2000 $\mu$ m)	7.72	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>77.29</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>14.12</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.74	
1000	7.72	
2000	7.78	
4000	4.17	
8000	2.17	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP18	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 264.32 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 57.61 Time for 50% of particles to settle over 1 m (hours) 0.005 D10 ( $\mu$ m ) 22.04 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.40 Time for 90% of particles to settle over 1 m (hours) 0.693
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.43</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.13	
Fine Silt % (8-16 $\mu$ m)	2.24	
Medium Silt % (16-31 $\mu$ m)	2.79	
Course Silt % (31-63 $\mu$ m)	4.51	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.67</b>	
Very Fine sand % (63-125 $\mu$ m)	7.16	
Fine sand % (125-250 $\mu$ m)	24.03	
Medium sand % (250-500 $\mu$ m)	32.20	
Coarse sand % (500-1000 $\mu$ m)	6.04	
Very Coarse sand % (1000-2000 $\mu$ m)	3.92	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>73.36</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>10.54</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 6.04	
	1000 3.92	
	2000 5.88	
	4000 3.83	
	8000 0.83	
	16000 0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell, coral and plant material present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP19	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 290.19 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 69.44 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m ) 73.99 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 4.51 Time for 90% of particles to settle over 1 m (hours) 0.062
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	25/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.34</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.20	
Fine Silt % (8-16 $\mu$ m)	1.22	
Medium Silt % (16-31 $\mu$ m)	1.63	
Course Silt % (31-63 $\mu$ m)	2.84	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.88</b>	
Very Fine sand % (63-125 $\mu$ m)	6.47	
Fine sand % (125-250 $\mu$ m)	26.56	
Medium sand % (250-500 $\mu$ m)	31.30	
Coarse sand % (500-1000 $\mu$ m)	7.97	
Very Coarse sand % (1000-2000 $\mu$ m)	5.98	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>78.28</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>12.49</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 7.97	
	1000 5.98	
	2000 6.57	
	4000 3.61	
	8000 2.31	
	16000 0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP20	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 200.03 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 33.00 Time for 50% of particles to settle over 1 m (hours) 0.008 D10 ( $\mu$ m) 26.51 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.58 Time for 90% of particles to settle over 1 m (hours) 0.479
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	26/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.95</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.94	
Fine Silt % (8-16 $\mu$ m)	2.03	
Medium Silt % (16-31 $\mu$ m)	2.93	
Course Silt % (31-63 $\mu$ m)	4.88	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.77</b>	
Very Fine sand % (63-125 $\mu$ m)	12.94	
Fine sand % (125-250 $\mu$ m)	33.01	
Medium sand % (250-500 $\mu$ m)	24.69	
Coarse sand % (500-1000 $\mu$ m)	4.36	
Very Coarse sand % (1000-2000 $\mu$ m)	4.06	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>79.06</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>5.22</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	4.36	
1000	4.06	
2000	2.80	
4000	2.42	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP21	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 192.64 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 30.60 Time for 50% of particles to settle over 1 m (hours) 0.009 D10 ( $\mu$ m ) 40.76 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.37 Time for 90% of particles to settle over 1 m (hours) 0.203
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	26/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.95</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.52	
Fine Silt % (8-16 $\mu$ m)	1.60	
Medium Silt % (16-31 $\mu$ m)	2.51	
Course Silt % (31-63 $\mu$ m)	4.47	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>10.10</b>	
Very Fine sand % (63-125 $\mu$ m)	15.65	
Fine sand % (125-250 $\mu$ m)	34.96	
Medium sand % (250-500 $\mu$ m)	21.12	
Coarse sand % (500-1000 $\mu$ m)	4.23	
Very Coarse sand % (1000-2000 $\mu$ m)	3.83	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>79.79</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>7.16</b>	
<b>Extended range by sieving</b>		
Extended size, $\mu$ m	Extended percent retained at size	
	500 4.23	
	1000 3.83	
	2000 4.16	
	4000 3.01	
	8000 0.00	
	16000 0.00	
		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP22	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 453.86 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 169.86 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m ) 43.08 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.53 Time for 90% of particles to settle over 1 m (hours) 0.181
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	26/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.07</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.52	
Fine Silt % (8-16 $\mu$ m)	1.65	
Medium Silt % (16-31 $\mu$ m)	2.20	
Course Silt % (31-63 $\mu$ m)	4.13	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>9.49</b>	
Very Fine sand % (63-125 $\mu$ m)	8.89	
Fine sand % (125-250 $\mu$ m)	15.50	
Medium sand % (250-500 $\mu$ m)	14.58	
Coarse sand % (500-1000 $\mu$ m)	15.51	
Very Coarse sand % (1000-2000 $\mu$ m)	12.22	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>66.71</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>20.72</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.51	
1000	12.22	
2000	11.50	
4000	9.22	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP23	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 274.07 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 61.94 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m) 13.57 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.15 Time for 90% of particles to settle over 1 m (hours) 1.830
Sampling Date:	16/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	26/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>5.32</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.60	
Fine Silt % (8-16 $\mu$ m)	2.78	
Medium Silt % (16-31 $\mu$ m)	3.31	
Course Silt % (31-63 $\mu$ m)	5.42	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.11</b>	
Very Fine sand % (63-125 $\mu$ m)	10.37	
Fine sand % (125-250 $\mu$ m)	17.68	
Medium sand % (250-500 $\mu$ m)	16.39	
Coarse sand % (500-1000 $\mu$ m)	9.95	
Very Coarse sand % (1000-2000 $\mu$ m)	6.79	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>61.18</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>19.38</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.95	
1000	6.79	
2000	8.64	
4000	8.30	
8000	2.44	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP24	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 762.30 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 479.18 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 63.14 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 3.29 Time for 90% of particles to settle over 1 m (hours) 0.084
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	26/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.33</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.23	
Fine Silt % (8-16 $\mu$ m)	1.34	
Medium Silt % (16-31 $\mu$ m)	1.72	
Course Silt % (31-63 $\mu$ m)	3.37	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>7.66</b>	
Very Fine sand % (63-125 $\mu$ m)	7.62	
Fine sand % (125-250 $\mu$ m)	13.21	
Medium sand % (250-500 $\mu$ m)	14.11	
Coarse sand % (500-1000 $\mu$ m)	9.67	
Very Coarse sand % (1000-2000 $\mu$ m)	10.22	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>54.83</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>35.19</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.67	
1000	10.22	
2000	12.04	
4000	16.03	
8000	7.11	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some mud, rock, shell, coral and plant material present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
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Date of Issue: 6/12/2021  
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Our Reference: RPS21-4

Sample Name:	OP25	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 196.77 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 31.93 Time for 50% of particles to settle over 1 m (hours) 0.009 D10 ( $\mu$ m ) 12.23 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.12 Time for 90% of particles to settle over 1 m (hours) 2.252
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>5.42</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.73	
Fine Silt % (8-16 $\mu$ m)	3.18	
Medium Silt % (16-31 $\mu$ m)	3.95	
Course Silt % (31-63 $\mu$ m)	6.93	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>16.78</b>	
Very Fine sand % (63-125 $\mu$ m)	14.07	
Fine sand % (125-250 $\mu$ m)	21.36	
Medium sand % (250-500 $\mu$ m)	17.52	
Coarse sand % (500-1000 $\mu$ m)	11.15	
Very Coarse sand % (1000-2000 $\mu$ m)	8.25	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>72.35</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>5.45</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.15	
1000	8.25	
2000	5.45	
4000	0.00	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP26	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 188.79 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 29.39 Time for 50% of particles to settle over 1 m (hours) 0.009 D10 ( $\mu$ m ) 13.93 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.16 Time for 90% of particles to settle over 1 m (hours) 1.737
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>5.03</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.56	
Fine Silt % (8-16 $\mu$ m)	3.10	
Medium Silt % (16-31 $\mu$ m)	3.95	
Course Silt % (31-63 $\mu$ m)	7.54	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.16</b>	
Very Fine sand % (63-125 $\mu$ m)	15.34	
Fine sand % (125-250 $\mu$ m)	21.17	
Medium sand % (250-500 $\mu$ m)	17.71	
Coarse sand % (500-1000 $\mu$ m)	12.16	
Very Coarse sand % (1000-2000 $\mu$ m)	7.01	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>73.39</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>4.42</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.16	
1000	7.01	
2000	3.32	
4000	1.10	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

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Date of Issue: 6/12/2021  
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Our Reference: RPS21-4

Sample Name:	OP27	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 148.96 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 18.30 Time for 50% of particles to settle over 1 m (hours) 0.015 D10 ( $\mu$ m) 7.55 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.05 Time for 90% of particles to settle over 1 m (hours) 5.911
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>6.77</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.56	
Fine Silt % (8-16 $\mu$ m)	4.44	
Medium Silt % (16-31 $\mu$ m)	5.52	
Course Silt % (31-63 $\mu$ m)	9.36	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>22.88</b>	
Very Fine sand % (63-125 $\mu$ m)	15.57	
Fine sand % (125-250 $\mu$ m)	18.99	
Medium sand % (250-500 $\mu$ m)	13.65	
Coarse sand % (500-1000 $\mu$ m)	7.67	
Very Coarse sand % (1000-2000 $\mu$ m)	5.60	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>61.48</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>8.88</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 7.67	
	1000 5.60	
	2000 5.64	
	4000 3.23	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Mud with some sand, rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

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Date of Issue: 6/12/2021  
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Our Reference: RPS21-4

Sample Name:	OP28	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 176.38 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 25.65 Time for 50% of particles to settle over 1 m (hours) 0.011 D10 ( $\mu$ m ) 9.64 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.08 Time for 90% of particles to settle over 1 m (hours) 3.623
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>5.86</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.14	
Fine Silt % (8-16 $\mu$ m)	4.26	
Medium Silt % (16-31 $\mu$ m)	5.40	
Course Silt % (31-63 $\mu$ m)	9.59	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>22.38</b>	
Very Fine sand % (63-125 $\mu$ m)	14.57	
Fine sand % (125-250 $\mu$ m)	14.00	
Medium sand % (250-500 $\mu$ m)	12.02	
Coarse sand % (500-1000 $\mu$ m)	11.46	
Very Coarse sand % (1000-2000 $\mu$ m)	8.53	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>60.57</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.19</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.46	
1000	8.53	
2000	6.30	
4000	4.88	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some sand, rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
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**PARTICLE SIZE ANALYSIS REPORT**

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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP29	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 139.29 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 16.00 Time for 50% of particles to settle over 1 m (hours) 0.017 D10 ( $\mu$ m ) 9.00 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.07 Time for 90% of particles to settle over 1 m (hours) 4.161
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>6.03</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.32	
Fine Silt % (8-16 $\mu$ m)	4.47	
Medium Silt % (16-31 $\mu$ m)	5.74	
Course Silt % (31-63 $\mu$ m)	11.66	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>25.18</b>	
Very Fine sand % (63-125 $\mu$ m)	16.57	
Fine sand % (125-250 $\mu$ m)	12.50	
Medium sand % (250-500 $\mu$ m)	11.60	
Coarse sand % (500-1000 $\mu$ m)	11.01	
Very Coarse sand % (1000-2000 $\mu$ m)	5.71	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>57.40</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.39</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.01	
1000	5.71	
2000	6.99	
4000	4.40	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some sand, rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	OP30	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 69.16 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 3.94 Time for 50% of particles to settle over 1 m (hours) 0.070 D10 ( $\mu$ m) 6.65 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.04 Time for 90% of particles to settle over 1 m (hours) 7.621
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>7.03</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.29	
Fine Silt % (8-16 $\mu$ m)	6.81	
Medium Silt % (16-31 $\mu$ m)	9.15	
Course Silt % (31-63 $\mu$ m)	18.97	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>39.22</b>	
Very Fine sand % (63-125 $\mu$ m)	29.65	
Fine sand % (125-250 $\mu$ m)	17.39	
Medium sand % (250-500 $\mu$ m)	5.86	
Coarse sand % (500-1000 $\mu$ m)	0.33	
Very Coarse sand % (1000-2000 $\mu$ m)	0.24	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>53.47</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>0.28</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 0.33	
	1000 0.24	
	2000 0.28	
	4000 0.00	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Mud with some sand and shell present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

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Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG1	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 435.73 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 156.56 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m ) 18.34 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.28 Time for 90% of particles to settle over 1 m (hours) 1.002
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.58</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.22	
Fine Silt % (8-16 $\mu$ m)	2.62	
Medium Silt % (16-31 $\mu$ m)	3.09	
Course Silt % (31-63 $\mu$ m)	4.89	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>12.82</b>	
Very Fine sand % (63-125 $\mu$ m)	7.40	
Fine sand % (125-250 $\mu$ m)	12.15	
Medium sand % (250-500 $\mu$ m)	15.80	
Coarse sand % (500-1000 $\mu$ m)	15.58	
Very Coarse sand % (1000-2000 $\mu$ m)	13.07	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>64.00</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>18.60</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.58	
1000	13.07	
2000	12.84	
4000	5.25	
8000	0.51	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG2	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 386.56 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 123.22 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m ) 15.52 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.20 Time for 90% of particles to settle over 1 m (hours) 1.398
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.78</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.42	
Fine Silt % (8-16 $\mu$ m)	2.94	
Medium Silt % (16-31 $\mu$ m)	3.51	
Course Silt % (31-63 $\mu$ m)	5.48	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.36</b>	
Very Fine sand % (63-125 $\mu$ m)	7.11	
Fine sand % (125-250 $\mu$ m)	11.97	
Medium sand % (250-500 $\mu$ m)	18.14	
Coarse sand % (500-1000 $\mu$ m)	15.73	
Very Coarse sand % (1000-2000 $\mu$ m)	9.64	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>62.58</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>18.28</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.73	
1000	9.64	
2000	9.40	
4000	5.68	
8000	3.20	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG3	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 307.92 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 78.18 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m ) 20.02 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.33 Time for 90% of particles to settle over 1 m (hours) 0.841
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	29/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.76</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.16	
Fine Silt % (8-16 $\mu$ m)	2.91	
Medium Silt % (16-31 $\mu$ m)	3.81	
Course Silt % (31-63 $\mu$ m)	5.57	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.45</b>	
Very Fine sand % (63-125 $\mu$ m)	9.66	
Fine sand % (125-250 $\mu$ m)	16.70	
Medium sand % (250-500 $\mu$ m)	16.59	
Coarse sand % (500-1000 $\mu$ m)	18.91	
Very Coarse sand % (1000-2000 $\mu$ m)	10.92	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>72.79</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>9.00</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	18.91	
1000	10.92	
2000	7.35	
4000	1.64	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG4	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 297.96 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 73.21 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m) 13.06 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.14 Time for 90% of particles to settle over 1 m (hours) 1.975
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.83</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.70	
Fine Silt % (8-16 $\mu$ m)	3.71	
Medium Silt % (16-31 $\mu$ m)	4.79	
Course Silt % (31-63 $\mu$ m)	6.40	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.60</b>	
Very Fine sand % (63-125 $\mu$ m)	11.00	
Fine sand % (125-250 $\mu$ m)	13.92	
Medium sand % (250-500 $\mu$ m)	8.27	
Coarse sand % (500-1000 $\mu$ m)	9.26	
Very Coarse sand % (1000-2000 $\mu$ m)	9.31	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>51.75</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>25.81</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 9.26	
	1000 9.31	
	2000 9.44	
	4000 8.49	
	8000 7.88	
	16000 0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG5	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 309.59 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 79.03 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m ) 16.97 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.24 Time for 90% of particles to settle over 1 m (hours) 1.170
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.13</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.31	
Fine Silt % (8-16 $\mu$ m)	3.23	
Medium Silt % (16-31 $\mu$ m)	4.28	
Course Silt % (31-63 $\mu$ m)	5.73	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>15.54</b>	
Very Fine sand % (63-125 $\mu$ m)	11.53	
Fine sand % (125-250 $\mu$ m)	15.30	
Medium sand % (250-500 $\mu$ m)	9.19	
Coarse sand % (500-1000 $\mu$ m)	11.21	
Very Coarse sand % (1000-2000 $\mu$ m)	10.14	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>57.38</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>22.96</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.21	
1000	10.14	
2000	11.06	
4000	5.20	
8000	4.00	
16000	2.70	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG6	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 189.35 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 29.56 Time for 50% of particles to settle over 1 m (hours) 0.009 D10 ( $\mu$ m ) 15.94 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.21 Time for 90% of particles to settle over 1 m (hours) 1.326
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.28</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.37	
Fine Silt % (8-16 $\mu$ m)	3.37	
Medium Silt % (16-31 $\mu$ m)	4.57	
Course Silt % (31-63 $\mu$ m)	6.49	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>16.80</b>	
Very Fine sand % (63-125 $\mu$ m)	15.79	
Fine sand % (125-250 $\mu$ m)	20.31	
Medium sand % (250-500 $\mu$ m)	9.08	
Coarse sand % (500-1000 $\mu$ m)	8.88	
Very Coarse sand % (1000-2000 $\mu$ m)	9.07	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>63.14</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.78</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.88	
1000	9.07	
2000	11.14	
4000	4.64	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG7	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 168.90 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 23.52 Time for 50% of particles to settle over 1 m (hours) 0.012 D10 ( $\mu$ m ) 15.49 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.20 Time for 90% of particles to settle over 1 m (hours) 1.404
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.11</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.47	
Fine Silt % (8-16 $\mu$ m)	3.63	
Medium Silt % (16-31 $\mu$ m)	4.97	
Course Silt % (31-63 $\mu$ m)	6.38	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.46</b>	
Very Fine sand % (63-125 $\mu$ m)	17.01	
Fine sand % (125-250 $\mu$ m)	24.39	
Medium sand % (250-500 $\mu$ m)	10.39	
Coarse sand % (500-1000 $\mu$ m)	7.54	
Very Coarse sand % (1000-2000 $\mu$ m)	7.44	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>66.78</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.65</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 7.54	
	1000 7.44	
	2000 7.07	
	4000 4.58	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG8	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 352.55 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 102.49 Time for 50% of particles to settle over 1 m (hours) 0.003 D10 ( $\mu$ m ) 17.53 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.25 Time for 90% of particles to settle over 1 m (hours) 1.097
Sampling Date:	18/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.20</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.29	
Fine Silt % (8-16 $\mu$ m)	3.03	
Medium Silt % (16-31 $\mu$ m)	3.85	
Course Silt % (31-63 $\mu$ m)	6.06	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>15.22</b>	
Very Fine sand % (63-125 $\mu$ m)	10.38	
Fine sand % (125-250 $\mu$ m)	13.19	
Medium sand % (250-500 $\mu$ m)	13.40	
Coarse sand % (500-1000 $\mu$ m)	15.59	
Very Coarse sand % (1000-2000 $\mu$ m)	10.39	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>62.94</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>17.64</b>	
<b>Settings</b>		SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
<b>Extended range by sieving</b>		
Extended size, $\mu$ m	Extended percent retained at size	
500	15.59	
1000	10.39	
2000	6.96	
4000	4.17	
8000	6.51	
16000	0.00	
<b>Sample visual assessment</b>		

  
Signatory: Jamie Woodward  
Date: 6/12/2021

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Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG9	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 441.67 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 160.86 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m ) 21.06 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.37 Time for 90% of particles to settle over 1 m (hours) 0.759
Sampling Date:	18/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.74</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.11	
Fine Silt % (8-16 $\mu$ m)	2.77	
Medium Silt % (16-31 $\mu$ m)	3.61	
Course Silt % (31-63 $\mu$ m)	5.53	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.01</b>	
Very Fine sand % (63-125 $\mu$ m)	10.11	
Fine sand % (125-250 $\mu$ m)	13.53	
Medium sand % (250-500 $\mu$ m)	9.92	
Coarse sand % (500-1000 $\mu$ m)	11.33	
Very Coarse sand % (1000-2000 $\mu$ m)	8.84	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>53.73</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>28.52</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.33	
1000	8.84	
2000	9.40	
4000	4.29	
8000	14.84	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG10	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 189.46 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 29.60 Time for 50% of particles to settle over 1 m (hours) 0.009 D10 ( $\mu$ m ) 12.51 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.13 Time for 90% of particles to settle over 1 m (hours) 2.154
Sampling Date:	18/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.64</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.85	
Fine Silt % (8-16 $\mu$ m)	4.25	
Medium Silt % (16-31 $\mu$ m)	5.70	
Course Silt % (31-63 $\mu$ m)	6.46	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>19.26</b>	
Very Fine sand % (63-125 $\mu$ m)	12.70	
Fine sand % (125-250 $\mu$ m)	22.02	
Medium sand % (250-500 $\mu$ m)	12.57	
Coarse sand % (500-1000 $\mu$ m)	9.17	
Very Coarse sand % (1000-2000 $\mu$ m)	6.78	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>63.24</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>12.87</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.17	
1000	6.78	
2000	5.76	
4000	7.11	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG11	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 165.40 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 22.56 Time for 50% of particles to settle over 1 m (hours) 0.012 D10 ( $\mu$ m ) 10.51 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.09 Time for 90% of particles to settle over 1 m (hours) 3.050
Sampling Date:	18/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>5.07</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.23	
Fine Silt % (8-16 $\mu$ m)	5.12	
Medium Silt % (16-31 $\mu$ m)	7.05	
Course Silt % (31-63 $\mu$ m)	7.47	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>22.86</b>	
Very Fine sand % (63-125 $\mu$ m)	13.00	
Fine sand % (125-250 $\mu$ m)	22.13	
Medium sand % (250-500 $\mu$ m)	10.08	
Coarse sand % (500-1000 $\mu$ m)	6.00	
Very Coarse sand % (1000-2000 $\mu$ m)	4.88	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>56.10</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.97</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	6.00	
1000	4.88	
2000	4.15	
4000	3.09	
8000	8.73	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG12	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 427.08 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 150.40 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m ) 15.77 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.21 Time for 90% of particles to settle over 1 m (hours) 1.354
Sampling Date:	18/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	30/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.62</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.36	
Fine Silt % (8-16 $\mu$ m)	3.10	
Medium Silt % (16-31 $\mu$ m)	3.77	
Course Silt % (31-63 $\mu$ m)	5.36	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.59</b>	
Very Fine sand % (63-125 $\mu$ m)	8.04	
Fine sand % (125-250 $\mu$ m)	11.92	
Medium sand % (250-500 $\mu$ m)	13.47	
Coarse sand % (500-1000 $\mu$ m)	15.70	
Very Coarse sand % (1000-2000 $\mu$ m)	10.15	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>59.26</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>21.53</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.70	
1000	10.15	
2000	9.88	
4000	8.04	
8000	3.60	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4

Sample Name:	SG13	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 328.28 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 88.87 Time for 50% of particles to settle over 1 m (hours) 0.003 D10 ( $\mu$ m ) 13.91 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.16 Time for 90% of particles to settle over 1 m (hours) 1.742
Sampling Date:	18/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-4	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.89</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.60	
Fine Silt % (8-16 $\mu$ m)	3.25	
Medium Silt % (16-31 $\mu$ m)	4.05	
Course Silt % (31-63 $\mu$ m)	5.95	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>15.85</b>	
Very Fine sand % (63-125 $\mu$ m)	10.96	
Fine sand % (125-250 $\mu$ m)	13.85	
Medium sand % (250-500 $\mu$ m)	9.90	
Coarse sand % (500-1000 $\mu$ m)	15.52	
Very Coarse sand % (1000-2000 $\mu$ m)	11.46	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>61.69</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>17.57</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.52	
1000	11.46	
2000	9.75	
4000	3.50	
8000	4.31	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 6/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS01	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 679.39 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 380.61 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 22.46 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.42 Time for 90% of particles to settle over 1 m (hours) 0.668
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.12</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.05	
Fine Silt % (8-16 $\mu$ m)	3.02	
Medium Silt % (16-31 $\mu$ m)	3.62	
Course Silt % (31-63 $\mu$ m)	5.81	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.50</b>	
Very Fine sand % (63-125 $\mu$ m)	10.47	
Fine sand % (125-250 $\mu$ m)	9.53	
Medium sand % (250-500 $\mu$ m)	6.98	
Coarse sand % (500-1000 $\mu$ m)	15.04	
Very Coarse sand % (1000-2000 $\mu$ m)	13.46	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>55.48</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>26.90</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.04	
1000	13.46	
2000	14.88	
4000	10.50	
8000	1.52	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock and shell present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS02	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 687.53 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 389.79 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m ) 12.34 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.13 Time for 90% of particles to settle over 1 m (hours) 2.211
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.60</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.97	
Fine Silt % (8-16 $\mu$ m)	4.12	
Medium Silt % (16-31 $\mu$ m)	4.57	
Course Silt % (31-63 $\mu$ m)	6.59	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>18.25</b>	
Very Fine sand % (63-125 $\mu$ m)	9.90	
Fine sand % (125-250 $\mu$ m)	7.61	
Medium sand % (250-500 $\mu$ m)	6.35	
Coarse sand % (500-1000 $\mu$ m)	8.77	
Very Coarse sand % (1000-2000 $\mu$ m)	11.00	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.63</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>33.52</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.77	
1000	11.00	
2000	17.81	
4000	15.71	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS03	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 3503.91 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 10124.00 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 18.49 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.28 Time for 90% of particles to settle over 1 m (hours) 0.986
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.68</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.39	
Fine Silt % (8-16 $\mu$ m)	3.19	
Medium Silt % (16-31 $\mu$ m)	3.45	
Course Silt % (31-63 $\mu$ m)	3.87	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>12.90</b>	
Very Fine sand % (63-125 $\mu$ m)	3.41	
Fine sand % (125-250 $\mu$ m)	2.04	
Medium sand % (250-500 $\mu$ m)	3.47	
Coarse sand % (500-1000 $\mu$ m)	7.78	
Very Coarse sand % (1000-2000 $\mu$ m)	6.93	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>23.63</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>59.79</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	7.78	
1000	6.93	
2000	13.02	
4000	16.91	
8000	10.07	
16000	19.79	
		<b>Sample visual assessment</b> Muddy rock with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS04	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 442.93 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 161.78 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 8.89 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.07 Time for 90% of particles to settle over 1 m (hours) 4.265
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>5.68</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.65	
Fine Silt % (8-16 $\mu$ m)	5.04	
Medium Silt % (16-31 $\mu$ m)	5.69	
Course Silt % (31-63 $\mu$ m)	6.81	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>21.19</b>	
Very Fine sand % (63-125 $\mu$ m)	6.13	
Fine sand % (125-250 $\mu$ m)	7.56	
Medium sand % (250-500 $\mu$ m)	11.00	
Coarse sand % (500-1000 $\mu$ m)	9.20	
Very Coarse sand % (1000-2000 $\mu$ m)	7.83	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>41.73</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>31.40</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.20	
1000	7.83	
2000	12.52	
4000	15.73	
8000	3.15	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS05	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 313.98 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 81.29 Time for 50% of particles to settle over 1 m (hours) 0.003 D10 ( $\mu$ m ) 6.71 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.04 Time for 90% of particles to settle over 1 m (hours) 7.473
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>6.92</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.29	
Fine Silt % (8-16 $\mu$ m)	5.83	
Medium Silt % (16-31 $\mu$ m)	6.64	
Course Silt % (31-63 $\mu$ m)	7.79	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>24.55</b>	
Very Fine sand % (63-125 $\mu$ m)	7.46	
Fine sand % (125-250 $\mu$ m)	8.02	
Medium sand % (250-500 $\mu$ m)	8.34	
Coarse sand % (500-1000 $\mu$ m)	8.90	
Very Coarse sand % (1000-2000 $\mu$ m)	8.83	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>41.55</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>26.98</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.90	
1000	8.83	
2000	11.57	
4000	13.55	
8000	1.86	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some sand, rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS06	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 898.48 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 665.67 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 28.72 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.68 Time for 90% of particles to settle over 1 m (hours) 0.409
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.06</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.90	
Fine Silt % (8-16 $\mu$ m)	2.53	
Medium Silt % (16-31 $\mu$ m)	2.86	
Course Silt % (31-63 $\mu$ m)	3.76	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.05</b>	
Very Fine sand % (63-125 $\mu$ m)	3.64	
Fine sand % (125-250 $\mu$ m)	5.31	
Medium sand % (250-500 $\mu$ m)	11.15	
Coarse sand % (500-1000 $\mu$ m)	19.81	
Very Coarse sand % (1000-2000 $\mu$ m)	12.75	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>52.66</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>33.23</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	19.81	
1000	12.75	
2000	15.37	
4000	13.68	
8000	4.18	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS07	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 747.83 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 461.16 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 23.57 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.46 Time for 90% of particles to settle over 1 m (hours) 0.607
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.38</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.09	
Fine Silt % (8-16 $\mu$ m)	2.76	
Medium Silt % (16-31 $\mu$ m)	3.15	
Course Silt % (31-63 $\mu$ m)	4.58	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>12.57</b>	
Very Fine sand % (63-125 $\mu$ m)	5.17	
Fine sand % (125-250 $\mu$ m)	8.71	
Medium sand % (250-500 $\mu$ m)	12.94	
Coarse sand % (500-1000 $\mu$ m)	14.59	
Very Coarse sand % (1000-2000 $\mu$ m)	16.45	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>57.86</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>26.19</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	14.59	
1000	16.45	
2000	10.59	
4000	7.11	
8000	8.50	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS08	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1512.45 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1886.28 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 25.40 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.53 Time for 90% of particles to settle over 1 m (hours) 0.522
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.21</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.99	
Fine Silt % (8-16 $\mu$ m)	2.68	
Medium Silt % (16-31 $\mu$ m)	3.09	
Course Silt % (31-63 $\mu$ m)	4.02	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.78</b>	
Very Fine sand % (63-125 $\mu$ m)	4.18	
Fine sand % (125-250 $\mu$ m)	5.80	
Medium sand % (250-500 $\mu$ m)	8.24	
Coarse sand % (500-1000 $\mu$ m)	11.04	
Very Coarse sand % (1000-2000 $\mu$ m)	11.20	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>40.47</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>44.54</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.04	
1000	11.20	
2000	13.96	
4000	18.73	
8000	11.85	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS09	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1527.74 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1924.61 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 24.53 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.50 Time for 90% of particles to settle over 1 m (hours) 0.560
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	1/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.31</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.08	
Fine Silt % (8-16 $\mu$ m)	2.70	
Medium Silt % (16-31 $\mu$ m)	3.03	
Course Silt % (31-63 $\mu$ m)	4.03	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.84</b>	
Very Fine sand % (63-125 $\mu$ m)	4.11	
Fine sand % (125-250 $\mu$ m)	3.94	
Medium sand % (250-500 $\mu$ m)	6.68	
Coarse sand % (500-1000 $\mu$ m)	14.61	
Very Coarse sand % (1000-2000 $\mu$ m)	10.45	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>39.79</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>45.07</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	14.61	
1000	10.45	
2000	12.11	
4000	12.46	
8000	20.49	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS10	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 808.26 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 538.70 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 17.56 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.25 Time for 90% of particles to settle over 1 m (hours) 1.093
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.92</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.42	
Fine Silt % (8-16 $\mu$ m)	3.19	
Medium Silt % (16-31 $\mu$ m)	3.56	
Course Silt % (31-63 $\mu$ m)	5.02	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.20</b>	
Very Fine sand % (63-125 $\mu$ m)	5.75	
Fine sand % (125-250 $\mu$ m)	5.99	
Medium sand % (250-500 $\mu$ m)	8.44	
Coarse sand % (500-1000 $\mu$ m)	19.00	
Very Coarse sand % (1000-2000 $\mu$ m)	19.25	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>58.42</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>23.47</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	19.00	
1000	19.25	
2000	15.65	
4000	7.54	
8000	0.28	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS11	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1988.95 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 3262.08 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 47.62 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.87 Time for 90% of particles to settle over 1 m (hours) 0.149
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.42</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.55	
Fine Silt % (8-16 $\mu$ m)	2.01	
Medium Silt % (16-31 $\mu$ m)	2.26	
Course Silt % (31-63 $\mu$ m)	3.18	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.99</b>	
Very Fine sand % (63-125 $\mu$ m)	3.64	
Fine sand % (125-250 $\mu$ m)	3.48	
Medium sand % (250-500 $\mu$ m)	5.48	
Coarse sand % (500-1000 $\mu$ m)	13.99	
Very Coarse sand % (1000-2000 $\mu$ m)	12.13	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>38.72</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>49.87</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.99	
1000	12.13	
2000	16.42	
4000	12.45	
8000	2.43	
16000	18.57	
		<b>Sample visual assessment</b> Muddy rock with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS12	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 973.49 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 781.47 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 20.15 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.33 Time for 90% of particles to settle over 1 m (hours) 0.830
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.57</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.22	
Fine Silt % (8-16 $\mu$ m)	3.03	
Medium Silt % (16-31 $\mu$ m)	3.53	
Course Silt % (31-63 $\mu$ m)	4.79	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>13.57</b>	
Very Fine sand % (63-125 $\mu$ m)	5.37	
Fine sand % (125-250 $\mu$ m)	6.38	
Medium sand % (250-500 $\mu$ m)	9.02	
Coarse sand % (500-1000 $\mu$ m)	12.77	
Very Coarse sand % (1000-2000 $\mu$ m)	9.41	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>42.95</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>39.91</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.77	
1000	9.41	
2000	17.03	
4000	15.15	
8000	7.73	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell coral present.

  
Signatory: Jamie Woodward  
Date: 10/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS13	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1126.58 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1046.57 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 23.09 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.44 Time for 90% of particles to settle over 1 m (hours) 0.632
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.36</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.07	
Fine Silt % (8-16 $\mu$ m)	2.82	
Medium Silt % (16-31 $\mu$ m)	3.28	
Course Silt % (31-63 $\mu$ m)	4.66	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>12.82</b>	
Very Fine sand % (63-125 $\mu$ m)	5.30	
Fine sand % (125-250 $\mu$ m)	5.82	
Medium sand % (250-500 $\mu$ m)	8.17	
Coarse sand % (500-1000 $\mu$ m)	12.69	
Very Coarse sand % (1000-2000 $\mu$ m)	14.52	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>46.50</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>37.31</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.69	
1000	14.52	
2000	19.34	
4000	17.97	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS14	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1119.97 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1034.32 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 15.99 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.21 Time for 90% of particles to settle over 1 m (hours) 1.317
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.25</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.48	
Fine Silt % (8-16 $\mu$ m)	3.27	
Medium Silt % (16-31 $\mu$ m)	3.75	
Course Silt % (31-63 $\mu$ m)	4.97	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.48</b>	
Very Fine sand % (63-125 $\mu$ m)	5.53	
Fine sand % (125-250 $\mu$ m)	5.99	
Medium sand % (250-500 $\mu$ m)	6.96	
Coarse sand % (500-1000 $\mu$ m)	11.35	
Very Coarse sand % (1000-2000 $\mu$ m)	12.02	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>41.85</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>39.42</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.35	
1000	12.02	
2000	15.85	
4000	14.75	
8000	8.82	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 10/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS15	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 4631.10 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 17685.37 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 27.82 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.64 Time for 90% of particles to settle over 1 m (hours) 0.435
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.18</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.93	
Fine Silt % (8-16 $\mu$ m)	2.52	
Medium Silt % (16-31 $\mu$ m)	2.89	
Course Silt % (31-63 $\mu$ m)	4.04	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.37</b>	
Very Fine sand % (63-125 $\mu$ m)	4.65	
Fine sand % (125-250 $\mu$ m)	5.01	
Medium sand % (250-500 $\mu$ m)	5.34	
Coarse sand % (500-1000 $\mu$ m)	3.29	
Very Coarse sand % (1000-2000 $\mu$ m)	3.91	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>22.22</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>63.24</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	3.29	
1000	3.91	
2000	10.12	
4000	19.74	
8000	33.38	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some sand and shell present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
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Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS16	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 2676.18 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 5905.75 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 33.80 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.94 Time for 90% of particles to settle over 1 m (hours) 0.295
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.94</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.77	
Fine Silt % (8-16 $\mu$ m)	2.30	
Medium Silt % (16-31 $\mu$ m)	2.62	
Course Silt % (31-63 $\mu$ m)	3.48	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>10.18</b>	
Very Fine sand % (63-125 $\mu$ m)	3.94	
Fine sand % (125-250 $\mu$ m)	4.43	
Medium sand % (250-500 $\mu$ m)	4.77	
Coarse sand % (500-1000 $\mu$ m)	7.88	
Very Coarse sand % (1000-2000 $\mu$ m)	8.78	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>29.79</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>57.09</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	7.88	
1000	8.78	
2000	20.98	
4000	25.00	
8000	11.12	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS17	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 842.85 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 585.80 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 42.67 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.50 Time for 90% of particles to settle over 1 m (hours) 0.185
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.84</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.60	
Fine Silt % (8-16 $\mu$ m)	2.00	
Medium Silt % (16-31 $\mu$ m)	2.25	
Course Silt % (31-63 $\mu$ m)	3.34	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>9.19</b>	
Very Fine sand % (63-125 $\mu$ m)	4.30	
Fine sand % (125-250 $\mu$ m)	8.30	
Medium sand % (250-500 $\mu$ m)	14.87	
Coarse sand % (500-1000 $\mu$ m)	15.32	
Very Coarse sand % (1000-2000 $\mu$ m)	10.59	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>53.38</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>34.59</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.32	
1000	10.59	
2000	14.08	
4000	13.71	
8000	6.80	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS18	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 989.87 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 807.98 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 50.37 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.09 Time for 90% of particles to settle over 1 m (hours) 0.133
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	2/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.49</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.45	
Fine Silt % (8-16 $\mu$ m)	1.85	
Medium Silt % (16-31 $\mu$ m)	2.10	
Course Silt % (31-63 $\mu$ m)	3.36	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.76</b>	
Very Fine sand % (63-125 $\mu$ m)	4.26	
Fine sand % (125-250 $\mu$ m)	8.25	
Medium sand % (250-500 $\mu$ m)	14.81	
Coarse sand % (500-1000 $\mu$ m)	11.66	
Very Coarse sand % (1000-2000 $\mu$ m)	14.70	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>53.69</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>35.06</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.66	
1000	14.70	
2000	18.37	
4000	12.37	
8000	4.32	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

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 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS19	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1601.05 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 2113.77 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 18.31 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.28 Time for 90% of particles to settle over 1 m (hours) 1.005
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.76</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.33	
Fine Silt % (8-16 $\mu$ m)	3.20	
Medium Silt % (16-31 $\mu$ m)	3.66	
Course Silt % (31-63 $\mu$ m)	4.65	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>13.83</b>	
Very Fine sand % (63-125 $\mu$ m)	4.68	
Fine sand % (125-250 $\mu$ m)	5.42	
Medium sand % (250-500 $\mu$ m)	8.27	
Coarse sand % (500-1000 $\mu$ m)	9.26	
Very Coarse sand % (1000-2000 $\mu$ m)	7.95	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>35.57</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>46.83</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.26	
1000	7.95	
2000	10.64	
4000	12.45	
8000	23.74	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 10/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS20	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 779.42 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 500.94 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 13.62 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.15 Time for 90% of particles to settle over 1 m (hours) 1.815
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.44</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.76	
Fine Silt % (8-16 $\mu$ m)	3.78	
Medium Silt % (16-31 $\mu$ m)	4.34	
Course Silt % (31-63 $\mu$ m)	5.79	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>16.67</b>	
Very Fine sand % (63-125 $\mu$ m)	5.95	
Fine sand % (125-250 $\mu$ m)	5.64	
Medium sand % (250-500 $\mu$ m)	9.90	
Coarse sand % (500-1000 $\mu$ m)	13.24	
Very Coarse sand % (1000-2000 $\mu$ m)	13.78	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>48.51</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>30.38</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.24	
1000	13.78	
2000	16.98	
4000	10.65	
8000	2.74	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 10/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS21	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1224.91 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1237.24 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 21.92 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.40 Time for 90% of particles to settle over 1 m (hours) 0.701
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.33</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.13	
Fine Silt % (8-16 $\mu$ m)	2.95	
Medium Silt % (16-31 $\mu$ m)	3.46	
Course Silt % (31-63 $\mu$ m)	4.63	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>13.16</b>	
Very Fine sand % (63-125 $\mu$ m)	4.92	
Fine sand % (125-250 $\mu$ m)	4.22	
Medium sand % (250-500 $\mu$ m)	7.09	
Coarse sand % (500-1000 $\mu$ m)	14.93	
Very Coarse sand % (1000-2000 $\mu$ m)	10.41	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>41.58</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>41.93</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	14.93	
1000	10.41	
2000	8.91	
4000	15.79	
8000	17.23	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
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Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS22	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1267.38 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1324.51 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 107.11 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 9.46 Time for 90% of particles to settle over 1 m (hours) 0.029
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.04</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.73	
Fine Silt % (8-16 $\mu$ m)	1.15	
Medium Silt % (16-31 $\mu$ m)	1.61	
Course Silt % (31-63 $\mu$ m)	2.64	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.14</b>	
Very Fine sand % (63-125 $\mu$ m)	3.64	
Fine sand % (125-250 $\mu$ m)	3.08	
Medium sand % (250-500 $\mu$ m)	5.35	
Coarse sand % (500-1000 $\mu$ m)	25.71	
Very Coarse sand % (1000-2000 $\mu$ m)	18.89	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>56.66</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>36.16</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	25.71	
1000	18.89	
2000	21.69	
4000	14.47	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS23	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1562.24 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 2012.54 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 22.59 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.42 Time for 90% of particles to settle over 1 m (hours) 0.660
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.26</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.07	
Fine Silt % (8-16 $\mu$ m)	2.93	
Medium Silt % (16-31 $\mu$ m)	3.43	
Course Silt % (31-63 $\mu$ m)	4.56	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>12.99</b>	
Very Fine sand % (63-125 $\mu$ m)	4.79	
Fine sand % (125-250 $\mu$ m)	3.95	
Medium sand % (250-500 $\mu$ m)	5.75	
Coarse sand % (500-1000 $\mu$ m)	13.61	
Very Coarse sand % (1000-2000 $\mu$ m)	10.04	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>38.14</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>45.60</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.61	
1000	10.04	
2000	7.12	
4000	15.94	
8000	22.55	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS25	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 2118.57 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 3701.11 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 85.31 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 6.00 Time for 90% of particles to settle over 1 m (hours) 0.046
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.52</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.00	
Fine Silt % (8-16 $\mu$ m)	1.41	
Medium Silt % (16-31 $\mu$ m)	1.83	
Course Silt % (31-63 $\mu$ m)	2.77	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>7.01</b>	
Very Fine sand % (63-125 $\mu$ m)	3.30	
Fine sand % (125-250 $\mu$ m)	2.60	
Medium sand % (250-500 $\mu$ m)	2.70	
Coarse sand % (500-1000 $\mu$ m)	14.23	
Very Coarse sand % (1000-2000 $\mu$ m)	18.02	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>40.85</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>50.62</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	14.23	
1000	18.02	
2000	10.43	
4000	10.77	
8000	29.42	
16000	0.00	
		<b>Sample visual assessment</b> Rock with some sand, mud, shell and coral present. Lots of large rocks up to 9cm in size present, could not be included in the sub sample.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS26	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 3011.27 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 7477.32 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 49.28 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.00 Time for 90% of particles to settle over 1 m (hours) 0.139
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.31</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.44	
Fine Silt % (8-16 $\mu$ m)	1.96	
Medium Silt % (16-31 $\mu$ m)	2.31	
Course Silt % (31-63 $\mu$ m)	3.22	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.94</b>	
Very Fine sand % (63-125 $\mu$ m)	3.45	
Fine sand % (125-250 $\mu$ m)	2.58	
Medium sand % (250-500 $\mu$ m)	3.33	
Coarse sand % (500-1000 $\mu$ m)	12.97	
Very Coarse sand % (1000-2000 $\mu$ m)	11.48	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>33.80</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>54.95</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.97	
1000	11.48	
2000	9.79	
4000	9.47	
8000	18.45	
16000	17.25	
		<b>Sample visual assessment</b> Rock with some sand, mud, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 14/12/2021

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**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS27	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 3181.82 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 8348.30 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 83.97 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 5.81 Time for 90% of particles to settle over 1 m (hours) 0.048
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.79</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.15	
Fine Silt % (8-16 $\mu$ m)	1.57	
Medium Silt % (16-31 $\mu$ m)	1.83	
Course Silt % (31-63 $\mu$ m)	2.47	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>7.02</b>	
Very Fine sand % (63-125 $\mu$ m)	2.64	
Fine sand % (125-250 $\mu$ m)	1.62	
Medium sand % (250-500 $\mu$ m)	2.87	
Coarse sand % (500-1000 $\mu$ m)	13.34	
Very Coarse sand % (1000-2000 $\mu$ m)	14.24	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>34.72</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>56.46</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.34	
1000	14.24	
2000	10.94	
4000	19.81	
8000	11.65	
16000	14.07	
		<b>Sample visual assessment</b> Rock with some sand, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

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 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS31	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 2483.21 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 5084.78 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 70.02 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 4.04 Time for 90% of particles to settle over 1 m (hours) 0.069
Sampling Date:	21/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	3/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.99</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.21	
Fine Silt % (8-16 $\mu$ m)	1.58	
Medium Silt % (16-31 $\mu$ m)	1.84	
Course Silt % (31-63 $\mu$ m)	2.84	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>7.47</b>	
Very Fine sand % (63-125 $\mu$ m)	3.48	
Fine sand % (125-250 $\mu$ m)	2.58	
Medium sand % (250-500 $\mu$ m)	4.02	
Coarse sand % (500-1000 $\mu$ m)	8.55	
Very Coarse sand % (1000-2000 $\mu$ m)	15.86	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>34.49</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>56.05</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.55	
1000	15.86	
2000	25.05	
4000	23.59	
8000	7.41	
16000	0.00	
		<b>Sample visual assessment</b> Rock with some sand, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS32	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 649.64 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 348.01 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 170.44 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 23.95 Time for 90% of particles to settle over 1 m (hours) 0.012
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.46</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.44	
Fine Silt % (8-16 $\mu$ m)	0.60	
Medium Silt % (16-31 $\mu$ m)	0.69	
Course Silt % (31-63 $\mu$ m)	2.21	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>3.95</b>	
Very Fine sand % (63-125 $\mu$ m)	2.75	
Fine sand % (125-250 $\mu$ m)	11.87	
Medium sand % (250-500 $\mu$ m)	27.14	
Coarse sand % (500-1000 $\mu$ m)	12.82	
Very Coarse sand % (1000-2000 $\mu$ m)	14.10	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>68.69</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>26.91</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.82	
1000	14.10	
2000	17.70	
4000	8.83	
8000	0.38	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS33	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 872.30 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 627.45 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 239.03 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 47.11 Time for 90% of particles to settle over 1 m (hours) 0.006
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.29</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.30	
Fine Silt % (8-16 $\mu$ m)	0.41	
Medium Silt % (16-31 $\mu$ m)	0.48	
Course Silt % (31-63 $\mu$ m)	1.40	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>2.59</b>	
Very Fine sand % (63-125 $\mu$ m)	1.75	
Fine sand % (125-250 $\mu$ m)	6.19	
Medium sand % (250-500 $\mu$ m)	19.97	
Coarse sand % (500-1000 $\mu$ m)	25.79	
Very Coarse sand % (1000-2000 $\mu$ m)	23.06	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>76.76</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>20.35</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	25.79	
1000	23.06	
2000	16.77	
4000	3.58	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

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 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS34	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 410.54 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 138.98 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 226.39 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 42.26 Time for 90% of particles to settle over 1 m (hours) 0.007
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.00</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.00	
Fine Silt % (8-16 $\mu$ m)	0.09	
Medium Silt % (16-31 $\mu$ m)	0.07	
Course Silt % (31-63 $\mu$ m)	1.20	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.36</b>	
Very Fine sand % (63-125 $\mu$ m)	0.61	
Fine sand % (125-250 $\mu$ m)	12.33	
Medium sand % (250-500 $\mu$ m)	51.32	
Coarse sand % (500-1000 $\mu$ m)	15.54	
Very Coarse sand % (1000-2000 $\mu$ m)	6.89	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>86.70</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.94</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.54	
1000	6.89	
2000	5.50	
4000	6.44	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS35	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 434.07 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 155.37 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m ) 89.50 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 6.60 Time for 90% of particles to settle over 1 m (hours) 0.042
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.51</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.92	
Fine Silt % (8-16 $\mu$ m)	1.24	
Medium Silt % (16-31 $\mu$ m)	1.51	
Course Silt % (31-63 $\mu$ m)	3.09	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.76</b>	
Very Fine sand % (63-125 $\mu$ m)	3.16	
Fine sand % (125-250 $\mu$ m)	12.52	
Medium sand % (250-500 $\mu$ m)	32.61	
Coarse sand % (500-1000 $\mu$ m)	12.87	
Very Coarse sand % (1000-2000 $\mu$ m)	8.68	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>69.83</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>21.90</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.87	
1000	8.68	
2000	12.54	
4000	9.15	
8000	0.21	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS36	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 636.80 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 334.39 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 253.26 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 52.89 Time for 90% of particles to settle over 1 m (hours) 0.005
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.05</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.17	
Fine Silt % (8-16 $\mu$ m)	0.35	
Medium Silt % (16-31 $\mu$ m)	0.33	
Course Silt % (31-63 $\mu$ m)	1.27	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>2.12</b>	
Very Fine sand % (63-125 $\mu$ m)	2.00	
Fine sand % (125-250 $\mu$ m)	5.48	
Medium sand % (250-500 $\mu$ m)	31.22	
Coarse sand % (500-1000 $\mu$ m)	33.34	
Very Coarse sand % (1000-2000 $\mu$ m)	16.28	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>88.33</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>9.50</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	33.34	
1000	16.28	
2000	7.92	
4000	1.58	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS37	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 734.44 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 444.80 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 319.07 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 83.95 Time for 90% of particles to settle over 1 m (hours) 0.003
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.00</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.00	
Fine Silt % (8-16 $\mu$ m)	0.00	
Medium Silt % (16-31 $\mu$ m)	0.04	
Course Silt % (31-63 $\mu$ m)	0.56	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>0.60</b>	
Very Fine sand % (63-125 $\mu$ m)	0.32	
Fine sand % (125-250 $\mu$ m)	2.55	
Medium sand % (250-500 $\mu$ m)	30.07	
Coarse sand % (500-1000 $\mu$ m)	35.10	
Very Coarse sand % (1000-2000 $\mu$ m)	20.16	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>88.20</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.20</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 35.10	
	1000 20.16	
	2000 8.91	
	4000 2.30	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS38	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 412.25 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 140.14 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 57.23 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.70 Time for 90% of particles to settle over 1 m (hours) 0.103
Sampling Date:	19/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.17</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.23	
Fine Silt % (8-16 $\mu$ m)	1.61	
Medium Silt % (16-31 $\mu$ m)	2.01	
Course Silt % (31-63 $\mu$ m)	3.50	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>8.36</b>	
Very Fine sand % (63-125 $\mu$ m)	3.92	
Fine sand % (125-250 $\mu$ m)	15.33	
Medium sand % (250-500 $\mu$ m)	26.73	
Coarse sand % (500-1000 $\mu$ m)	11.19	
Very Coarse sand % (1000-2000 $\mu$ m)	12.70	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>69.87</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>19.60</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.19	
1000	12.70	
2000	9.74	
4000	4.63	
8000	5.23	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS39	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 946.15 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 738.19 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 367.89 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 111.60 Time for 90% of particles to settle over 1 m (hours) 0.002
Sampling Date:	19/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.00</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.06	
Fine Silt % (8-16 $\mu$ m)	0.15	
Medium Silt % (16-31 $\mu$ m)	0.17	
Course Silt % (31-63 $\mu$ m)	0.40	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>0.79</b>	
Very Fine sand % (63-125 $\mu$ m)	0.26	
Fine sand % (125-250 $\mu$ m)	1.53	
Medium sand % (250-500 $\mu$ m)	17.45	
Coarse sand % (500-1000 $\mu$ m)	33.59	
Very Coarse sand % (1000-2000 $\mu$ m)	27.61	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>80.44</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>18.77</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	33.59	
1000	27.61	
2000	14.64	
4000	4.13	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS40	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 471.87 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 183.61 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 86.68 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 6.20 Time for 90% of particles to settle over 1 m (hours) 0.045
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.40</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.82	
Fine Silt % (8-16 $\mu$ m)	1.11	
Medium Silt % (16-31 $\mu$ m)	1.31	
Course Silt % (31-63 $\mu$ m)	3.26	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>6.50</b>	
Very Fine sand % (63-125 $\mu$ m)	4.45	
Fine sand % (125-250 $\mu$ m)	12.29	
Medium sand % (250-500 $\mu$ m)	27.48	
Coarse sand % (500-1000 $\mu$ m)	15.21	
Very Coarse sand % (1000-2000 $\mu$ m)	11.01	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>70.44</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>21.65</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.21	
1000	11.01	
2000	13.90	
4000	6.30	
8000	1.46	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS41	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 363.21 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 108.78 Time for 50% of particles to settle over 1 m (hours) 0.003 D10 ( $\mu$ m) 52.08 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 2.24 Time for 90% of particles to settle over 1 m (hours) 0.124
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.02</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.15	
Fine Silt % (8-16 $\mu$ m)	1.60	
Medium Silt % (16-31 $\mu$ m)	1.92	
Course Silt % (31-63 $\mu$ m)	5.31	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>9.99</b>	
Very Fine sand % (63-125 $\mu$ m)	8.66	
Fine sand % (125-250 $\mu$ m)	14.54	
Medium sand % (250-500 $\mu$ m)	27.32	
Coarse sand % (500-1000 $\mu$ m)	16.08	
Very Coarse sand % (1000-2000 $\mu$ m)	8.90	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>75.50</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>12.49</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 16.08	
	1000 8.90	
	2000 8.26	
	4000 4.23	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Sand with some rock, mud, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS42	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 281.62 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 65.40 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m) 17.35 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.25 Time for 90% of particles to settle over 1 m (hours) 1.119
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.05</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.29	
Fine Silt % (8-16 $\mu$ m)	3.22	
Medium Silt % (16-31 $\mu$ m)	4.14	
Course Silt % (31-63 $\mu$ m)	7.68	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.33</b>	
Very Fine sand % (63-125 $\mu$ m)	9.51	
Fine sand % (125-250 $\mu$ m)	14.83	
Medium sand % (250-500 $\mu$ m)	27.21	
Coarse sand % (500-1000 $\mu$ m)	11.23	
Very Coarse sand % (1000-2000 $\mu$ m)	5.09	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>67.88</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>10.74</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.23	
1000	5.09	
2000	6.78	
4000	3.96	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS44 a	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1035.68 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 884.50 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 363.74 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 109.10 Time for 90% of particles to settle over 1 m (hours) 0.003
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.13</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.20	
Fine Silt % (8-16 $\mu$ m)	0.25	
Medium Silt % (16-31 $\mu$ m)	0.24	
Course Silt % (31-63 $\mu$ m)	0.51	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.20</b>	
Very Fine sand % (63-125 $\mu$ m)	0.42	
Fine sand % (125-250 $\mu$ m)	2.07	
Medium sand % (250-500 $\mu$ m)	13.92	
Coarse sand % (500-1000 $\mu$ m)	31.21	
Very Coarse sand % (1000-2000 $\mu$ m)	29.14	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>76.77</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>21.90</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	31.21	
1000	29.14	
2000	16.69	
4000	5.20	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
Signatory: Jamie Woodward  
Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS44 b	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 828.32 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 565.77 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 278.40 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 63.91 Time for 90% of particles to settle over 1 m (hours) 0.004
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.14</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.31	
Fine Silt % (8-16 $\mu$ m)	0.36	
Medium Silt % (16-31 $\mu$ m)	0.32	
Course Silt % (31-63 $\mu$ m)	0.79	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.78</b>	
Very Fine sand % (63-125 $\mu$ m)	0.53	
Fine sand % (125-250 $\mu$ m)	4.75	
Medium sand % (250-500 $\mu$ m)	27.00	
Coarse sand % (500-1000 $\mu$ m)	24.07	
Very Coarse sand % (1000-2000 $\mu$ m)	20.14	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>76.49</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>21.60</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	24.07	
1000	20.14	
2000	18.98	
4000	2.62	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS45	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1177.05 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1142.45 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 286.44 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 67.66 Time for 90% of particles to settle over 1 m (hours) 0.004
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.68</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.42	
Fine Silt % (8-16 $\mu$ m)	0.59	
Medium Silt % (16-31 $\mu$ m)	0.75	
Course Silt % (31-63 $\mu$ m)	1.39	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>3.16</b>	
Very Fine sand % (63-125 $\mu$ m)	1.80	
Fine sand % (125-250 $\mu$ m)	3.11	
Medium sand % (250-500 $\mu$ m)	7.88	
Coarse sand % (500-1000 $\mu$ m)	28.23	
Very Coarse sand % (1000-2000 $\mu$ m)	29.02	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>70.04</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>26.12</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	28.23	
1000	29.02	
2000	19.81	
4000	6.31	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS46	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 957.20 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 755.53 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 554.76 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 253.78 Time for 90% of particles to settle over 1 m (hours) 0.001
Sampling Date:	19/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	8/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.08</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.08	
Fine Silt % (8-16 $\mu$ m)	0.12	
Medium Silt % (16-31 $\mu$ m)	0.17	
Course Silt % (31-63 $\mu$ m)	0.36	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>0.74</b>	
Very Fine sand % (63-125 $\mu$ m)	0.58	
Fine sand % (125-250 $\mu$ m)	0.12	
Medium sand % (250-500 $\mu$ m)	3.03	
Coarse sand % (500-1000 $\mu$ m)	49.70	
Very Coarse sand % (1000-2000 $\mu$ m)	39.42	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>92.85</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>6.33</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	49.70	
1000	39.42	
2000	5.69	
4000	0.64	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS47	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 316.70 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 82.71 Time for 50% of particles to settle over 1 m (hours) 0.003 D10 ( $\mu$ m) 35.09 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.02 Time for 90% of particles to settle over 1 m (hours) 0.274
Sampling Date:	19/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.66</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.49	
Fine Silt % (8-16 $\mu$ m)	2.14	
Medium Silt % (16-31 $\mu$ m)	2.90	
Course Silt % (31-63 $\mu$ m)	7.71	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.24</b>	
Very Fine sand % (63-125 $\mu$ m)	14.52	
Fine sand % (125-250 $\mu$ m)	14.23	
Medium sand % (250-500 $\mu$ m)	11.09	
Coarse sand % (500-1000 $\mu$ m)	23.55	
Very Coarse sand % (1000-2000 $\mu$ m)	14.24	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>77.63</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>5.47</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	23.55	
1000	14.24	
2000	5.13	
4000	0.33	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS48	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 146.35 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 17.66 Time for 50% of particles to settle over 1 m (hours) 0.016 D10 ( $\mu$ m) 18.03 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.27 Time for 90% of particles to settle over 1 m (hours) 1.036
Sampling Date:	19/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.31</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.15	
Fine Silt % (8-16 $\mu$ m)	2.90	
Medium Silt % (16-31 $\mu$ m)	4.55	
Course Silt % (31-63 $\mu$ m)	11.00	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>20.61</b>	
Very Fine sand % (63-125 $\mu$ m)	19.55	
Fine sand % (125-250 $\mu$ m)	25.51	
Medium sand % (250-500 $\mu$ m)	17.44	
Coarse sand % (500-1000 $\mu$ m)	3.90	
Very Coarse sand % (1000-2000 $\mu$ m)	4.05	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>70.46</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>4.62</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	3.90	
1000	4.05	
2000	3.09	
4000	0.42	
8000	1.11	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS49	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 54.37 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 2.44 Time for 50% of particles to settle over 1 m (hours) 0.114 D10 ( $\mu$ m) 4.03 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.01 Time for 90% of particles to settle over 1 m (hours) 20.737
Sampling Date:	19/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	7/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>9.95</b>	
Very Fine Silt % (4-8 $\mu$ m)	5.21	
Fine Silt % (8-16 $\mu$ m)	7.16	
Medium Silt % (16-31 $\mu$ m)	11.06	
Course Silt % (31-63 $\mu$ m)	22.24	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>45.67</b>	
Very Fine sand % (63-125 $\mu$ m)	25.48	
Fine sand % (125-250 $\mu$ m)	13.02	
Medium sand % (250-500 $\mu$ m)	5.28	
Coarse sand % (500-1000 $\mu$ m)	0.18	
Very Coarse sand % (1000-2000 $\mu$ m)	0.21	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>44.16</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>0.22</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 0.18	
	1000 0.21	
	2000 0.22	
	4000 0.00	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Mud with some sand, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS70	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1170.63 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1130.01 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 22.23 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.41 Time for 90% of particles to settle over 1 m (hours) 0.682
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.54</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.07	
Fine Silt % (8-16 $\mu$ m)	2.81	
Medium Silt % (16-31 $\mu$ m)	3.31	
Course Silt % (31-63 $\mu$ m)	4.92	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>13.12</b>	
Very Fine sand % (63-125 $\mu$ m)	5.19	
Fine sand % (125-250 $\mu$ m)	3.19	
Medium sand % (250-500 $\mu$ m)	6.14	
Coarse sand % (500-1000 $\mu$ m)	14.51	
Very Coarse sand % (1000-2000 $\mu$ m)	25.34	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>54.36</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>28.98</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	14.51	
1000	25.34	
2000	15.56	
4000	6.52	
8000	6.90	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS74	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 978.65 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 789.77 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 34.13 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.96 Time for 90% of particles to settle over 1 m (hours) 0.289
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.79</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.63	
Fine Silt % (8-16 $\mu$ m)	2.26	
Medium Silt % (16-31 $\mu$ m)	2.82	
Course Silt % (31-63 $\mu$ m)	5.05	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.76</b>	
Very Fine sand % (63-125 $\mu$ m)	6.58	
Fine sand % (125-250 $\mu$ m)	4.59	
Medium sand % (250-500 $\mu$ m)	5.92	
Coarse sand % (500-1000 $\mu$ m)	19.18	
Very Coarse sand % (1000-2000 $\mu$ m)	16.83	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>53.10</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>32.35</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	19.18	
1000	16.83	
2000	14.04	
4000	14.63	
8000	3.68	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS75	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1004.55 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 832.12 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 45.09 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.68 Time for 90% of particles to settle over 1 m (hours) 0.166
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.35</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.36	
Fine Silt % (8-16 $\mu$ m)	1.84	
Medium Silt % (16-31 $\mu$ m)	2.33	
Course Silt % (31-63 $\mu$ m)	5.11	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>10.65</b>	
Very Fine sand % (63-125 $\mu$ m)	8.00	
Fine sand % (125-250 $\mu$ m)	6.46	
Medium sand % (250-500 $\mu$ m)	6.98	
Coarse sand % (500-1000 $\mu$ m)	15.51	
Very Coarse sand % (1000-2000 $\mu$ m)	12.47	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>49.41</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>37.59</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	15.51	
1000	12.47	
2000	17.36	
4000	15.86	
8000	4.37	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 14/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	HS77	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 272.69 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 61.32 Time for 50% of particles to settle over 1 m (hours) 0.005 D10 ( $\mu$ m) 29.48 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.72 Time for 90% of particles to settle over 1 m (hours) 0.388
Sampling Date:	20/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	6/12/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.02</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.72	
Fine Silt % (8-16 $\mu$ m)	2.38	
Medium Silt % (16-31 $\mu$ m)	3.19	
Course Silt % (31-63 $\mu$ m)	6.71	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.00</b>	
Very Fine sand % (63-125 $\mu$ m)	10.84	
Fine sand % (125-250 $\mu$ m)	19.27	
Medium sand % (250-500 $\mu$ m)	19.38	
Coarse sand % (500-1000 $\mu$ m)	6.83	
Very Coarse sand % (1000-2000 $\mu$ m)	8.85	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>65.16</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>17.82</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	6.83	
1000	8.85	
2000	9.98	
4000	7.85	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock, shell and coral present.

  
 Signatory: Jamie Woodward  
 Date: 14/12/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	PTS-57.5-GS	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 206.90 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 35.30 Time for 50% of particles to settle over 1 m (hours) 0.008 D10 ( $\mu$ m) 32.77 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.89 Time for 90% of particles to settle over 1 m (hours) 0.314
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	15/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.43</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.73	
Fine Silt % (8-16 $\mu$ m)	1.84	
Medium Silt % (16-31 $\mu$ m)	2.70	
Course Silt % (31-63 $\mu$ m)	4.84	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.11</b>	
Very Fine sand % (63-125 $\mu$ m)	14.23	
Fine sand % (125-250 $\mu$ m)	29.60	
Medium sand % (250-500 $\mu$ m)	19.62	
Coarse sand % (500-1000 $\mu$ m)	6.29	
Very Coarse sand % (1000-2000 $\mu$ m)	6.35	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>76.09</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>9.36</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	6.29	
1000	6.35	
2000	5.26	
4000	4.10	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock and shell present.

  
Signatory: Jamie Woodward  
Date: 19/11/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	PTS-62.5-GS	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 233.71 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 45.04 Time for 50% of particles to settle over 1 m (hours) 0.006 D10 ( $\mu$ m ) 30.80 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.78 Time for 90% of particles to settle over 1 m (hours) 0.355
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	15/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.62</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.79	
Fine Silt % (8-16 $\mu$ m)	1.92	
Medium Silt % (16-31 $\mu$ m)	2.71	
Course Silt % (31-63 $\mu$ m)	4.81	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>11.23</b>	
Very Fine sand % (63-125 $\mu$ m)	13.06	
Fine sand % (125-250 $\mu$ m)	24.50	
Medium sand % (250-500 $\mu$ m)	16.19	
Coarse sand % (500-1000 $\mu$ m)	10.28	
Very Coarse sand % (1000-2000 $\mu$ m)	10.67	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>74.71</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>10.45</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 10.28	
	1000 10.67	
	2000 7.90	
	4000 2.54	
	8000 0.00	
	16000 0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock and shell present.

  
 Signatory: Jamie Woodward  
 Date: 19/11/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-5

Sample Name:	PTS-64.0-GS	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 295.77 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 72.13 Time for 50% of particles to settle over 1 m (hours) 0.004 D10 ( $\mu$ m) 37.59 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.17 Time for 90% of particles to settle over 1 m (hours) 0.238
Sampling Date:	17/10/2021	
Sample Type:	Sediment	
MAFRL Job Code:	RPS21-5	
Client Reference:	AU213002038.001	
Analysis Date:	15/11/2021	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.29</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.61	
Fine Silt % (8-16 $\mu$ m)	1.75	
Medium Silt % (16-31 $\mu$ m)	2.42	
Course Silt % (31-63 $\mu$ m)	4.45	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>10.23</b>	
Very Fine sand % (63-125 $\mu$ m)	11.14	
Fine sand % (125-250 $\mu$ m)	20.65	
Medium sand % (250-500 $\mu$ m)	15.27	
Coarse sand % (500-1000 $\mu$ m)	10.25	
Very Coarse sand % (1000-2000 $\mu$ m)	9.10	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>66.40</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>20.09</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	10.25	
1000	9.10	
2000	11.26	
4000	7.52	
8000	1.31	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some rock and shell present.

  
 Signatory: Jamie Woodward  
 Date: 19/11/2021

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-75_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 840.86 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 583.04 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 271.85 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 60.94 Time for 90% of particles to settle over 1 m (hours) 0.005
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.31</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.16	
Fine Silt % (8-16 $\mu$ m)	0.24	
Medium Silt % (16-31 $\mu$ m)	0.39	
Course Silt % (31-63 $\mu$ m)	1.16	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.95</b>	
Very Fine sand % (63-125 $\mu$ m)	2.48	
Fine sand % (125-250 $\mu$ m)	4.47	
Medium sand % (250-500 $\mu$ m)	7.31	
Coarse sand % (500-1000 $\mu$ m)	49.11	
Very Coarse sand % (1000-2000 $\mu$ m)	25.96	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>89.34</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>8.41</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	49.11	
1000	25.96	
2000	5.66	
4000	2.75	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and silt present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-75_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 962.55 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 764.00 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 263.81 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 57.39 Time for 90% of particles to settle over 1 m (hours) 0.005
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	1/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.42</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.21	
Fine Silt % (8-16 $\mu$ m)	0.32	
Medium Silt % (16-31 $\mu$ m)	0.52	
Course Silt % (31-63 $\mu$ m)	1.60	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>2.65</b>	
Very Fine sand % (63-125 $\mu$ m)	3.11	
Fine sand % (125-250 $\mu$ m)	3.52	
Medium sand % (250-500 $\mu$ m)	4.46	
Coarse sand % (500-1000 $\mu$ m)	38.76	
Very Coarse sand % (1000-2000 $\mu$ m)	36.51	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>86.35</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>10.58</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	38.76	
1000	36.51	
2000	10.34	
4000	0.24	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and mud present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-85_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1064.52 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 934.45 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 514.74 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 218.48 Time for 90% of particles to settle over 1 m (hours) 0.001
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.19</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.11	
Fine Silt % (8-16 $\mu$ m)	0.19	
Medium Silt % (16-31 $\mu$ m)	0.35	
Course Silt % (31-63 $\mu$ m)	0.89	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.54</b>	
Very Fine sand % (63-125 $\mu$ m)	1.84	
Fine sand % (125-250 $\mu$ m)	2.53	
Medium sand % (250-500 $\mu$ m)	2.77	
Coarse sand % (500-1000 $\mu$ m)	38.60	
Very Coarse sand % (1000-2000 $\mu$ m)	39.27	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>85.01</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>13.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	38.60	
1000	39.27	
2000	12.06	
4000	1.21	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and silt present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-85_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 988.29 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 805.41 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 513.36 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 217.32 Time for 90% of particles to settle over 1 m (hours) 0.001
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.22</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.14	
Fine Silt % (8-16 $\mu$ m)	0.20	
Medium Silt % (16-31 $\mu$ m)	0.29	
Course Silt % (31-63 $\mu$ m)	0.58	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.21</b>	
Very Fine sand % (63-125 $\mu$ m)	0.88	
Fine sand % (125-250 $\mu$ m)	1.39	
Medium sand % (250-500 $\mu$ m)	5.17	
Coarse sand % (500-1000 $\mu$ m)	42.11	
Very Coarse sand % (1000-2000 $\mu$ m)	40.58	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>90.13</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>8.44</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	42.11	
1000	40.58	
2000	8.44	
4000	0.00	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-85_U_1	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 969.23 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 774.65 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 500.15 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 206.28 Time for 90% of particles to settle over 1 m (hours) 0.001
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.23</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.14	
Fine Silt % (8-16 $\mu$ m)	0.23	
Medium Silt % (16-31 $\mu$ m)	0.41	
Course Silt % (31-63 $\mu$ m)	1.02	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.80</b>	
Very Fine sand % (63-125 $\mu$ m)	1.79	
Fine sand % (125-250 $\mu$ m)	2.53	
Medium sand % (250-500 $\mu$ m)	3.63	
Coarse sand % (500-1000 $\mu$ m)	42.64	
Very Coarse sand % (1000-2000 $\mu$ m)	39.36	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>89.95</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>8.02</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	42.64	
1000	39.36	
2000	6.05	
4000	1.97	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and silt present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-95_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 492.38 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 199.92 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 36.58 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.10 Time for 90% of particles to settle over 1 m (hours) 0.252
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.96</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.37	
Fine Silt % (8-16 $\mu$ m)	1.87	
Medium Silt % (16-31 $\mu$ m)	2.75	
Course Silt % (31-63 $\mu$ m)	6.32	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>12.31</b>	
Very Fine sand % (63-125 $\mu$ m)	8.74	
Fine sand % (125-250 $\mu$ m)	9.71	
Medium sand % (250-500 $\mu$ m)	16.65	
Coarse sand % (500-1000 $\mu$ m)	23.37	
Very Coarse sand % (1000-2000 $\mu$ m)	14.72	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>73.20</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.53</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	23.37	
1000	14.72	
2000	8.72	
4000	2.81	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-95_U_1	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 420.82 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 146.03 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 21.56 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.38 Time for 90% of particles to settle over 1 m (hours) 0.725
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.17</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.92	
Fine Silt % (8-16 $\mu$ m)	2.52	
Medium Silt % (16-31 $\mu$ m)	3.56	
Course Silt % (31-63 $\mu$ m)	7.42	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>15.42</b>	
Very Fine sand % (63-125 $\mu$ m)	9.18	
Fine sand % (125-250 $\mu$ m)	9.25	
Medium sand % (250-500 $\mu$ m)	16.05	
Coarse sand % (500-1000 $\mu$ m)	19.28	
Very Coarse sand % (1000-2000 $\mu$ m)	12.50	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>66.25</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>14.16</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	19.28	
1000	12.50	
2000	9.85	
4000	4.31	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-7_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 637.19 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 334.80 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 201.32 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 33.42 Time for 90% of particles to settle over 1 m (hours) 0.008
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	3/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.16</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.29	
Fine Silt % (8-16 $\mu$ m)	0.44	
Medium Silt % (16-31 $\mu$ m)	0.53	
Course Silt % (31-63 $\mu$ m)	2.02	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>3.28</b>	
Very Fine sand % (63-125 $\mu$ m)	3.12	
Fine sand % (125-250 $\mu$ m)	7.84	
Medium sand % (250-500 $\mu$ m)	29.29	
Coarse sand % (500-1000 $\mu$ m)	23.02	
Very Coarse sand % (1000-2000 $\mu$ m)	12.37	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>75.63</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>20.93</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	23.02	
1000	12.37	
2000	13.79	
4000	7.14	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and mud present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-8_L	<b>Settling Velocity calculations using Stokes Law</b>	
Sampling Date:	7/01/2022		
Sample Type:	Sediment		
MAFRL Job Code:	RPS22-1		
Client Reference:	NA		
Analysis Date:	7/02/2022		
Method Number:	9400	<b>Parameters</b>	
		Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> )	2.65
		Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> )	1.025
		Acceleration due to Gravity (g) (ms <sup>-2</sup> )	9.81
		Liquid viscosity ( $\eta$ ) (cp)	1.074
		*Liquid parameters based on seawater of 35ppt @ 20°C	
		<b>Calculations</b>	
		D50 ( $\mu$ m )	880.56
		Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> )	639.38
		Time for 50% of particles to settle over 1 m (hours)	0.000
		D10 ( $\mu$ m )	306.66
		Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> )	77.54
		Time for 90% of particles to settle over 1 m (hours)	0.004
		<b>Settings</b>	
		SOP Name	SOP-3REPS-default-0% obscuration.msop
		Analysis Model	General Purpose
		Result Units	Volume
		Instrument	Mastersizer3000
		RI/ABS:	2.74 / 1
		Dispersant	Water
		Additives	10mL Sodium Hexametaphosphate
		Sonication (s)	300
<b>Wentworth Size Classifications</b>			
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.07</b>		
Very Fine Silt % (4-8 $\mu$ m)	0.17		
Fine Silt % (8-16 $\mu$ m)	0.24		
Medium Silt % (16-31 $\mu$ m)	0.30		
Course Silt % (31-63 $\mu$ m)	0.76		
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.47</b>		
Very Fine sand % (63-125 $\mu$ m)	1.23		
Fine sand % (125-250 $\mu$ m)	3.57		
Medium sand % (250-500 $\mu$ m)	17.72		
Coarse sand % (500-1000 $\mu$ m)	34.10		
Very Coarse sand % (1000-2000 $\mu$ m)	26.60		
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>83.21</b>		
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.26</b>		
<b>Extended range by sieving</b>			
Extended size, $\mu$ m	Extended percent retained at size		
	500	34.10	<b>Sample visual assessment</b> Sand with some shell, coral and rock present.
	1000	26.60	
	2000	12.00	
	4000	3.26	
	8000	0.00	
	16000	0.00	

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-8_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 916.94 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 693.31 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 313.12 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 80.85 Time for 90% of particles to settle over 1 m (hours) 0.003
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.06</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.17	
Fine Silt % (8-16 $\mu$ m)	0.24	
Medium Silt % (16-31 $\mu$ m)	0.28	
Course Silt % (31-63 $\mu$ m)	0.72	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.41</b>	
Very Fine sand % (63-125 $\mu$ m)	1.09	
Fine sand % (125-250 $\mu$ m)	3.49	
Medium sand % (250-500 $\mu$ m)	16.95	
Coarse sand % (500-1000 $\mu$ m)	32.38	
Very Coarse sand % (1000-2000 $\mu$ m)	27.79	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>81.70</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>16.83</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	32.38	
1000	27.79	
2000	14.32	
4000	2.51	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-23	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 896.26 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 662.39 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 365.82 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 110.35 Time for 90% of particles to settle over 1 m (hours) 0.003
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.02</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.15	
Fine Silt % (8-16 $\mu$ m)	0.20	
Medium Silt % (16-31 $\mu$ m)	0.21	
Course Silt % (31-63 $\mu$ m)	0.49	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.05</b>	
Very Fine sand % (63-125 $\mu$ m)	0.50	
Fine sand % (125-250 $\mu$ m)	1.53	
Medium sand % (250-500 $\mu$ m)	16.33	
Coarse sand % (500-1000 $\mu$ m)	38.58	
Very Coarse sand % (1000-2000 $\mu$ m)	26.49	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>83.43</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.50</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	38.58	
1000	26.49	
2000	11.29	
4000	4.21	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-23_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 901.75 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 670.53 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 373.33 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 114.93 Time for 90% of particles to settle over 1 m (hours) 0.002
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.01</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.14	
Fine Silt % (8-16 $\mu$ m)	0.20	
Medium Silt % (16-31 $\mu$ m)	0.22	
Course Silt % (31-63 $\mu$ m)	0.48	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.03</b>	
Very Fine sand % (63-125 $\mu$ m)	0.47	
Fine sand % (125-250 $\mu$ m)	1.47	
Medium sand % (250-500 $\mu$ m)	15.45	
Coarse sand % (500-1000 $\mu$ m)	39.29	
Very Coarse sand % (1000-2000 $\mu$ m)	31.12	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>87.80</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.16</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	39.29	
1000	31.12	
2000	10.64	
4000	0.51	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP102-7_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1026.04 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 868.11 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 4.99 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 13.547
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	3/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>8.80</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.83	
Fine Silt % (8-16 $\mu$ m)	4.29	
Medium Silt % (16-31 $\mu$ m)	4.61	
Course Silt % (31-63 $\mu$ m)	5.09	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.83</b>	
Very Fine sand % (63-125 $\mu$ m)	4.02	
Fine sand % (125-250 $\mu$ m)	4.46	
Medium sand % (250-500 $\mu$ m)	7.79	
Coarse sand % (500-1000 $\mu$ m)	6.85	
Very Coarse sand % (1000-2000 $\mu$ m)	9.59	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>32.71</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>40.66</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	6.85	
1000	9.59	
2000	19.73	
4000	14.50	
8000	6.43	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP102-7_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 652.36 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 350.93 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 7.55 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.05 Time for 90% of particles to settle over 1 m (hours) 5.907
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	3/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>7.06</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.24	
Fine Silt % (8-16 $\mu$ m)	3.94	
Medium Silt % (16-31 $\mu$ m)	5.42	
Course Silt % (31-63 $\mu$ m)	8.38	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>20.98</b>	
Very Fine sand % (63-125 $\mu$ m)	7.72	
Fine sand % (125-250 $\mu$ m)	5.55	
Medium sand % (250-500 $\mu$ m)	6.66	
Coarse sand % (500-1000 $\mu$ m)	6.70	
Very Coarse sand % (1000-2000 $\mu$ m)	10.08	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>36.71</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>35.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	6.70	
1000	10.08	
2000	12.40	
4000	9.55	
8000	13.32	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP103-1_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 408.70 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 137.74 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 4.46 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 16.911
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>9.37</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.18	
Fine Silt % (8-16 $\mu$ m)	4.82	
Medium Silt % (16-31 $\mu$ m)	4.53	
Course Silt % (31-63 $\mu$ m)	4.11	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.63</b>	
Very Fine sand % (63-125 $\mu$ m)	2.72	
Fine sand % (125-250 $\mu$ m)	7.38	
Medium sand % (250-500 $\mu$ m)	17.58	
Coarse sand % (500-1000 $\mu$ m)	9.51	
Very Coarse sand % (1000-2000 $\mu$ m)	6.32	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.51</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>29.50</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.51	
1000	6.32	
2000	9.90	
4000	11.58	
8000	8.01	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP103-1_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 658.13 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 357.17 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 5.35 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 11.755
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>8.47</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.79	
Fine Silt % (8-16 $\mu$ m)	4.44	
Medium Silt % (16-31 $\mu$ m)	4.31	
Course Silt % (31-63 $\mu$ m)	4.66	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.20</b>	
Very Fine sand % (63-125 $\mu$ m)	4.21	
Fine sand % (125-250 $\mu$ m)	4.93	
Medium sand % (250-500 $\mu$ m)	10.83	
Coarse sand % (500-1000 $\mu$ m)	13.79	
Very Coarse sand % (1000-2000 $\mu$ m)	9.31	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.07</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>31.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.79	
1000	9.31	
2000	11.30	
4000	10.86	
8000	9.10	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP103-5_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1998.46 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 3293.35 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 34.97 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.01 Time for 90% of particles to settle over 1 m (hours) 0.275
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.95</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.70	
Fine Silt % (8-16 $\mu$ m)	2.20	
Medium Silt % (16-31 $\mu$ m)	2.60	
Course Silt % (31-63 $\mu$ m)	3.81	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>10.32</b>	
Very Fine sand % (63-125 $\mu$ m)	4.09	
Fine sand % (125-250 $\mu$ m)	3.19	
Medium sand % (250-500 $\mu$ m)	5.25	
Coarse sand % (500-1000 $\mu$ m)	12.26	
Very Coarse sand % (1000-2000 $\mu$ m)	11.95	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>36.75</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>49.98</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.26	
1000	11.95	
2000	13.97	
4000	25.12	
8000	10.89	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some shell, coral and sand present. Rocks upto approximately 3.5cm in size not included in the sub sample.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP104-9_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 665.89 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 365.63 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 4.31 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 18.136
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>9.55</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.13	
Fine Silt % (8-16 $\mu$ m)	4.33	
Medium Silt % (16-31 $\mu$ m)	4.67	
Course Silt % (31-63 $\mu$ m)	5.99	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>19.13</b>	
Very Fine sand % (63-125 $\mu$ m)	5.90	
Fine sand % (125-250 $\mu$ m)	4.65	
Medium sand % (250-500 $\mu$ m)	7.13	
Coarse sand % (500-1000 $\mu$ m)	11.01	
Very Coarse sand % (1000-2000 $\mu$ m)	6.97	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>35.65</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>35.68</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.01	
1000	6.97	
2000	9.03	
4000	22.45	
8000	4.19	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP106_U_a	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 688.86 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 391.30 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 9.48 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.07 Time for 90% of particles to settle over 1 m (hours) 3.746														
Sampling Date:	6/01/2022															
Sample Type:	Sediment															
MAFRL Job Code:	RPS22-1															
Client Reference:	NA															
Analysis Date:	4/02/2022															
Method Number:	9400															
<b>Wentworth Size Classifications</b> <b>Total Clay % (0-4<math>\mu</math>m) 6.10</b> Very Fine Silt % (4-8 $\mu$ m) 3.02 Fine Silt % (8-16 $\mu$ m) 4.41 Medium Silt % (16-31 $\mu$ m) 6.73 Course Silt % (31-63 $\mu$ m) 9.23 <b>Total Silt (4-63<math>\mu</math>m) 23.39</b> Very Fine sand % (63-125 $\mu$ m) 7.81 Fine sand % (125-250 $\mu$ m) 4.20 Medium sand % (250-500 $\mu$ m) 4.75 Coarse sand % (500-1000 $\mu$ m) 9.97 Very Coarse sand % (1000-2000 $\mu$ m) 12.79 <b>Total Sand (63-2000<math>\mu</math>m) 39.51</b> <b>Total Gravels (&gt;2000<math>\mu</math>m) 31.01</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300														
<b>Extended range by sieving</b> <table border="1"> <thead> <tr> <th>Extended size, <math>\mu</math>m</th> <th>Extended percent retained at size</th> </tr> </thead> <tbody> <tr><td>500</td><td>9.97</td></tr> <tr><td>1000</td><td>12.79</td></tr> <tr><td>2000</td><td>18.57</td></tr> <tr><td>4000</td><td>12.44</td></tr> <tr><td>8000</td><td>0.00</td></tr> <tr><td>16000</td><td>0.00</td></tr> </tbody> </table>			Extended size, $\mu$ m	Extended percent retained at size	500	9.97	1000	12.79	2000	18.57	4000	12.44	8000	0.00	16000	0.00
Extended size, $\mu$ m	Extended percent retained at size															
500	9.97															
1000	12.79															
2000	18.57															
4000	12.44															
8000	0.00															
16000	0.00															
<b>Sample visual assessment</b> Rocky mud with some shell, sand and coral present. Rocks upto approximately 5cm in size not included in the sub sample.																

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP106-0_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 978.75 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 789.92 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 24.81 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.51 Time for 90% of particles to settle over 1 m (hours) 0.547
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.68</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.85	
Fine Silt % (8-16 $\mu$ m)	2.43	
Medium Silt % (16-31 $\mu$ m)	3.33	
Course Silt % (31-63 $\mu$ m)	6.78	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.39</b>	
Very Fine sand % (63-125 $\mu$ m)	8.74	
Fine sand % (125-250 $\mu$ m)	5.00	
Medium sand % (250-500 $\mu$ m)	5.19	
Coarse sand % (500-1000 $\mu$ m)	13.57	
Very Coarse sand % (1000-2000 $\mu$ m)	10.70	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.20</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>38.73</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.57	
1000	10.70	
2000	11.21	
4000	11.14	
8000	16.38	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some shell, rock and coral present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP106-0_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1364.98 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1536.38 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 16.66 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.23 Time for 90% of particles to settle over 1 m (hours) 1.214
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.45</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.18	
Fine Silt % (8-16 $\mu$ m)	3.13	
Medium Silt % (16-31 $\mu$ m)	5.09	
Course Silt % (31-63 $\mu$ m)	7.91	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>18.31</b>	
Very Fine sand % (63-125 $\mu$ m)	7.07	
Fine sand % (125-250 $\mu$ m)	3.72	
Medium sand % (250-500 $\mu$ m)	4.14	
Coarse sand % (500-1000 $\mu$ m)	8.68	
Very Coarse sand % (1000-2000 $\mu$ m)	9.95	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>33.56</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>43.68</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.68	
1000	9.95	
2000	12.76	
4000	26.73	
8000	4.19	
16000	0.00	
		<b>Sample visual assessment</b> Rocky mud with some shell, coral and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP110-4_U2	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 2451.24 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 4954.71 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 46.07 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.75 Time for 90% of particles to settle over 1 m (hours) 0.159
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	2/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.77</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.39	
Fine Silt % (8-16 $\mu$ m)	1.74	
Medium Silt % (16-31 $\mu$ m)	2.19	
Course Silt % (31-63 $\mu$ m)	3.92	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>9.24</b>	
Very Fine sand % (63-125 $\mu$ m)	4.64	
Fine sand % (125-250 $\mu$ m)	2.93	
Medium sand % (250-500 $\mu$ m)	3.85	
Coarse sand % (500-1000 $\mu$ m)	9.42	
Very Coarse sand % (1000-2000 $\mu$ m)	12.87	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>33.72</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>54.28</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.42	
1000	12.87	
2000	18.95	
4000	26.16	
8000	9.17	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some shell, coral and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP112-4_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 2764.31 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 6301.16 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 113.05 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 10.54 Time for 90% of particles to settle over 1 m (hours) 0.026
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.16</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.90	
Fine Silt % (8-16 $\mu$ m)	1.08	
Medium Silt % (16-31 $\mu$ m)	1.44	
Course Silt % (31-63 $\mu$ m)	2.33	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>5.75</b>	
Very Fine sand % (63-125 $\mu$ m)	3.72	
Fine sand % (125-250 $\mu$ m)	4.46	
Medium sand % (250-500 $\mu$ m)	4.80	
Coarse sand % (500-1000 $\mu$ m)	8.11	
Very Coarse sand % (1000-2000 $\mu$ m)	13.67	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>34.76</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>58.33</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.11	
1000	13.67	
2000	21.80	
4000	27.02	
8000	9.51	
16000	0.00	
		<b>Sample visual assessment</b> Rock with some sand and mud present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP119-7_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 524.15 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 226.55 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 4.42 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 17.258
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	1/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>9.38</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.66	
Fine Silt % (8-16 $\mu$ m)	5.68	
Medium Silt % (16-31 $\mu$ m)	6.59	
Course Silt % (31-63 $\mu$ m)	7.59	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>24.53</b>	
Very Fine sand % (63-125 $\mu$ m)	5.72	
Fine sand % (125-250 $\mu$ m)	5.02	
Medium sand % (250-500 $\mu$ m)	5.11	
Coarse sand % (500-1000 $\mu$ m)	5.13	
Very Coarse sand % (1000-2000 $\mu$ m)	5.90	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>26.88</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>39.22</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	5.13	
1000	5.90	
2000	11.16	
4000	9.47	
8000	18.59	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, sand and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP119-7_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 626.96 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 324.14 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 6.66 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.04 Time for 90% of particles to settle over 1 m (hours) 7.586
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	1/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>7.24</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.87	
Fine Silt % (8-16 $\mu$ m)	4.90	
Medium Silt % (16-31 $\mu$ m)	5.81	
Course Silt % (31-63 $\mu$ m)	7.52	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>22.09</b>	
Very Fine sand % (63-125 $\mu$ m)	6.72	
Fine sand % (125-250 $\mu$ m)	4.75	
Medium sand % (250-500 $\mu$ m)	6.59	
Coarse sand % (500-1000 $\mu$ m)	10.25	
Very Coarse sand % (1000-2000 $\mu$ m)	7.44	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>35.75</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>34.91</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	10.25	
1000	7.44	
2000	7.34	
4000	12.06	
8000	15.51	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, sand and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP119-8_U	<b>Settling Velocity calculations using Stokes Law</b>	
Sampling Date:	11/01/2022		
Sample Type:	Sediment		
MAFRL Job Code:	RPS22-1		
Client Reference:	NA		
Analysis Date:	1/02/2022		
Method Number:	9400		
<b>Wentworth Size Classifications</b>		<b>Parameters</b>	
<b>Total Clay % (0-4µm)</b>	<b>3.46</b>	Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> )	2.65
Very Fine Silt % (4-8µm)	1.89	Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> )	1.025
Fine Silt % (8-16µm)	2.47	Acceleration due to Gravity (g) (ms <sup>-2</sup> )	9.81
Medium Silt % (16-31µm)	2.88	Liquid viscosity ( $\eta$ ) (cp)	1.074
Course Silt % (31-63µm)	3.47	*Liquid parameters based on seawater of 35ppt @ 20°C	
<b>Total Silt (4-63µm)</b>	<b>10.71</b>	<b>Calculations</b>	
Very Fine sand % (63-125µm)	3.00	D50 (µm)	6708.68
Fine sand % (125-250µm)	1.92	Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> )	37112.44
Medium sand % (250-500µm)	2.81	Time for 50% of particles to settle over 1 m (hours)	0.000
Coarse sand % (500-1000µm)	5.84	D10 (µm)	26.59
Very Coarse sand % (1000-2000µm)	6.06	Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> )	0.58
<b>Total Sand (63-2000µm)</b>	<b>19.64</b>	Time for 90% of particles to settle over 1 m (hours)	0.477
<b>Total Gravels (&gt;2000µm)</b>	<b>66.18</b>	<b>Settings</b>	
<b>Extended range by sieving</b>		SOP Name	SOP-LV-3REPS-default.msop
Extended size, µm	Extended percent retained at size	Analysis Model	General Purpose
		Result Units	Volume
		Instrument	Mastersizer3000
		RI/ABS:	2.74 / 1
		Dispersant	Water
		Additives	10mL Sodium Hexametaphosphate
		Sonication (s)	300
		<b>Sample visual assessment</b>	
		Rocks with some shell, sand and mud present. Large rocks upto approximately 6cm in size not included in the sub sample.	
	500		5.84
	1000		6.06
	2000		6.85
	4000		13.79
	8000		19.58
	16000		25.97

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP120-5_U	<b>Settling Velocity calculations using Stokes Law</b>
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	2/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		<b>Parameters</b>
<b>Total Clay % (0-4µm)</b>	<b>2.19</b>	Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65
Very Fine Silt % (4-8µm)	1.26	Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025
Fine Silt % (8-16µm)	1.68	Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81
Medium Silt % (16-31µm)	1.93	Liquid viscosity ( $\eta$ ) (cp) 1.074
Course Silt % (31-63µm)	2.67	*Liquid parameters based on seawater of 35ppt @ 20°C
<b>Total Silt (4-63µm)</b>	<b>7.53</b>	<b>Calculations</b>
Very Fine sand % (63-125µm)	2.93	D50 (µm) 6239.74
Fine sand % (125-250µm)	2.36	Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 32105.42
Medium sand % (250-500µm)	3.29	Time for 50% of particles to settle over 1 m (hours) 0.000
Coarse sand % (500-1000µm)	5.47	D10 (µm) 67.13
Very Coarse sand % (1000-2000µm)	6.49	Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 3.72
<b>Total Sand (63-2000µm)</b>	<b>20.54</b>	Time for 90% of particles to settle over 1 m (hours) 0.075
<b>Total Gravels (&gt;2000µm)</b>	<b>69.74</b>	<b>Settings</b>
<b>Extended range by sieving</b>		SOP Name SOP-LV-3REPS-default.msop
Extended size, µm	Extended percent retained at size	Analysis Model General Purpose
500	5.47	Result Units Volume
1000	6.49	Instrument Mastersizer3000
2000	11.96	RI/ABS: 2.74 / 1
4000	13.89	Dispersant Water
8000	43.89	Additives 10mL Sodium Hexametaphosphate
16000	0.00	Sonication (s) 300
		<b>Sample visual assessment</b>
		Muddy rock with some shell and sand present. Rocks upto approximately 4.5cm in size not included in the sub sample.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP120-6	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1198.84 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1185.14 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 6.93 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.04 Time for 90% of particles to settle over 1 m (hours) 7.006
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	2/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>6.85</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.07	
Fine Silt % (8-16 $\mu$ m)	4.62	
Medium Silt % (16-31 $\mu$ m)	4.30	
Course Silt % (31-63 $\mu$ m)	4.65	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.63</b>	
Very Fine sand % (63-125 $\mu$ m)	5.15	
Fine sand % (125-250 $\mu$ m)	7.70	
Medium sand % (250-500 $\mu$ m)	5.94	
Coarse sand % (500-1000 $\mu$ m)	5.71	
Very Coarse sand % (1000-2000 $\mu$ m)	5.10	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>29.60</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>45.92</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	5.71	
1000	5.10	
2000	3.74	
4000	9.89	
8000	32.28	
16000	0.00	
		<b>Sample visual assessment</b> Rocky mud with some shell and sand present.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP120-6_U	<b>Settling Velocity calculations using Stokes Law</b>
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	3/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		<b>Parameters</b>
<b>Total Clay % (0-4µm)</b>	<b>7.50</b>	Particle density ( $\rho$ ) (g/cm <sup>3</sup> ) 2.65
Very Fine Silt % (4-8µm)	4.64	Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025
Fine Silt % (8-16µm)	5.14	Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81
Medium Silt % (16-31µm)	4.45	Liquid viscosity ( $\eta$ ) (cp) 1.074
Course Silt % (31-63µm)	4.50	*Liquid parameters based on seawater of 35ppt @ 20°C
<b>Total Silt (4-63µm)</b>	<b>18.74</b>	<b>Calculations</b>
Very Fine sand % (63-125µm)	4.45	D50 (µm) 2987.64
Fine sand % (125-250µm)	5.83	Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 7360.43
Medium sand % (250-500µm)	4.51	Time for 50% of particles to settle over 1 m (hours) 0.000
Coarse sand % (500-1000µm)	4.04	D10 (µm) 5.92
Very Coarse sand % (1000-2000µm)	3.60	Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.03
<b>Total Sand (63-2000µm)</b>	<b>22.43</b>	Time for 90% of particles to settle over 1 m (hours) 9.597
<b>Total Gravels (&gt;2000µm)</b>	<b>51.33</b>	<b>Settings</b>
<b>Extended range by sieving</b>		SOP Name SOP-LV-3REPS-default.msop
Extended size, µm	Extended percent retained at size	Analysis Model General Purpose
500	4.04	Result Units Volume
1000	3.60	Instrument Mastersizer3000
2000	2.70	RI/ABS: 2.74 / 1
4000	7.41	Dispersant Water
8000	41.22	Additives 10mL Sodium Hexametaphosphate
16000	0.00	Sonication (s) 300
		<b>Sample visual assessment</b>
		Rocky mud with some shell and sand present. Large rocks upto approximately 6cm in size not included in the sub sample.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-75_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 840.86 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 583.04 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 271.85 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 60.94 Time for 90% of particles to settle over 1 m (hours) 0.005
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.31</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.16	
Fine Silt % (8-16 $\mu$ m)	0.24	
Medium Silt % (16-31 $\mu$ m)	0.39	
Course Silt % (31-63 $\mu$ m)	1.16	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.95</b>	
Very Fine sand % (63-125 $\mu$ m)	2.48	
Fine sand % (125-250 $\mu$ m)	4.47	
Medium sand % (250-500 $\mu$ m)	7.31	
Coarse sand % (500-1000 $\mu$ m)	49.11	
Very Coarse sand % (1000-2000 $\mu$ m)	25.96	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>89.34</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>8.41</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	49.11	
1000	25.96	
2000	5.66	
4000	2.75	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and silt present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-75_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 962.55 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 764.00 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 263.81 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 57.39 Time for 90% of particles to settle over 1 m (hours) 0.005
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	1/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.42</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.21	
Fine Silt % (8-16 $\mu$ m)	0.32	
Medium Silt % (16-31 $\mu$ m)	0.52	
Course Silt % (31-63 $\mu$ m)	1.60	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>2.65</b>	
Very Fine sand % (63-125 $\mu$ m)	3.11	
Fine sand % (125-250 $\mu$ m)	3.52	
Medium sand % (250-500 $\mu$ m)	4.46	
Coarse sand % (500-1000 $\mu$ m)	38.76	
Very Coarse sand % (1000-2000 $\mu$ m)	36.51	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>86.35</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>10.58</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	38.76	
1000	36.51	
2000	10.34	
4000	0.24	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and mud present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-85_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1064.52 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 934.45 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 514.74 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 218.48 Time for 90% of particles to settle over 1 m (hours) 0.001
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.19</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.11	
Fine Silt % (8-16 $\mu$ m)	0.19	
Medium Silt % (16-31 $\mu$ m)	0.35	
Course Silt % (31-63 $\mu$ m)	0.89	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.54</b>	
Very Fine sand % (63-125 $\mu$ m)	1.84	
Fine sand % (125-250 $\mu$ m)	2.53	
Medium sand % (250-500 $\mu$ m)	2.77	
Coarse sand % (500-1000 $\mu$ m)	38.60	
Very Coarse sand % (1000-2000 $\mu$ m)	39.27	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>85.01</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>13.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	38.60	
1000	39.27	
2000	12.06	
4000	1.21	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and silt present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-85_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 988.29 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 805.41 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 513.36 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 217.32 Time for 90% of particles to settle over 1 m (hours) 0.001
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.22</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.14	
Fine Silt % (8-16 $\mu$ m)	0.20	
Medium Silt % (16-31 $\mu$ m)	0.29	
Course Silt % (31-63 $\mu$ m)	0.58	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.21</b>	
Very Fine sand % (63-125 $\mu$ m)	0.88	
Fine sand % (125-250 $\mu$ m)	1.39	
Medium sand % (250-500 $\mu$ m)	5.17	
Coarse sand % (500-1000 $\mu$ m)	42.11	
Very Coarse sand % (1000-2000 $\mu$ m)	40.58	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>90.13</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>8.44</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	42.11	
1000	40.58	
2000	8.44	
4000	0.00	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-85_U_1	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 969.23 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 774.65 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 500.15 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 206.28 Time for 90% of particles to settle over 1 m (hours) 0.001
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.23</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.14	
Fine Silt % (8-16 $\mu$ m)	0.23	
Medium Silt % (16-31 $\mu$ m)	0.41	
Course Silt % (31-63 $\mu$ m)	1.02	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.80</b>	
Very Fine sand % (63-125 $\mu$ m)	1.79	
Fine sand % (125-250 $\mu$ m)	2.53	
Medium sand % (250-500 $\mu$ m)	3.63	
Coarse sand % (500-1000 $\mu$ m)	42.64	
Very Coarse sand % (1000-2000 $\mu$ m)	39.36	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>89.95</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>8.02</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	42.64	
1000	39.36	
2000	6.05	
4000	1.97	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and silt present.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-95_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 492.38 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 199.92 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 36.58 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.10 Time for 90% of particles to settle over 1 m (hours) 0.252
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.96</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.37	
Fine Silt % (8-16 $\mu$ m)	1.87	
Medium Silt % (16-31 $\mu$ m)	2.75	
Course Silt % (31-63 $\mu$ m)	6.32	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>12.31</b>	
Very Fine sand % (63-125 $\mu$ m)	8.74	
Fine sand % (125-250 $\mu$ m)	9.71	
Medium sand % (250-500 $\mu$ m)	16.65	
Coarse sand % (500-1000 $\mu$ m)	23.37	
Very Coarse sand % (1000-2000 $\mu$ m)	14.72	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>73.20</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.53</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	23.37	
1000	14.72	
2000	8.72	
4000	2.81	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some shell, coral and rock present.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP92-95_U_1	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 420.82 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 146.03 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 21.56 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.38 Time for 90% of particles to settle over 1 m (hours) 0.725
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.17</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.92	
Fine Silt % (8-16 $\mu$ m)	2.52	
Medium Silt % (16-31 $\mu$ m)	3.56	
Course Silt % (31-63 $\mu$ m)	7.42	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>15.42</b>	
Very Fine sand % (63-125 $\mu$ m)	9.18	
Fine sand % (125-250 $\mu$ m)	9.25	
Medium sand % (250-500 $\mu$ m)	16.05	
Coarse sand % (500-1000 $\mu$ m)	19.28	
Very Coarse sand % (1000-2000 $\mu$ m)	12.50	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>66.25</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>14.16</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	19.28	
1000	12.50	
2000	9.85	
4000	4.31	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some shell, coral and rock present.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-7_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 637.19 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 334.80 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 201.32 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 33.42 Time for 90% of particles to settle over 1 m (hours) 0.008
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	3/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.16</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.29	
Fine Silt % (8-16 $\mu$ m)	0.44	
Medium Silt % (16-31 $\mu$ m)	0.53	
Course Silt % (31-63 $\mu$ m)	2.02	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>3.28</b>	
Very Fine sand % (63-125 $\mu$ m)	3.12	
Fine sand % (125-250 $\mu$ m)	7.84	
Medium sand % (250-500 $\mu$ m)	29.29	
Coarse sand % (500-1000 $\mu$ m)	23.02	
Very Coarse sand % (1000-2000 $\mu$ m)	12.37	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>75.63</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>20.93</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	23.02	
1000	12.37	
2000	13.79	
4000	7.14	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral, rock and mud present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-8_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 880.56 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 639.38 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 306.66 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 77.54 Time for 90% of particles to settle over 1 m (hours) 0.004
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.07</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.17	
Fine Silt % (8-16 $\mu$ m)	0.24	
Medium Silt % (16-31 $\mu$ m)	0.30	
Course Silt % (31-63 $\mu$ m)	0.76	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.47</b>	
Very Fine sand % (63-125 $\mu$ m)	1.23	
Fine sand % (125-250 $\mu$ m)	3.57	
Medium sand % (250-500 $\mu$ m)	17.72	
Coarse sand % (500-1000 $\mu$ m)	34.10	
Very Coarse sand % (1000-2000 $\mu$ m)	26.60	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>83.21</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	34.10	
1000	26.60	
2000	12.00	
4000	3.26	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-8_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 916.94 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 693.31 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 313.12 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 80.85 Time for 90% of particles to settle over 1 m (hours) 0.003
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.06</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.17	
Fine Silt % (8-16 $\mu$ m)	0.24	
Medium Silt % (16-31 $\mu$ m)	0.28	
Course Silt % (31-63 $\mu$ m)	0.72	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.41</b>	
Very Fine sand % (63-125 $\mu$ m)	1.09	
Fine sand % (125-250 $\mu$ m)	3.49	
Medium sand % (250-500 $\mu$ m)	16.95	
Coarse sand % (500-1000 $\mu$ m)	32.38	
Very Coarse sand % (1000-2000 $\mu$ m)	27.79	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>81.70</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>16.83</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	32.38	
1000	27.79	
2000	14.32	
4000	2.51	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-23	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 896.26 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 662.39 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 365.82 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 110.35 Time for 90% of particles to settle over 1 m (hours) 0.003
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.02</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.15	
Fine Silt % (8-16 $\mu$ m)	0.20	
Medium Silt % (16-31 $\mu$ m)	0.21	
Course Silt % (31-63 $\mu$ m)	0.49	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.05</b>	
Very Fine sand % (63-125 $\mu$ m)	0.50	
Fine sand % (125-250 $\mu$ m)	1.53	
Medium sand % (250-500 $\mu$ m)	16.33	
Coarse sand % (500-1000 $\mu$ m)	38.58	
Very Coarse sand % (1000-2000 $\mu$ m)	26.49	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>83.43</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>15.50</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	38.58	
1000	26.49	
2000	11.29	
4000	4.21	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP93-23_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 901.75 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 670.53 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 373.33 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 114.93 Time for 90% of particles to settle over 1 m (hours) 0.002
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	7/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>0.01</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.14	
Fine Silt % (8-16 $\mu$ m)	0.20	
Medium Silt % (16-31 $\mu$ m)	0.22	
Course Silt % (31-63 $\mu$ m)	0.48	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>1.03</b>	
Very Fine sand % (63-125 $\mu$ m)	0.47	
Fine sand % (125-250 $\mu$ m)	1.47	
Medium sand % (250-500 $\mu$ m)	15.45	
Coarse sand % (500-1000 $\mu$ m)	39.29	
Very Coarse sand % (1000-2000 $\mu$ m)	31.12	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>87.80</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>11.16</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-3REPS-default-0% obscuration.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	39.29	
1000	31.12	
2000	10.64	
4000	0.51	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Sand with some shell, coral and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP102-7_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 1026.04 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 868.11 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 4.99 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 13.547
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	3/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>8.80</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.83	
Fine Silt % (8-16 $\mu$ m)	4.29	
Medium Silt % (16-31 $\mu$ m)	4.61	
Course Silt % (31-63 $\mu$ m)	5.09	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.83</b>	
Very Fine sand % (63-125 $\mu$ m)	4.02	
Fine sand % (125-250 $\mu$ m)	4.46	
Medium sand % (250-500 $\mu$ m)	7.79	
Coarse sand % (500-1000 $\mu$ m)	6.85	
Very Coarse sand % (1000-2000 $\mu$ m)	9.59	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>32.71</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>40.66</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	6.85	
1000	9.59	
2000	19.73	
4000	14.50	
8000	6.43	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP102-7_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 652.36 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 350.93 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 7.55 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.05 Time for 90% of particles to settle over 1 m (hours) 5.907
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	3/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>7.06</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.24	
Fine Silt % (8-16 $\mu$ m)	3.94	
Medium Silt % (16-31 $\mu$ m)	5.42	
Course Silt % (31-63 $\mu$ m)	8.38	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>20.98</b>	
Very Fine sand % (63-125 $\mu$ m)	7.72	
Fine sand % (125-250 $\mu$ m)	5.55	
Medium sand % (250-500 $\mu$ m)	6.66	
Coarse sand % (500-1000 $\mu$ m)	6.70	
Very Coarse sand % (1000-2000 $\mu$ m)	10.08	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>36.71</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>35.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	6.70	
1000	10.08	
2000	12.40	
4000	9.55	
8000	13.32	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP103-1_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 408.70 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 137.74 Time for 50% of particles to settle over 1 m (hours) 0.002 D10 ( $\mu$ m) 4.46 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 16.911
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>9.37</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.18	
Fine Silt % (8-16 $\mu$ m)	4.82	
Medium Silt % (16-31 $\mu$ m)	4.53	
Course Silt % (31-63 $\mu$ m)	4.11	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.63</b>	
Very Fine sand % (63-125 $\mu$ m)	2.72	
Fine sand % (125-250 $\mu$ m)	7.38	
Medium sand % (250-500 $\mu$ m)	17.58	
Coarse sand % (500-1000 $\mu$ m)	9.51	
Very Coarse sand % (1000-2000 $\mu$ m)	6.32	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.51</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>29.50</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.51	
1000	6.32	
2000	9.90	
4000	11.58	
8000	8.01	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP103-1_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 658.13 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 357.17 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 5.35 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 11.755
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>8.47</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.79	
Fine Silt % (8-16 $\mu$ m)	4.44	
Medium Silt % (16-31 $\mu$ m)	4.31	
Course Silt % (31-63 $\mu$ m)	4.66	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.20</b>	
Very Fine sand % (63-125 $\mu$ m)	4.21	
Fine sand % (125-250 $\mu$ m)	4.93	
Medium sand % (250-500 $\mu$ m)	10.83	
Coarse sand % (500-1000 $\mu$ m)	13.79	
Very Coarse sand % (1000-2000 $\mu$ m)	9.31	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.07</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>31.26</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.79	
1000	9.31	
2000	11.30	
4000	10.86	
8000	9.10	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP103-5_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1998.46 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 3293.35 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 34.97 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.01 Time for 90% of particles to settle over 1 m (hours) 0.275
Sampling Date:	7/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.95</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.70	
Fine Silt % (8-16 $\mu$ m)	2.20	
Medium Silt % (16-31 $\mu$ m)	2.60	
Course Silt % (31-63 $\mu$ m)	3.81	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>10.32</b>	
Very Fine sand % (63-125 $\mu$ m)	4.09	
Fine sand % (125-250 $\mu$ m)	3.19	
Medium sand % (250-500 $\mu$ m)	5.25	
Coarse sand % (500-1000 $\mu$ m)	12.26	
Very Coarse sand % (1000-2000 $\mu$ m)	11.95	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>36.75</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>49.98</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	12.26	
1000	11.95	
2000	13.97	
4000	25.12	
8000	10.89	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some shell, coral and sand present. Rocks upto approximately 3.5cm in size not included in the sub sample.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP104-9_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 665.89 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 365.63 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 4.31 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 18.136
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>9.55</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.13	
Fine Silt % (8-16 $\mu$ m)	4.33	
Medium Silt % (16-31 $\mu$ m)	4.67	
Course Silt % (31-63 $\mu$ m)	5.99	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>19.13</b>	
Very Fine sand % (63-125 $\mu$ m)	5.90	
Fine sand % (125-250 $\mu$ m)	4.65	
Medium sand % (250-500 $\mu$ m)	7.13	
Coarse sand % (500-1000 $\mu$ m)	11.01	
Very Coarse sand % (1000-2000 $\mu$ m)	6.97	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>35.65</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>35.68</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	11.01	
1000	6.97	
2000	9.03	
4000	22.45	
8000	4.19	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, rock and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP106_U_a	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 688.86 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 391.30 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 9.48 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.07 Time for 90% of particles to settle over 1 m (hours) 3.746
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>6.10</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.02	
Fine Silt % (8-16 $\mu$ m)	4.41	
Medium Silt % (16-31 $\mu$ m)	6.73	
Course Silt % (31-63 $\mu$ m)	9.23	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>23.39</b>	
Very Fine sand % (63-125 $\mu$ m)	7.81	
Fine sand % (125-250 $\mu$ m)	4.20	
Medium sand % (250-500 $\mu$ m)	4.75	
Coarse sand % (500-1000 $\mu$ m)	9.97	
Very Coarse sand % (1000-2000 $\mu$ m)	12.79	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>39.51</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>31.01</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.97	
1000	12.79	
2000	18.57	
4000	12.44	
8000	0.00	
16000	0.00	
		<b>Sample visual assessment</b> Rocky mud with some shell, sand and coral present. Rocks upto approximately 5cm in size not included in the sub sample.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP106-0_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 978.75 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 789.92 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 24.81 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.51 Time for 90% of particles to settle over 1 m (hours) 0.547
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>3.68</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.85	
Fine Silt % (8-16 $\mu$ m)	2.43	
Medium Silt % (16-31 $\mu$ m)	3.33	
Course Silt % (31-63 $\mu$ m)	6.78	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>14.39</b>	
Very Fine sand % (63-125 $\mu$ m)	8.74	
Fine sand % (125-250 $\mu$ m)	5.00	
Medium sand % (250-500 $\mu$ m)	5.19	
Coarse sand % (500-1000 $\mu$ m)	13.57	
Very Coarse sand % (1000-2000 $\mu$ m)	10.70	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>43.20</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>38.73</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	13.57	
1000	10.70	
2000	11.21	
4000	11.14	
8000	16.38	
16000	0.00	
		<b>Sample visual assessment</b> Muddy sand with some shell, rock and coral present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP106-0_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1364.98 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1536.38 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 16.66 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.23 Time for 90% of particles to settle over 1 m (hours) 1.214
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	4/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>4.45</b>	
Very Fine Silt % (4-8 $\mu$ m)	2.18	
Fine Silt % (8-16 $\mu$ m)	3.13	
Medium Silt % (16-31 $\mu$ m)	5.09	
Course Silt % (31-63 $\mu$ m)	7.91	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>18.31</b>	
Very Fine sand % (63-125 $\mu$ m)	7.07	
Fine sand % (125-250 $\mu$ m)	3.72	
Medium sand % (250-500 $\mu$ m)	4.14	
Coarse sand % (500-1000 $\mu$ m)	8.68	
Very Coarse sand % (1000-2000 $\mu$ m)	9.95	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>33.56</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>43.68</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 8.68	
	1000 9.95	
	2000 12.76	
	4000 26.73	
	8000 4.19	
	16000 0.00	
		<b>Sample visual assessment</b> Rocky mud with some shell, coral and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP110-4_U2	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 2451.24 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 4954.71 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 46.07 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 1.75 Time for 90% of particles to settle over 1 m (hours) 0.159
Sampling Date:	10/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	2/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>2.77</b>	
Very Fine Silt % (4-8 $\mu$ m)	1.39	
Fine Silt % (8-16 $\mu$ m)	1.74	
Medium Silt % (16-31 $\mu$ m)	2.19	
Course Silt % (31-63 $\mu$ m)	3.92	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>9.24</b>	
Very Fine sand % (63-125 $\mu$ m)	4.64	
Fine sand % (125-250 $\mu$ m)	2.93	
Medium sand % (250-500 $\mu$ m)	3.85	
Coarse sand % (500-1000 $\mu$ m)	9.42	
Very Coarse sand % (1000-2000 $\mu$ m)	12.87	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>33.72</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>54.28</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	9.42	
1000	12.87	
2000	18.95	
4000	26.16	
8000	9.17	
16000	0.00	
		<b>Sample visual assessment</b> Muddy rock with some shell, coral and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP112-4_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m ) 2764.31 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 6301.16 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m ) 113.05 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 10.54 Time for 90% of particles to settle over 1 m (hours) 0.026
Sampling Date:	6/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	31/01/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>1.16</b>	
Very Fine Silt % (4-8 $\mu$ m)	0.90	
Fine Silt % (8-16 $\mu$ m)	1.08	
Medium Silt % (16-31 $\mu$ m)	1.44	
Course Silt % (31-63 $\mu$ m)	2.33	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>5.75</b>	
Very Fine sand % (63-125 $\mu$ m)	3.72	
Fine sand % (125-250 $\mu$ m)	4.46	
Medium sand % (250-500 $\mu$ m)	4.80	
Coarse sand % (500-1000 $\mu$ m)	8.11	
Very Coarse sand % (1000-2000 $\mu$ m)	13.67	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>34.76</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>58.33</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	8.11	
1000	13.67	
2000	21.80	
4000	27.02	
8000	9.51	
16000	0.00	
		<b>Sample visual assessment</b> Rock with some sand and mud present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP119-7_L	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 524.15 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 226.55 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 4.42 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.02 Time for 90% of particles to settle over 1 m (hours) 17.258
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	1/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>9.38</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.66	
Fine Silt % (8-16 $\mu$ m)	5.68	
Medium Silt % (16-31 $\mu$ m)	6.59	
Course Silt % (31-63 $\mu$ m)	7.59	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>24.53</b>	
Very Fine sand % (63-125 $\mu$ m)	5.72	
Fine sand % (125-250 $\mu$ m)	5.02	
Medium sand % (250-500 $\mu$ m)	5.11	
Coarse sand % (500-1000 $\mu$ m)	5.13	
Very Coarse sand % (1000-2000 $\mu$ m)	5.90	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>26.88</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>39.22</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	5.13	
1000	5.90	
2000	11.16	
4000	9.47	
8000	18.59	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, sand and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP119-7_U	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 626.96 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 324.14 Time for 50% of particles to settle over 1 m (hours) 0.001 D10 ( $\mu$ m) 6.66 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.04 Time for 90% of particles to settle over 1 m (hours) 7.586
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	1/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>7.24</b>	
Very Fine Silt % (4-8 $\mu$ m)	3.87	
Fine Silt % (8-16 $\mu$ m)	4.90	
Medium Silt % (16-31 $\mu$ m)	5.81	
Course Silt % (31-63 $\mu$ m)	7.52	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>22.09</b>	
Very Fine sand % (63-125 $\mu$ m)	6.72	
Fine sand % (125-250 $\mu$ m)	4.75	
Medium sand % (250-500 $\mu$ m)	6.59	
Coarse sand % (500-1000 $\mu$ m)	10.25	
Very Coarse sand % (1000-2000 $\mu$ m)	7.44	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>35.75</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>34.91</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
500	10.25	
1000	7.44	
2000	7.34	
4000	12.06	
8000	15.51	
16000	0.00	
		<b>Sample visual assessment</b> Mud with some shell, sand and rock present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.






**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP119-8_U	<b>Settling Velocity calculations using Stokes Law</b>
Sampling Date:	11/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	1/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		<b>Parameters</b>
<b>Total Clay % (0-4µm)</b>	<b>3.46</b>	Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65
Very Fine Silt % (4-8µm)	1.89	Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025
Fine Silt % (8-16µm)	2.47	Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81
Medium Silt % (16-31µm)	2.88	Liquid viscosity ( $\eta$ ) (cp) 1.074
Course Silt % (31-63µm)	3.47	*Liquid parameters based on seawater of 35ppt @ 20°C
<b>Total Silt (4-63µm)</b>	<b>10.71</b>	<b>Calculations</b>
Very Fine sand % (63-125µm)	3.00	D50 (µm) 6708.68
Fine sand % (125-250µm)	1.92	Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 37112.44
Medium sand % (250-500µm)	2.81	Time for 50% of particles to settle over 1 m (hours) 0.000
Coarse sand % (500-1000µm)	5.84	D10 (µm) 26.59
Very Coarse sand % (1000-2000µm)	6.06	Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.58
<b>Total Sand (63-2000µm)</b>	<b>19.64</b>	Time for 90% of particles to settle over 1 m (hours) 0.477
<b>Total Gravels (&gt;2000µm)</b>	<b>66.18</b>	<b>Settings</b>
<b>Extended range by sieving</b>		SOP Name SOP-LV-3REPS-default.msop
Extended size, µm	Extended percent retained at size	Analysis Model General Purpose
500	5.84	Result Units Volume
1000	6.06	Instrument Mastersizer3000
2000	6.85	RI/ABS: 2.74 / 1
4000	13.79	Dispersant Water
8000	19.58	Additives 10mL Sodium Hexametaphosphate
16000	25.97	Sonication (s) 300
		<b>Sample visual assessment</b>
		Rocks with some shell, sand and mud present. Large rocks upto approximately 6cm in size not included in the sub sample.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP120-5_U	<b>Settling Velocity calculations using Stokes Law</b>
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	2/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4µm)</b>	<b>2.19</b>	
Very Fine Silt % (4-8µm)	1.26	
Fine Silt % (8-16µm)	1.68	
Medium Silt % (16-31µm)	1.93	
Course Silt % (31-63µm)	2.67	
<b>Total Silt (4-63µm)</b>	<b>7.53</b>	
Very Fine sand % (63-125µm)	2.93	
Fine sand % (125-250µm)	2.36	
Medium sand % (250-500µm)	3.29	
Coarse sand % (500-1000µm)	5.47	
Very Coarse sand % (1000-2000µm)	6.49	
<b>Total Sand (63-2000µm)</b>	<b>20.54</b>	
<b>Total Gravels (&gt;2000µm)</b>	<b>69.74</b>	
<b>Extended range by sieving</b>		
Extended size, µm	Extended percent retained at size	
	500 5.47	
	1000 6.49	
	2000 11.96	
	4000 13.89	
	8000 43.89	
	16000 0.00	
		<b>Parameters</b>
		Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65
		Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025
		Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81
		Liquid viscosity ( $\eta$ ) (cp) 1.074
		*Liquid parameters based on seawater of 35ppt @ 20°C
		<b>Calculations</b>
		D50 (µm) 6239.74
		Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 32105.42
		Time for 50% of particles to settle over 1 m (hours) 0.000
		D10 (µm) 67.13
		Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 3.72
		Time for 90% of particles to settle over 1 m (hours) 0.075
		<b>Settings</b>
		SOP Name SOP-LV-3REPS-default.msop
		Analysis Model General Purpose
		Result Units Volume
		Instrument Mastersizer3000
		RI/ABS: 2.74 / 1
		Dispersant Water
		Additives 10mL Sodium Hexametaphosphate
		Sonication (s) 300
		<b>Sample visual assessment</b>
		Muddy rock with some shell and sand present. Rocks upto approximately 4.5cm in size not included in the sub sample.

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP120-6	<b>Settling Velocity calculations using Stokes Law</b> <b>Parameters</b> Particle density ( $\rho_p$ ) (g/cm <sup>3</sup> ) 2.65 Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> ) 1.025 Acceleration due to Gravity (g) (ms <sup>-2</sup> ) 9.81 Liquid viscosity ( $\eta$ ) (cp) 1.074 *Liquid parameters based on seawater of 35ppt @ 20°C <b>Calculations</b> D50 ( $\mu$ m) 1198.84 Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> ) 1185.14 Time for 50% of particles to settle over 1 m (hours) 0.000 D10 ( $\mu$ m) 6.93 Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> ) 0.04 Time for 90% of particles to settle over 1 m (hours) 7.006
Sampling Date:	8/01/2022	
Sample Type:	Sediment	
MAFRL Job Code:	RPS22-1	
Client Reference:	NA	
Analysis Date:	2/02/2022	
Method Number:	9400	
<b>Wentworth Size Classifications</b>		
<b>Total Clay % (0-4<math>\mu</math>m)</b>	<b>6.85</b>	
Very Fine Silt % (4-8 $\mu$ m)	4.07	
Fine Silt % (8-16 $\mu$ m)	4.62	
Medium Silt % (16-31 $\mu$ m)	4.30	
Course Silt % (31-63 $\mu$ m)	4.65	
<b>Total Silt (4-63<math>\mu</math>m)</b>	<b>17.63</b>	
Very Fine sand % (63-125 $\mu$ m)	5.15	
Fine sand % (125-250 $\mu$ m)	7.70	
Medium sand % (250-500 $\mu$ m)	5.94	
Coarse sand % (500-1000 $\mu$ m)	5.71	
Very Coarse sand % (1000-2000 $\mu$ m)	5.10	
<b>Total Sand (63-2000<math>\mu</math>m)</b>	<b>29.60</b>	
<b>Total Gravels (&gt;2000<math>\mu</math>m)</b>	<b>45.92</b>	
<b>Extended range by sieving</b>		<b>Settings</b> SOP Name SOP-LV-3REPS-default.msop Analysis Model General Purpose Result Units Volume Instrument Mastersizer3000 RI/ABS: 2.74 / 1 Dispersant Water Additives 10mL Sodium Hexametaphosphate Sonication (s) 300
Extended size, $\mu$ m	Extended percent retained at size	
	500 5.71	
	1000 5.10	
	2000 3.74	
	4000 9.89	
	8000 32.28	
	16000 0.00	
		<b>Sample visual assessment</b> Rocky mud with some shell and sand present.

  
 Signatory: Jamie Woodward  
 Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
 Spare test items will be held for two months unless otherwise requested.




**PARTICLE SIZE ANALYSIS REPORT**

Contact: Katharine Thorne  
Customer: RPS  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 17/02/2022  
Date Received: 13/01/2022  
Our Reference: RPS22-1

Sample Name:	KP120-6_U	<b>Settling Velocity calculations using Stokes Law</b>	
Sampling Date:	8/01/2022		
Sample Type:	Sediment		
MAFRL Job Code:	RPS22-1		
Client Reference:	NA		
Analysis Date:	3/02/2022		
Method Number:	9400		
<b>Wentworth Size Classifications</b>		<b>Parameters</b>	
<b>Total Clay % (0-4µm)</b>	<b>7.50</b>	Particle density ( $\rho$ ) (g/cm <sup>3</sup> )	2.65
Very Fine Silt % (4-8µm)	4.64	Liquid density ( $\rho_f$ ) (g/cm <sup>3</sup> )	1.025
Fine Silt % (8-16µm)	5.14	Acceleration due to Gravity (g) (ms <sup>-2</sup> )	9.81
Medium Silt % (16-31µm)	4.45	Liquid viscosity ( $\eta$ ) (cp)	1.074
Course Silt % (31-63µm)	4.50	*Liquid parameters based on seawater of 35ppt @ 20°C	
<b>Total Silt (4-63µm)</b>	<b>18.74</b>	<b>Calculations</b>	
Very Fine sand % (63-125µm)	4.45	D50 (µm)	2987.64
Fine sand % (125-250µm)	5.83	Minimum settling velocity of 50% of particles (mm s <sup>-1</sup> )	7360.43
Medium sand % (250-500µm)	4.51	Time for 50% of particles to settle over 1 m (hours)	0.000
Coarse sand % (500-1000µm)	4.04	D10 (µm)	5.92
Very Coarse sand % (1000-2000µm)	3.60	Minimum settling velocity of 90% of particles (mm s <sup>-1</sup> )	0.03
<b>Total Sand (63-2000µm)</b>	<b>22.43</b>	Time for 90% of particles to settle over 1 m (hours)	9.597
<b>Total Gravels (&gt;2000µm)</b>	<b>51.33</b>	<b>Settings</b>	
<b>Extended range by sieving</b>		SOP Name	SOP-LV-3REPS-default.msop
Extended size, µm	Extended percent retained at size	Analysis Model	General Purpose
		Result Units	Volume
		Instrument	Mastersizer3000
		RI/ABS:	2.74 / 1
		Dispersant	Water
		Additives	10mL Sodium Hexametaphosphate
		Sonication (s)	300
500	4.04	<b>Sample visual assessment</b>	
1000	3.60	Rocky mud with some shell and sand present. Large rocks upto approximately 6cm in size not included in the sub sample.	
2000	2.70		
4000	7.41		
8000	41.22		
16000	0.00		

  
Signatory: Jamie Woodward  
Date: 17/02/2022

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.

## Appendix E

### Laboratory sediment infauna data







## Appendix F

### Laboratory sediment and water naturally occurring radioactive materials data





CLIENT DETAILS

LABORATORY DETAILS

Contact **Natalie Robson**  
 Client **RPS AUSTRALIA WEST PTY LTD**  
 Address **Level 2, 27-31 Troode Street  
 West Perth, WA 6005  
 PO Box 170, West Perth WA 6872  
 6005**  
 Telephone **61 8 92111111**  
 Facsimile **(Not specified)**  
 Email **natalie.robson@rpsgroup.com.au**  
 Project **NORM analysis of waters & Sediment sampl**  
 Order Number **(Not specified)**  
 Samples **59**

Manager **Adam Atkinson**  
 Laboratory **SGS Melbourne EH&S**  
 Address **10/585 Blackburn Road  
 Notting Hill Victoria 3168**  
 Telephone **+61395743200**  
 Facsimile **+61395743399**  
 Email **Au.SampleReceipt.Melbourne@sgs.com**  
 SGS Reference **ME323489 R0**  
 Date Received **3/11/2021**  
 Date Reported **14/2/2022**

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(22793).

SIGNATORIES



**Adam ATKINSON**  
 Australian Chemistry Manager

Radionuclides by Gamma Ray Spectrometry in liquids [AS301/AS406] Tested: 1/12/2021

PARAMETER	UOM	LOR	OP1B	OP2B	OP3B	OP4B	OP5B
			WATER	WATER	WATER	WATER	WATER
			16/10/2021 ME323489.001	16/10/2021 ME323489.002	16/10/2021 ME323489.003	16/10/2021 ME323489.004	16/10/2021 ME323489.005
Radium-226	Bq/L	-	<0.045	<0.051	<0.063	<b>0.023 ±0.011</b>	<0.027
Radium-228	Bq/L	-	<0.130	<0.150	<0.130	<0.087	<0.100
Thorium-228	Bq/L	-	<0.021	<0.021	<0.048	<0.026	<0.024

PARAMETER	UOM	LOR	OP6B	OP7B	OP8B	OP9B	OP10B
			WATER	WATER	WATER	WATER	WATER
			16/10/2021 ME323489.006	17/10/2021 ME323489.007	17/10/2021 ME323489.008	17/10/2021 ME323489.009	17/10/2021 ME323489.010
Radium-226	Bq/L	-	<b>0.018 ±0.011</b>	<0.064	<0.045	<0.053	<0.057
Radium-228	Bq/L	-	<0.110	<0.084	<0.140	<0.150	<0.160
Thorium-228	Bq/L	-	<0.021	<0.031	<0.025	<0.024	<0.035

PARAMETER	UOM	LOR	SG7B	SG11B	SG1B	SG12B	SG13B
			WATER	WATER	WATER	WATER	WATER
			17/10/2021 ME323489.011	17/10/2021 ME323489.012	18/10/2021 ME323489.013	18/10/2021 ME323489.014	18/10/2021 ME323489.015
Radium-226	Bq/L	-	<0.044	<0.050	<0.039	<0.037	<0.046
Radium-228	Bq/L	-	<0.130	<0.150	<0.110	<0.086	<0.094
Thorium-228	Bq/L	-	<0.029	<0.025	<0.033	<0.027	<0.034

PARAMETER	UOM	LOR	SG8B	SG4B
			WATER	WATER
			18/10/2021 ME323489.016	18/10/2021 ME323489.017
Radium-226	Bq/L	-	<0.043	<0.044
Radium-228	Bq/L	-	<0.086	<0.140
Thorium-228	Bq/L	-	<0.032	<0.023

Radionuclides by Gamma Ray Spectrometry in solids [AS303/AS406] Tested: 4/1/2022

PARAMETER	UOM	LOR	OP1	OP2	OP3	OP4	OP5
			SOIL	SOIL	SOIL	SOIL	SOIL
			15/10/2021 ME323489.018	15/10/2021 ME323489.019	15/10/2021 ME323489.020	15/10/2021 ME323489.021	15/10/2021 ME323489.022
Radium-226	Bq/kg	-	<b>8.1 ±1.0</b>	<b>3.6 ±0.4</b>	<b>8.3 ±0.9</b>	<b>9.8 ±1.0</b>	<b>9.5 ±1.0</b>
Radium-228	Bq/kg	-	<b>8.1 ±1.5</b>	<b>4.2 ±0.6</b>	<b>10 ±1</b>	<b>8.2 ±1.3</b>	<b>9.2 ±1.2</b>
Thorium-228	Bq/kg	-	<b>8.8 ±1.2</b>	<b>4.3 ±0.5</b>	<b>12 ±1</b>	<b>11 ±1</b>	<b>12 ±1</b>

PARAMETER	UOM	LOR	OP6	OP7	OP9	OP10	OP11
			SOIL	SOIL	SOIL	SOIL	SOIL
			15/10/2021 ME323489.023	15/10/2021 ME323489.024	15/10/2021 ME323489.025	15/10/2021 ME323489.026	15/10/2021 ME323489.027
Radium-226	Bq/kg	-	<b>9.7 ±1.0</b>	<b>11 ±1</b>	<b>9.7 ±1.0</b>	<b>10 ±1</b>	<b>11 ±1</b>
Radium-228	Bq/kg	-	<b>11 ±1</b>	<b>13 ±1</b>	<b>10 ±1</b>	<b>10 ±1</b>	<b>11 ±1</b>
Thorium-228	Bq/kg	-	<b>14 ±1</b>	<b>13 ±1</b>	<b>13 ±1</b>	<b>12 ±1</b>	<b>13 ±1</b>

PARAMETER	UOM	LOR	OP12	OP13	OP14	OP15	OP16
			SOIL	SOIL	SOIL	SOIL	SOIL
			15/10/2021 ME323489.028	15/10/2021 ME323489.029	15/10/2021 ME323489.030	15/10/2021 ME323489.031	16/10/2021 ME323489.032
Radium-226	Bq/kg	-	<b>11 ±1</b>	<b>11 ±1</b>	<b>11 ±1</b>	<b>9.6 ±1.0</b>	<b>10 ±1</b>
Radium-228	Bq/kg	-	<b>12 ±1</b>	<b>11 ±1</b>	<b>13 ±1</b>	<b>10 ±1</b>	<b>11 ±1</b>
Thorium-228	Bq/kg	-	<b>17 ±2</b>	<b>13 ±1</b>	<b>15 ±1</b>	<b>11 ±1</b>	<b>13 ±1</b>

PARAMETER	UOM	LOR	OP17	OP18	OP19	OP20	OP21
			SOIL	SOIL	SOIL	SOIL	SOIL
			16/10/2021 ME323489.033	16/10/2021 ME323489.034	16/10/2021 ME323489.035	16/10/2021 ME323489.036	16/10/2021 ME323489.037
Radium-226	Bq/kg	-	<b>9.6 ±1.0</b>	<b>9.2 ±1.1</b>	<b>9.3 ±1.3</b>	<b>10 ±1</b>	<b>8.8 ±1.2</b>
Radium-228	Bq/kg	-	<b>11 ±1</b>	<b>12 ±2</b>	<b>11 ±2</b>	<b>12 ±2</b>	<b>12 ±2</b>
Thorium-228	Bq/kg	-	<b>13 ±1</b>	<b>14 ±1</b>	<b>15 ±2</b>	<b>15 ±2</b>	<b>16 ±2</b>

PARAMETER	UOM	LOR	OP22	OP23	OP24	OP25	OP26
			SOIL	SOIL	SOIL	SOIL	SOIL
			16/10/2021 ME323489.038	16/10/2021 ME323489.039	17/10/2021 ME323489.040	17/10/2021 ME323489.041	17/10/2021 ME323489.042
Radium-226	Bq/kg	-	<b>9.4 ±1.0</b>	<b>10 ±1</b>	<b>8.1 ±0.9</b>	<b>11 ±1</b>	<b>12 ±1</b>
Radium-228	Bq/kg	-	<b>12 ±2</b>	<b>13 ±2</b>	<b>13 ±2</b>	<b>18 ±2</b>	<b>13 ±3</b>
Thorium-228	Bq/kg	-	<b>14 ±1</b>	<b>17 ±2</b>	<b>15 ±2</b>	<b>20 ±2</b>	<b>18 ±2</b>

PARAMETER	UOM	LOR	OP27	OP28	OP29	OP30	SG1
			SOIL	SOIL	SOIL	SOIL	SOIL
			17/10/2021 ME323489.043	17/10/2021 ME323489.044	17/10/2021 ME323489.045	17/10/2021 ME323489.046	18/10/2021 ME323489.047
Radium-226	Bq/kg	-	<b>14 ±2</b>	<b>15 ±1</b>	<b>14 ±2</b>	<b>17 ±2</b>	<b>0.83 ±0.09</b>
Radium-228	Bq/kg	-	<b>15 ±2</b>	<b>19 ±2</b>	<b>17 ±2</b>	<b>26 ±3</b>	<b>1.1 ±0.2</b>
Thorium-228	Bq/kg	-	<b>20 ±2</b>	<b>21 ±2</b>	<b>23 ±2</b>	<b>24 ±3</b>	<b>1.4 ±0.2</b>

PARAMETER	UOM	LOR	SG2	SG3	SG4	SG5	SG6
			SOIL	SOIL	SOIL	SOIL	SOIL
			17/10/2021 ME323489.048	17/10/2021 ME323489.049	17/10/2021 ME323489.050	17/10/2021 ME323489.051	17/10/2021 ME323489.052
Radium-226	Bq/kg	-	<b>9.7 ±1.0</b>	<b>10 ±1</b>	<b>13 ±1</b>	<b>12 ±1</b>	<b>12 ±1</b>
Radium-228	Bq/kg	-	<b>12 ±2</b>	<b>12 ±2</b>	<b>16 ±2</b>	<b>14 ±2</b>	<b>18 ±3</b>
Thorium-228	Bq/kg	-	<b>16 ±2</b>	<b>16 ±2</b>	<b>21 ±2</b>	<b>20 ±2</b>	<b>18 ±2</b>

Radionuclides by Gamma Ray Spectrometry in solids [AS303/AS406] Tested: 4/1/2022 (continued)

PARAMETER	UOM	LOR	SG7	SG8	SG9	SG10	SG11
			SOIL	SOIL	SOIL	SOIL	SOIL
			17/10/2021 ME323489.053	18/10/2021 ME323489.054	18/10/2021 ME323489.055	18/10/2021 ME323489.056	18/10/2021 ME323489.057
Radium-226	Bq/kg	-	<b>14 ±2</b>	<b>9.5 ±1.2</b>	<b>10 ±1</b>	<b>13 ±1</b>	<b>15 ±1</b>
Radium-228	Bq/kg	-	<b>19 ±3</b>	<b>10 ±2</b>	<b>13 ±2</b>	<b>17 ±2</b>	<b>18 ±2</b>
Thorium-228	Bq/kg	-	<b>20 ±3</b>	<b>15 ±2</b>	<b>16 ±2</b>	<b>18 ±2</b>	<b>19 ±2</b>

PARAMETER	UOM	LOR	SG12	SG13
			SOIL	SOIL
			18/10/2021 ME323489.058	18/10/2021 ME323489.059
Radium-226	Bq/kg	-	<b>10 ±1</b>	<b>9.0 ±1.2</b>
Radium-228	Bq/kg	-	<b>12 ±2</b>	<b>11 ±2</b>
Thorium-228	Bq/kg	-	<b>15 ±2</b>	<b>13 ±2</b>

METHOD

METHODOLOGY SUMMARY

**ARS-SOP-AS301/AS406**

Analysis of radionuclides in liquids by high resolution gamma ray spectrometry after radiochemical preparation . Radiochemical preparation involves total sample evaporation, sample co-precipitation using stable elemental carriers, or a combination thereof. In some cases, preparation may involve merely transferring liquid to a standard geometry container such as a Marinelli beaker.

**AS303/406**

Analysis of radionuclides in solid samples by high resolution gamma ray spectrometry after preparation to meet standard calibrated geometries. Preparation involves drying, crushing and sieving, and setting in an epoxy resin where necessary.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received. Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- a. 1 Bq is equivalent to 27 pCi
- b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: [www.sgs.com.au/en-gb/environment-health-and-safety](http://www.sgs.com.au/en-gb/environment-health-and-safety).

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CLIENT DETAILS

LABORATORY DETAILS

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 Project **NORM analysis of waters & Sediment sampl**  
 Order Number **(Not specified)**  
 Samples **59**

Manager **Adam Atkinson**  
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 Email **Au.SampleReceipt.Melbourne@sgs.com**  
 SGS Reference **ME323489 R0**  
 Date Received **3/11/2021**  
 Date Reported **14/2/2022**

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(22793).

SIGNATORIES



**Adam ATKINSON**  
 Australian Chemistry Manager

Radionuclides by Gamma Ray Spectrometry in liquids [AS301/AS406] Tested: 1/12/2021

PARAMETER	UOM	LOR	OP1B	OP2B	OP3B	OP4B	OP5B
			WATER	WATER	WATER	WATER	WATER
			16/10/2021 ME323489.001	16/10/2021 ME323489.002	16/10/2021 ME323489.003	16/10/2021 ME323489.004	16/10/2021 ME323489.005
Radium-226	Bq/L	-	<0.045	<0.051	<0.063	<b>0.023 ±0.011</b>	<0.027
Radium-228	Bq/L	-	<0.130	<0.150	<0.130	<0.087	<0.100
Thorium-228	Bq/L	-	<0.021	<0.021	<0.048	<0.026	<0.024

PARAMETER	UOM	LOR	OP6B	OP7B	OP8B	OP9B	OP10B
			WATER	WATER	WATER	WATER	WATER
			16/10/2021 ME323489.006	17/10/2021 ME323489.007	17/10/2021 ME323489.008	17/10/2021 ME323489.009	17/10/2021 ME323489.010
Radium-226	Bq/L	-	<b>0.018 ±0.011</b>	<0.064	<0.045	<0.053	<0.057
Radium-228	Bq/L	-	<0.110	<0.084	<0.140	<0.150	<0.160
Thorium-228	Bq/L	-	<0.021	<0.031	<0.025	<0.024	<0.035

PARAMETER	UOM	LOR	SG7B	SG11B	SG1B	SG12B	SG13B
			WATER	WATER	WATER	WATER	WATER
			17/10/2021 ME323489.011	17/10/2021 ME323489.012	18/10/2021 ME323489.013	18/10/2021 ME323489.014	18/10/2021 ME323489.015
Radium-226	Bq/L	-	<0.044	<0.050	<0.039	<0.037	<0.046
Radium-228	Bq/L	-	<0.130	<0.150	<0.110	<0.086	<0.094
Thorium-228	Bq/L	-	<0.029	<0.025	<0.033	<0.027	<0.034

PARAMETER	UOM	LOR	SG8B	SG4B
			WATER	WATER
			18/10/2021 ME323489.016	18/10/2021 ME323489.017
Radium-226	Bq/L	-	<0.043	<0.044
Radium-228	Bq/L	-	<0.086	<0.140
Thorium-228	Bq/L	-	<0.032	<0.023

Radionuclides by Gamma Ray Spectrometry in solids [AS303/AS406] Tested: 4/1/2022

PARAMETER	UOM	LOR	OP1	OP2	OP3	OP4	OP5
			SOIL	SOIL	SOIL	SOIL	SOIL
			15/10/2021 ME323489.018	15/10/2021 ME323489.019	15/10/2021 ME323489.020	15/10/2021 ME323489.021	15/10/2021 ME323489.022
Radium-226	Bq/kg	-	<b>8.1 ±1.0</b>	<b>3.6 ±0.4</b>	<b>8.3 ±0.9</b>	<b>9.8 ±1.0</b>	<b>9.5 ±1.0</b>
Radium-228	Bq/kg	-	<b>8.1 ±1.5</b>	<b>4.2 ±0.6</b>	<b>10 ±1</b>	<b>8.2 ±1.3</b>	<b>9.2 ±1.2</b>
Thorium-228	Bq/kg	-	<b>8.8 ±1.2</b>	<b>4.3 ±0.5</b>	<b>12 ±1</b>	<b>11 ±1</b>	<b>12 ±1</b>

PARAMETER	UOM	LOR	OP6	OP7	OP9	OP10	OP11
			SOIL	SOIL	SOIL	SOIL	SOIL
			15/10/2021 ME323489.023	15/10/2021 ME323489.024	15/10/2021 ME323489.025	15/10/2021 ME323489.026	15/10/2021 ME323489.027
Radium-226	Bq/kg	-	<b>9.7 ±1.0</b>	<b>11 ±1</b>	<b>9.7 ±1.0</b>	<b>10 ±1</b>	<b>11 ±1</b>
Radium-228	Bq/kg	-	<b>11 ±1</b>	<b>13 ±1</b>	<b>10 ±1</b>	<b>10 ±1</b>	<b>11 ±1</b>
Thorium-228	Bq/kg	-	<b>14 ±1</b>	<b>13 ±1</b>	<b>13 ±1</b>	<b>12 ±1</b>	<b>13 ±1</b>

PARAMETER	UOM	LOR	OP12	OP13	OP14	OP15	OP16
			SOIL	SOIL	SOIL	SOIL	SOIL
			15/10/2021 ME323489.028	15/10/2021 ME323489.029	15/10/2021 ME323489.030	15/10/2021 ME323489.031	16/10/2021 ME323489.032
Radium-226	Bq/kg	-	<b>11 ±1</b>	<b>11 ±1</b>	<b>11 ±1</b>	<b>9.6 ±1.0</b>	<b>10 ±1</b>
Radium-228	Bq/kg	-	<b>12 ±1</b>	<b>11 ±1</b>	<b>13 ±1</b>	<b>10 ±1</b>	<b>11 ±1</b>
Thorium-228	Bq/kg	-	<b>17 ±2</b>	<b>13 ±1</b>	<b>15 ±1</b>	<b>11 ±1</b>	<b>13 ±1</b>

PARAMETER	UOM	LOR	OP17	OP18	OP19	OP20	OP21
			SOIL	SOIL	SOIL	SOIL	SOIL
			16/10/2021 ME323489.033	16/10/2021 ME323489.034	16/10/2021 ME323489.035	16/10/2021 ME323489.036	16/10/2021 ME323489.037
Radium-226	Bq/kg	-	<b>9.6 ±1.0</b>	<b>9.2 ±1.1</b>	<b>9.3 ±1.3</b>	<b>10 ±1</b>	<b>8.8 ±1.2</b>
Radium-228	Bq/kg	-	<b>11 ±1</b>	<b>12 ±2</b>	<b>11 ±2</b>	<b>12 ±2</b>	<b>12 ±2</b>
Thorium-228	Bq/kg	-	<b>13 ±1</b>	<b>14 ±1</b>	<b>15 ±2</b>	<b>15 ±2</b>	<b>16 ±2</b>

PARAMETER	UOM	LOR	OP22	OP23	OP24	OP25	OP26
			SOIL	SOIL	SOIL	SOIL	SOIL
			16/10/2021 ME323489.038	16/10/2021 ME323489.039	17/10/2021 ME323489.040	17/10/2021 ME323489.041	17/10/2021 ME323489.042
Radium-226	Bq/kg	-	<b>9.4 ±1.0</b>	<b>10 ±1</b>	<b>8.1 ±0.9</b>	<b>11 ±1</b>	<b>12 ±1</b>
Radium-228	Bq/kg	-	<b>12 ±2</b>	<b>13 ±2</b>	<b>13 ±2</b>	<b>18 ±2</b>	<b>13 ±3</b>
Thorium-228	Bq/kg	-	<b>14 ±1</b>	<b>17 ±2</b>	<b>15 ±2</b>	<b>20 ±2</b>	<b>18 ±2</b>

PARAMETER	UOM	LOR	OP27	OP28	OP29	OP30	SG1
			SOIL	SOIL	SOIL	SOIL	SOIL
			17/10/2021 ME323489.043	17/10/2021 ME323489.044	17/10/2021 ME323489.045	17/10/2021 ME323489.046	18/10/2021 ME323489.047
Radium-226	Bq/kg	-	<b>14 ±2</b>	<b>15 ±1</b>	<b>14 ±2</b>	<b>17 ±2</b>	<b>0.83 ±0.09</b>
Radium-228	Bq/kg	-	<b>15 ±2</b>	<b>19 ±2</b>	<b>17 ±2</b>	<b>26 ±3</b>	<b>1.1 ±0.2</b>
Thorium-228	Bq/kg	-	<b>20 ±2</b>	<b>21 ±2</b>	<b>23 ±2</b>	<b>24 ±3</b>	<b>1.4 ±0.2</b>

PARAMETER	UOM	LOR	SG2	SG3	SG4	SG5	SG6
			SOIL	SOIL	SOIL	SOIL	SOIL
			17/10/2021 ME323489.048	17/10/2021 ME323489.049	17/10/2021 ME323489.050	17/10/2021 ME323489.051	17/10/2021 ME323489.052
Radium-226	Bq/kg	-	<b>9.7 ±1.0</b>	<b>10 ±1</b>	<b>13 ±1</b>	<b>12 ±1</b>	<b>12 ±1</b>
Radium-228	Bq/kg	-	<b>12 ±2</b>	<b>12 ±2</b>	<b>16 ±2</b>	<b>14 ±2</b>	<b>18 ±3</b>
Thorium-228	Bq/kg	-	<b>16 ±2</b>	<b>16 ±2</b>	<b>21 ±2</b>	<b>20 ±2</b>	<b>18 ±2</b>



Radionuclides by Gamma Ray Spectrometry in solids [AS303/AS406] Tested: 4/1/2022 (continued)

PARAMETER	UOM	LOR	SG7	SG8	SG9	SG10	SG11
			SOIL	SOIL	SOIL	SOIL	SOIL
			17/10/2021 ME323489.053	18/10/2021 ME323489.054	18/10/2021 ME323489.055	18/10/2021 ME323489.056	18/10/2021 ME323489.057
Radium-226	Bq/kg	-	<b>14 ±2</b>	<b>9.5 ±1.2</b>	<b>10 ±1</b>	<b>13 ±1</b>	<b>15 ±1</b>
Radium-228	Bq/kg	-	<b>19 ±3</b>	<b>10 ±2</b>	<b>13 ±2</b>	<b>17 ±2</b>	<b>18 ±2</b>
Thorium-228	Bq/kg	-	<b>20 ±3</b>	<b>15 ±2</b>	<b>16 ±2</b>	<b>18 ±2</b>	<b>19 ±2</b>

PARAMETER	UOM	LOR	SG12	SG13
			SOIL	SOIL
			18/10/2021 ME323489.058	18/10/2021 ME323489.059
Radium-226	Bq/kg	-	<b>10 ±1</b>	<b>9.0 ±1.2</b>
Radium-228	Bq/kg	-	<b>12 ±2</b>	<b>11 ±2</b>
Thorium-228	Bq/kg	-	<b>15 ±2</b>	<b>13 ±2</b>

METHOD

METHODOLOGY SUMMARY

**ARS-SOP-AS301/AS406**

Analysis of radionuclides in liquids by high resolution gamma ray spectrometry after radiochemical preparation . Radiochemical preparation involves total sample evaporation, sample co-precipitation using stable elemental carriers, or a combination thereof. In some cases, preparation may involve merely transferring liquid to a standard geometry container such as a Marinelli beaker.

**AS303/406**

Analysis of radionuclides in solid samples by high resolution gamma ray spectrometry after preparation to meet standard calibrated geometries. Preparation involves drying, crushing and sieving, and setting in an epoxy resin where necessary.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received. Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- a. 1 Bq is equivalent to 27 pCi
- b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: [www.sgs.com.au/en-gb/environment-health-and-safety](http://www.sgs.com.au/en-gb/environment-health-and-safety).

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Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or

## Appendix G

### Laboratory sediment and water metals, nutrients, chlorophyll-a and total suspended solids data





**SEDIMENT DATA**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	2600 TKN mg.N/g	4500 TOTAL P mg.P/g	6200 TOC % C	ICP002 Total Ext Al mg/kg	ICP002 Total Ext As mg/kg	ICP002 Total Ext Ba mg/kg	ICP002 Total Ext Cd mg/kg	ICP002 Total Ext Co mg/kg	ICP002 Total Ext Cr mg/kg	ICP002 Total Ext Cu mg/kg	ICP002 Total Ext Fe mg/kg	ICP002 Total Ext Ni mg/kg	ICP002 Total Ext Zn mg/kg	ICP007 Total Ext Hg mg/kg
Reporting Limit		<0.1	<0.05	<0.1	<20	<2	<0.2	<0.1	<0.2	<0.2	<0.2	<5	<0.7	<0.5	<0.01
Analysis Date File		23/11/2021 21112301,02	23/11/2021 21112301,02	12/11/2021 21111201	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	19/11/2021 21111901-02
OP1	15/10/2021	0.3	0.36	0.2	3500	13	5.5	0.2	2.6	11	1.2	8300	4.0	4.5	<0.01
OP2	15/10/2021	0.3	0.42	0.2	4900	16	6.7	0.3	3.3	13	1.6	9700	5.1	5.6	<0.01
OP3	15/10/2021	0.6	0.47	0.4	7800	13	8.0	0.3	4.2	18	2.5	11000	6.8	8.6	<0.01
OP4	15/10/2021	0.3	0.49	0.2	4400	22	6.3	0.3	4.1	12	1.3	11000	4.7	5.6	<0.01
OP5	15/10/2021	0.3	0.52	0.2	5000	23	7.2	0.2	3.8	13	1.5	12000	5.2	5.7	<0.01
OP6	15/10/2021	0.5	0.53	0.3	6500	20	6.8	0.2	4.5	15	2.0	13000	6.4	7.5	<0.01
OP7	15/10/2021	0.3	0.53	0.2	4900	31	6.5	0.2	5.6	12	1.5	13000	5.9	5.9	<0.01
OP9	15/10/2021	0.4	0.50	0.2	5800	21	7.6	0.3	4.3	13	1.7	12000	5.9	6.1	<0.01
OP10	15/10/2021	0.3	0.53	0.2	5500	24	7.8	0.3	4.4	12	1.5	13000	5.2	5.4	<0.01
OP11	15/10/2021	0.3	0.53	0.2	6100	27	7.8	0.2	5.6	14	1.7	14000	6.4	6.1	<0.01
OP12	15/10/2021	0.6	0.55	0.3	8300	21	9.2	0.3	4.8	16	2.2	14000	6.9	7.9	<0.01
OP13	15/10/2021	0.3	0.57	0.2	6200	30	8.3	0.3	5.0	14	1.4	15000	5.8	5.9	<0.01
OP14	15/10/2021	0.3	0.56	0.2	5600	35	7.3	0.3	5.4	13	1.5	15000	6.3	5.5	<0.01
OP15	15/10/2021	0.3	0.50	0.2	4700	23	6.9	0.3	4.0	12	1.4	12000	5.1	5.0	<0.01
OP16	16/10/2021	0.4	0.44	0.2	6300	17	8.4	0.2	4.6	14	1.7	11000	6.1	6.2	<0.01
OP17	16/10/2021	0.3	0.42	0.2	4500	16	7.2	0.3	4.1	12	1.3	11000	5.2	5.1	<0.01
OP18	16/10/2021	0.4	0.41	0.3	6600	13	8.3	0.2	4.3	14	1.8	11000	5.7	6.4	<0.01
OP19	16/10/2021	0.3	0.40	0.2	5100	16	8.1	0.2	3.9	13	1.5	11000	6.3	5.9	<0.01
OP20	16/10/2021	0.5	0.37	0.3	5700	10	7.2	0.2	3.7	13	1.7	9100	5.3	6.4	<0.01
OP21	16/10/2021	0.5	0.37	0.3	5700	7	7.5	0.2	3.8	13	1.8	8800	5.6	6.5	<0.01
OP22	16/10/2021	0.4	0.48	0.2	7100	19	7.7	0.2	5.1	15	1.8	14000	6.8	6.9	<0.01
OP23	16/10/2021	0.5	0.38	0.4	8600	12	9.1	0.2	4.3	18	2.6	13000	7.5	9.1	<0.01
OP24	17/10/2021	0.5	0.49	0.3	8900	17	9.8	0.3	4.2	15	2.2	12000	6.3	7.3	<0.01
OP25	17/10/2021	0.4	0.48	0.3	8600	18	9.2	0.1	4.7	17	2.3	14000	6.7	8.2	<0.01
OP26	17/10/2021	0.5	0.55	0.3	8800	18	9.7	0.2	5.0	16	2.3	15000	5.7	8.6	<0.01
OP27	17/10/2021	0.5	0.45	0.4	9400	13	10	<0.1	5.4	19	2.9	14000	7.2	10	<0.01
OP28	17/10/2021	0.4	0.43	0.4	9000	15	13	0.2	5.1	19	2.7	14000	6.4	10	<0.01
OP29	17/10/2021	0.5	0.38	0.4	9100	13	11	0.1	5.1	22	3.2	15000	6.4	11	<0.01

Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.

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**SEDIMENT DATA**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	2600 TKN mg.N/g	4500 TOTAL P mg.P/g	6200 TOC % C	ICP002 Total Ext Al mg/kg	ICP002 Total Ext As mg/kg	ICP002 Total Ext Ba mg/kg	ICP002 Total Ext Cd mg/kg	ICP002 Total Ext Co mg/kg	ICP002 Total Ext Cr mg/kg	ICP002 Total Ext Cu mg/kg	ICP002 Total Ext Fe mg/kg	ICP002 Total Ext Ni mg/kg	ICP002 Total Ext Zn mg/kg	ICP007 Total Ext Hg mg/kg
Reporting Limit		<0.1	<0.05	<0.1	<20	<2	<0.2	<0.1	<0.2	<0.2	<0.2	<5	<0.7	<0.5	<0.01
Analysis Date File		23/11/2021 21112301,02	23/11/2021 21112301,02	12/11/2021 21111201	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	24/11/2021 21112401A	19/11/2021 21111901-02
OP30	17/10/2021	0.6	0.45	0.5	12000	11	13	0.2	6.3	26	4.7	15000	8.7	16	<0.01
SG1	17/10/2021	0.4	0.59	0.3	8700	33	13	0.1	5.7	19	2.5	20000	6.4	11	<0.01
SG2	17/10/2021	0.4	0.60	0.3	10000	38	11	0.2	5.8	20	2.5	23000	6.7	10	<0.01
SG3	17/10/2021	0.4	0.50	0.3	7900	27	12	0.2	4.8	15	2.6	15000	5.8	9.4	<0.01
SG4	17/10/2021	0.4	0.48	0.4	9500	22	14	0.2	5.8	20	3.7	19000	7.1	12	<0.01
SG5	17/10/2021	0.4	0.50	0.3	9000	27	12	0.2	5.5	18	3.4	17000	6.7	12	<0.01
SG6	17/10/2021	0.4	0.45	0.3	9300	24	15	0.2	5.3	17	3.6	16000	6.9	11	<0.01
SG7	17/10/2021	0.4	0.45	0.3	7200	19	13	0.2	4.9	16	3.3	14000	6.3	11	<0.01
SG8	18/10/2021	0.4	0.58	0.3	9400	27	13	0.1	5.6	18	2.7	16000	6.0	11	<0.01
SG9	18/10/2021	0.4	0.51	0.4	8300	24	11	0.2	5.2	17	2.9	15000	6.3	10	<0.01
SG10	18/10/2021	0.3	0.38	0.3	7300	18	13	0.1	4.5	16	3.3	14000	6.2	10	<0.01
SG11	18/10/2021	0.3	0.37	0.3	6200	18	13	0.1	4.2	16	4.7	15000	7.3	12	<0.01
SG12	18/10/2021	0.4	0.62	0.3	9000	38	12	0.1	4.9	17	2.2	20000	5.7	9.5	<0.01
SG13	18/10/2021	0.5	0.54	0.4	7700	25	11	0.2	4.8	15	2.2	15000	5.4	9.0	<0.01
Triplicate A	17/10/2021	0.3	0.59	0.2	5500	35	7.8	0.2	5.2	12	1.4	14000	5.8	5.9	<0.01
Triplicate B	17/10/2021	0.4	0.51	0.3	7300	26	12	0.3	4.2	14	2.5	14000	5.3	8.9	<0.01
Triplicate C	17/10/2021	0.4	0.53	0.2	7400	25	12	0.2	4.6	14	2.6	14000	5.4	8.7	<0.01
Triplicate D	17/10/2021	0.4	0.46	0.3	9600	21	13	0.2	5.6	18	3.4	15000	6.9	12	<0.01
Trip Blank		<0.1	<0.05	<0.1	630	<2	4.1	<0.1	<0.2	1.5	<0.2	110	<0.7	<0.5	<0.01

Note: For results for compliance purposes uncertainty of measurement (MU) will sometimes affect the interpretation whether the result passes or fails the compliance limit.  
Tables for measurement uncertainty are available online at [www.mafri.murdoch.edu.au](http://www.mafri.murdoch.edu.au)

Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.

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**WATER QUALITY DATA**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 6/12/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-4  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	4700 TOTAL-P µg.P/L	2700 TOTAL-N µg.N/L	ICP001 Total Ext Al mg/L	ICP001 Total Ext As mg/L	ICP001 Total Ext Ba mg/L	ICP001 Total Ext Cd mg/L	ICP001 Total Ext Co mg/L	ICP001 Total Ext Cr mg/L	ICP001 Total Ext Cu mg/L	ICP001 Total Ext Fe mg/L	ICP001 Total Ext Ni mg/L	ICP001 Total Ext Zn mg/L	ICP006 Total Ext Hg mg/L
Reporting Limit		<5	<50	<0.01	<0.02	<0.0004	<0.0006	<0.002	<0.001	<0.001	<0.01	<0.007	<0.005	<0.0004
Analysis Date File		10/11/2021 21111001	10/11/2021 21111001	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	1/12/2021 21120101	26/11/2021 21112601
Equipment Blank	18/10/2021	220	680	17	<0.02	0.030	<0.0006	0.007	0.043	0.005	14	0.023	0.24	<0.0004
Field Blank	18/10/2021	<5	70	<0.01	<0.02	<0.0004	<0.0006	<0.002	<0.001	0.001	<0.01	<0.007	<0.005	<0.0004

Signatory: Jamie Woodward  
Date: 6/12/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.

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## CERTIFICATE OF ANALYSIS

<b>Work Order</b> : <b>EB2200737</b> <b>Amendment</b> : <b>(Preliminary Report)</b> <b>Client</b> : <b>RPS AAP Consulting Pty Ltd</b> <b>Contact</b> : <b>KAT THORNE</b> <b>Address</b> : <b>Level 2, 27-31 Troode St West Perth 6005</b> <b>Telephone</b> : <b>----</b> <b>Project</b> : <b>Marine Sediment Sampling</b> <b>Order number</b> : <b>----</b> <b>C-O-C number</b> : <b>----</b> <b>Sampler</b> : <b>LUCIA &amp; KATE</b> <b>Site</b> : <b>----</b> <b>Quote number</b> : <b>EP/875/21_V3</b> <b>No. of samples received</b> : <b>18</b> <b>No. of samples analysed</b> : <b>17</b>	<b>Page</b> : 1 of 16  <b>Laboratory</b> : Environmental Division Brisbane <b>Contact</b> : Nick Courts <b>Address</b> : 2 Byth Street Stafford QLD Australia 4053  <b>Telephone</b> : +61-7-3243 7222 <b>Date Samples Received</b> : 12-Jan-2022 08:20 <b>Date Analysis Commenced</b> : 13-Jan-2022 <b>Issue Date</b> : 25-Jan-2022 14:47
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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, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD

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## 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.

This report contains preliminary authorised results. The report may contain semi-quantitative results. Any result presented in this preliminary report may be subject to change in the final report.

- 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.
- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- EK061G (Total Kjeldahl Nitrogen as N) / EK067G (Total Phosphorus as P): Sample EB2200737\_002 (KP92-95\_U\_1) Shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP93-23\_U' (EB2200737-001) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP120-6\_U' (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- AES 6318477 T/O 6314877
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP120-6\_U (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP92-95\_U\_1 (EB2200737-002) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EP071 (TRH Semivolatiles): Sample 'KP92-95\_U\_1' shows poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- 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<sub>3</sub>) 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/m<sup>3</sup> in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m<sup>3</sup>'.



# (Preliminary Report)

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.8	9.6	9.9	9.7	9.1	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.008	0.080	0.010	0.015	0.526	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	50	<10	<10	328	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	43.4	47.0	36.3	2.13	19.3	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	8680	9390	7250	425	3860	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	13.9	15.0	11.6	0.68	6.19	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.08	<0.02	<0.02	0.52	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	50	<10	<10	328	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	4	<1	<1	25	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	17.1	24.3	16.8	16.0	41.3	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	600	2620	760	340	9520	
Iron	7439-89-6	50	mg/kg	8560	10700	10000	1680	29100	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	17.8	18.5	18.6	1.21	27.3	
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	9.9	13.7	11.4	1.7	33.2	
Copper	7440-50-8	1.0	mg/kg	<1.0	1.8	1.3	1.1	5.7	
Cobalt	7440-48-4	0.5	mg/kg	1.2	2.5	1.4	<0.5	8.7	
Lead	7439-92-1	1.0	mg/kg	2.4	3.8	2.7	24.1	10.6	

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Project : Marine Sediment Sampling



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	362	371	311	<10	173	
Nickel	7440-02-0	1.0	mg/kg	1.7	3.7	2.3	<1.0	9.8	
Selenium	7782-49-2	0.1	mg/kg	0.1	0.2	0.1	<0.1	0.6	
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	1.8	5.1	2.8	1.6	17.2	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	60	160	60	50	210	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	315	283	312	44	210	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.04	0.60	0.05	<0.02	0.53	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	3	3	<3	4	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	3	3	<3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time					08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EP080-SD: BTEXN - Continued</b>									
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<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	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
4.4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
4.4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
4.4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
^ 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	Not Authorised	
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	Not Authorised	
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time					08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	Not Authorised	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	90.6	90.0	94.8	97.3	83.6	
Toluene-D8	2037-26-5	0.2	%	81.0	84.0	82.3	89.3	77.6	
4-Bromofluorobenzene	460-00-4	0.2	%	91.5	95.2	94.7	102	87.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	113	132	90.4	93.8	110	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	65.2	25.9	55.4	56.4	Not Authorised	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	60.0	27.5	58.8	63.8	32.5	

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.9	9.6	9.6	9.9	9.7	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.011	0.020	0.011	0.015	0.052	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	13	<10	<10	33	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	48.5	15.4	36.4	36.3	47.8	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9700	3070	7280	7250	9560	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.6	4.92	11.7	11.6	15.3	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.02	<0.02	<0.02	0.05	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	13	<10	<10	33	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	20.1	24.9	18.8	16.4	24.2	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	670	2430	2780	960	2670	
Iron	7439-89-6	50	mg/kg	5540	18500	9710	10500	11800	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	12.8	14.6	12.6	19.8	18.3	
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	6.4	15.6	13.3	15.0	16.4	
Copper	7440-50-8	1.0	mg/kg	<1.0	2.1	2.0	<1.0	1.6	
Cobalt	7440-48-4	0.5	mg/kg	0.9	3.0	2.8	1.4	2.4	
Lead	7439-92-1	1.0	mg/kg	1.9	7.8	4.1	2.9	3.8	

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time				10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	250	167	177	512	397	
Nickel	7440-02-0	1.0	mg/kg	1.5	3.3	3.8	2.1	3.6	
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.2	0.2	0.1	0.2	
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	1.3	6.5	7.6	1.7	5.4	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	90	240	170	50	140	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	346	340	262	247	335	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.06	0.14	0.11	0.05	0.12	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	10	6	<3	4	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	10	9	<3	4	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	3	4	4	3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	4	<3	4	
C29 - C36 Fraction	----	5	mg/kg	<5	8	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	12	8	3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EP080-SD: BTEXN - Continued</b>									
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<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	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
Aldrin	309-00-2	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
beta-BHC	319-85-7	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
delta-BHC	319-86-8	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
4.4'-DDD	72-54-8	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
4.4'-DDE	72-55-9	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
4.4'-DDT	50-29-3	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-29-3	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Dieldrin	60-57-1	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Endrin	72-20-8	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Heptachlor	76-44-8	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	Not Authorised	<0.25	Not Authorised	<0.25	
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	27304-13-8	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	Not Authorised	<0.50	Not Authorised	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	80.1	84.2	89.4	97.6	88.5	
Toluene-D8	2037-26-5	0.2	%	70.2	76.8	81.4	88.9	82.6	
4-Bromofluorobenzene	460-00-4	0.2	%	80.0	88.4	91.2	98.2	91.8	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	106	121	84.3	103	128	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	46.1	Not Authorised	56.7	Not Authorised	55.8	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	47.5	52.5	52.5	68.8	55.0	



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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.4	9.2	9.4	9.9	9.9	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.042	0.340	0.102	0.010	0.014	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	26	212	64	<10	<10	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	14.2	40.8	23.6	35.0	45.5	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	2830	8160	4720	6990	9090	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	4.54	13.1	7.56	11.2	14.6	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.04	0.34	0.10	<0.02	<0.02	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	26	212	64	<10	<10	
Liming Rate excluding ANC	----	1	kg CaCO3/t	2	16	5	<1	<1	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	29.7	35.8	32.4	19.2	7.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	5840	6700	5590	720	760	
Iron	7439-89-6	50	mg/kg	32300	24700	22200	7960	8110	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	11.0	26.6	20.5	19.6	16.5	
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	28.5	27.8	37.0	9.3	11.6	
Copper	7440-50-8	1.0	mg/kg	6.1	3.6	3.2	<1.0	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	4.2	7.0	5.9	1.1	1.2	
Lead	7439-92-1	1.0	mg/kg	13.4	9.5	9.8	2.4	2.4	

# (Preliminary Report)

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Project : Marine Sediment Sampling



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	102	156	212	228	316	
Nickel	7440-02-0	1.0	mg/kg	5.3	7.6	6.5	1.7	1.9	
Selenium	7782-49-2	0.1	mg/kg	0.3	0.4	0.3	0.1	0.1	
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	10.2	12.1	11.0	1.6	1.8	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	110	40	60	60	80	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	181	27	35	292	355	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.15	0.56	0.20	0.04	0.06	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	4	3	4	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	4	3	4	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	3	<3	4	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	<3	7	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	

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Analytical Results

Table with columns: Sub-Matrix: SOIL, Sample ID, Sampling date / time, Compound, CAS Number, LOR, Unit, and results for various sample IDs (KP120-6\_U, KP119-7\_U, KP119-8\_U, KP92-75\_L, KP92-85\_U\_1) across different compound groups like EP080-SD: BTEXN, EP090: Organotin Compounds, and EP131A: Organochlorine Pesticides.

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## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time					08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	62.9	62.8	65.4	70.9	73.7	
Toluene-D8	2037-26-5	0.2	%	55.0	53.9	56.7	61.8	63.9	
4-Bromofluorobenzene	460-00-4	0.2	%	64.3	70.2	74.9	79.0	84.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	78.4	90.8	127	127	81.1	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	60.5	59.5	55.1	37.7	65.4	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	62.5	65.0	62.5	50.0	63.8	

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Analytical Results

Table with columns: Compound, CAS Number, LOR, Unit, Sample ID, TB, FB, and multiple blank columns. Rows include various hydrocarbon fractions (C10-C14, C15-C28, C29-C36, etc.), BTEXN components (Benzene, Toluene, Ethylbenzene, etc.), and TPH(V)/BTEX Surrogates (1,2-Dichloroethane-D4, Toluene-D8, 4-Bromofluorobenzene).



### Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
<b>EP090S: Organotin Surrogate</b>			
Tripropyltin	----	35	130
<b>EP131S: OC Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	10	119
<b>EP131T: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	10	106

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (SOIL) EP131A: Organochlorine Pesticides
- (SOIL) EP131S: OC Pesticide Surrogate
- (SOIL) EP131B: Polychlorinated Biphenyls (as Aroclors)
- (SOIL) EP131T: PCB Surrogate

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	<b>: EB2200737</b>	<b>Page</b>	: 1 of 16
<b>Client</b>	<b>: RPS AAP Consulting Pty Ltd</b>	<b>Laboratory</b>	: Environmental Division Brisbane
<b>Contact</b>	<b>: KAT THORNE</b>	<b>Contact</b>	: Nick Courts
<b>Address</b>	<b>: Level 2, 27-31 Troode St West Perth 6005</b>	<b>Address</b>	: 2 Byth Street Stafford QLD Australia 4053
<b>Telephone</b>	: ----	<b>Telephone</b>	: +61-7-3243 7222
<b>Project</b>	<b>: Marine Sediment Sampling</b>	<b>Date Samples Received</b>	: 12-Jan-2022 08:20
<b>Order number</b>	: ----	<b>Date Analysis Commenced</b>	: 13-Jan-2022
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 28-Jan-2022 09:11
<b>Sampler</b>	<b>: LUCIA &amp; KATE</b>		
<b>Site</b>	: ----		
<b>Quote number</b>	<b>: EP/875/21_V3</b>		
<b>No. of samples received</b>	<b>: 18</b>		
<b>No. of samples analysed</b>	<b>: 17</b>		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, 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.
- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- EK061G (Total Kjeldahl Nitrogen as N) / EK067G (Total Phosphorus as P): Sample EB2200737\_002 (KP92-95\_U\_1) Shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP93-23\_U' (EB2200737-001) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP120-6\_U' (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- AES 6318477 T/O 6314877
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP120-6\_U (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP92-95\_U\_1 (EB2200737-002) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EP071 (TRH Semivolatiles): Sample 'KP92-95\_U\_1' shows poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- 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<sub>3</sub>) 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/m<sup>3</sup> in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m<sup>3</sup>'.





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.8	9.6	9.9	9.7	9.1	
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.008	0.080	0.010	0.015	0.526	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	50	<10	<10	328	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	43.4	47.0	36.3	2.13	19.3	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	8680	9390	7250	425	3860	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	13.9	15.0	11.6	0.68	6.19	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.08	<0.02	<0.02	0.52	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	50	<10	<10	328	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	4	<1	<1	25	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	17.1	24.3	16.8	16.0	41.3	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	600	2620	760	340	9520	
Iron	7439-89-6	50	mg/kg	8560	10700	10000	1680	29100	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	17.8	18.5	18.6	1.21	27.3	
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	9.9	13.7	11.4	1.7	33.2	
Copper	7440-50-8	1.0	mg/kg	<1.0	1.8	1.3	1.1	5.7	
Cobalt	7440-48-4	0.5	mg/kg	1.2	2.5	1.4	<0.5	8.7	
Lead	7439-92-1	1.0	mg/kg	2.4	3.8	2.7	24.1	10.6	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	362	371	311	<10	173	
Nickel	7440-02-0	1.0	mg/kg	1.7	3.7	2.3	<1.0	9.8	
Selenium	7782-49-2	0.1	mg/kg	0.1	0.2	0.1	<0.1	0.6	
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	1.8	5.1	2.8	1.6	17.2	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	60	160	60	50	210	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	315	283	312	44	210	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.04	0.60	0.05	<0.02	0.53	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	3	3	<3	4	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	3	3	<3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time					08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	EB2200737-006
				Result	Result	Result	Result	Result	Result
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	27304-13-8	0.50	µg/kg	<0.50	<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	<0.50
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	90.6	90.0	94.8	97.3	83.6	
Toluene-D8	2037-26-5	0.2	%	81.0	84.0	82.3	89.3	77.6	
4-Bromofluorobenzene	460-00-4	0.2	%	91.5	95.2	94.7	102	87.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	113	132	90.4	93.8	110	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	65.2	25.9	55.4	56.4	50.6	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	60.0	27.5	58.8	63.8	32.5	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time				10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.9	9.6	9.6	9.9	9.7	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.011	0.020	0.011	0.015	0.052	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	13	<10	<10	33	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	48.5	15.4	36.4	36.3	47.8	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9700	3070	7280	7250	9560	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.6	4.92	11.7	11.6	15.3	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.02	<0.02	<0.02	0.05	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	13	<10	<10	33	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	20.1	24.9	18.8	16.4	24.2	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	670	2430	2780	960	2670	
Iron	7439-89-6	50	mg/kg	5540	18500	9710	10500	11800	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	12.8	14.6	12.6	19.8	18.3	
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	6.4	15.6	13.3	15.0	16.4	
Copper	7440-50-8	1.0	mg/kg	<1.0	2.1	2.0	<1.0	1.6	
Cobalt	7440-48-4	0.5	mg/kg	0.9	3.0	2.8	1.4	2.4	
Lead	7439-92-1	1.0	mg/kg	1.9	7.8	4.1	2.9	3.8	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	250	167	177	512	397	
Nickel	7440-02-0	1.0	mg/kg	1.5	3.3	3.8	2.1	3.6	
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.2	0.2	0.1	0.2	
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	1.3	6.5	7.6	1.7	5.4	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	90	240	170	50	140	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	346	340	262	247	335	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.06	0.14	0.11	0.05	0.12	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	10	6	<3	4	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	10	9	<3	4	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	3	4	4	3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	4	<3	4	
C29 - C36 Fraction	----	5	mg/kg	<5	8	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	12	8	3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time				10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	80.1	84.2	89.4	97.6	88.5	
Toluene-D8	2037-26-5	0.2	%	70.2	76.8	81.4	88.9	82.6	
4-Bromofluorobenzene	460-00-4	0.2	%	80.0	88.4	91.2	98.2	91.8	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	106	121	84.3	103	128	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	46.1	44.9	56.7	48.9	55.8	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	47.5	52.5	52.5	68.8	55.0	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.4	9.2	9.4	9.9	9.9	
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.042	0.340	0.102	0.010	0.014	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	26	212	64	<10	<10	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	14.2	40.8	23.6	35.0	45.5	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	2830	8160	4720	6990	9090	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	4.54	13.1	7.56	11.2	14.6	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.04	0.34	0.10	<0.02	<0.02	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	26	212	64	<10	<10	
Liming Rate excluding ANC	----	1	kg CaCO3/t	2	16	5	<1	<1	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	29.7	35.8	32.4	19.2	7.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	5840	6700	5590	720	760	
Iron	7439-89-6	50	mg/kg	32300	24700	22200	7960	8110	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	11.0	26.6	20.5	19.6	16.5	
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	28.5	27.8	37.0	9.3	11.6	
Copper	7440-50-8	1.0	mg/kg	6.1	3.6	3.2	<1.0	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	4.2	7.0	5.9	1.1	1.2	
Lead	7439-92-1	1.0	mg/kg	13.4	9.5	9.8	2.4	2.4	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	102	156	212	228	316	
Nickel	7440-02-0	1.0	mg/kg	5.3	7.6	6.5	1.7	1.9	
Selenium	7782-49-2	0.1	mg/kg	0.3	0.4	0.3	0.1	0.1	
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	10.2	12.1	11.0	1.6	1.8	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	110	40	60	60	80	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	181	27	35	292	355	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.15	0.56	0.20	0.04	0.06	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	4	3	4	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	4	3	4	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	3	<3	4	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	<3	7	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EP080-SD: BTEXN - Continued</b>									
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<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	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	
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	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	62.9	62.8	65.4	70.9	73.7	
Toluene-D8	2037-26-5	0.2	%	55.0	53.9	56.7	61.8	63.9	
4-Bromofluorobenzene	460-00-4	0.2	%	64.3	70.2	74.9	79.0	84.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	78.4	90.8	127	127	81.1	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	60.5	59.5	55.1	37.7	65.4	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	62.5	65.0	62.5	50.0	63.8	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	TB	FB	----	----	----
Sampling date / time				10-Jan-2022 00:00	10-Jan-2022 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EB2200737-010	EB2200737-011	-----	-----	-----	
				Result	Result	----	----	----	
<b>EP071: Total Petroleum Hydrocarbons</b>									
C10 - C14 Fraction	----	50	µg/L	----	<50	----	----	----	
C15 - C28 Fraction	----	100	µg/L	----	<100	----	----	----	
C29 - C36 Fraction	----	50	µg/L	----	<50	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	<50	----	----	----	
<b>EP071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	100	µg/L	----	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	----	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	----	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	<100	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	115	----	----	----	----	
Toluene-D8	2037-26-5	2	%	97.4	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	98.7	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
<b>EP090S: Organotin Surrogate</b>			
Tripropyltin	----	35	130
<b>EP131S: OC Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	10	119
<b>EP131T: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	10	106
Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

## Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (SOIL) EP131A: Organochlorine Pesticides
- (SOIL) EP131S: OC Pesticide Surrogate
- (SOIL) EP131B: Polychlorinated Biphenyls (as Aroclors)
- (SOIL) EP131T: PCB Surrogate

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	<b>: EB2200550</b>	<b>Page</b>	: 1 of 16
<b>Client</b>	<b>: RPS AAP Consulting Pty Ltd</b>	<b>Laboratory</b>	: Environmental Division Brisbane
<b>Contact</b>	<b>: KAT THORNE</b>	<b>Contact</b>	: Nick Courts
<b>Address</b>	<b>: Level 2, 27-31 Troode St West Perth 6005</b>	<b>Address</b>	: 2 Byth Street Stafford QLD Australia 4053
<b>Telephone</b>	: ----	<b>Telephone</b>	: +61-7-3243 7222
<b>Project</b>	<b>: Marine Sediment Sampling</b>	<b>Date Samples Received</b>	: 11-Jan-2022 06:10
<b>Order number</b>	: ----	<b>Date Analysis Commenced</b>	: 12-Jan-2022
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 21-Jan-2022 11:18
<b>Sampler</b>	<b>: LUCIA &amp; KATE</b>		
<b>Site</b>	: ----		
<b>Quote number</b>	<b>: EP/875/21_V3</b>		
<b>No. of samples received</b>	<b>: 15</b>		
<b>No. of samples analysed</b>	<b>: 13</b>		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD
Thomas Donovan	Senior Organic Chemist - PFAS	Brisbane Organics, 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  
∅ = 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.
- **OC Pesticides (Ultratrace) & PCB's (Ultratrace) analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- **Ultra trace organics analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- EK067G (Total Phosphorus as P): Sample EB2200550\_001 (KP93.7\_U) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- EK067G (Total Phosphorus as P) / EK061G (Total Kjeldahl Nitrogen as N): Sample EB2200550\_002 (KP93.8\_U) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EG020-SD (Total Metals Sediments by ICP-MS): Sample 'KP106.0\_L' (EB2200550-012) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- 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<sub>3</sub>) 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/m<sup>3</sup> in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m<sup>3</sup>'.





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93.7_U	KP93.8_U	KP93.8_L	KP102.7_U	KP102.7_L
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-001	EB2200550-002	EB2200550-003	EB2200550-004	EB2200550-005	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.8	9.8	9.8	9.2	9.2	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.013	0.011	0.006	0.226	0.249	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	141	155	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	47.5	46.6	48.5	22.2	21.8	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9500	9310	9680	4430	4350	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.2	14.9	15.5	7.11	6.98	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	0.22	0.25	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	141	155	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	10	12	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	21.2	24.9	17.2	28.7	29.6	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	820	1170	710	5480	4440	
Iron	7439-89-6	50	mg/kg	8380	13700	7870	13500	13200	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	16.0	23.9	19.2	14.7	11.9	
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	8.8	12.8	9.4	17.0	20.2	
Copper	7440-50-8	1.0	mg/kg	1.1	1.9	2.6	4.8	4.6	
Cobalt	7440-48-4	0.5	mg/kg	1.3	2.0	1.3	3.9	4.1	
Lead	7439-92-1	1.0	mg/kg	2.0	4.6	2.4	5.0	6.3	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93.7_U	KP93.8_U	KP93.8_L	KP102.7_U	KP102.7_L
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-001	EB2200550-002	EB2200550-003	EB2200550-004	EB2200550-005	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	463	628	710	170	113	
Nickel	7440-02-0	1.0	mg/kg	1.7	2.7	1.8	5.2	4.9	
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	2.5	4.3	1.8	8.1	7.5	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	0.01	0.01	0.01	0.02	0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	90	90	60	80	210	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	336	238	242	55	560	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.07	0.05	0.05	0.27	0.24	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	3	3	
>C16 - C34 Fraction	----	3	mg/kg	<3	3	7	10	8	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	3	7	13	11	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	3	3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	4	8	9	
C15 - C28 Fraction	----	3	mg/kg	<3	3	7	8	6	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	3	11	16	15	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93.7_U	KP93.8_U	KP93.8_L	KP102.7_U	KP102.7_L
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-001	EB2200550-002	EB2200550-003	EB2200550-004	EB2200550-005	
				Result	Result	Result	Result	Result	
<b>EP080-SD: BTEXN - Continued</b>									
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<sup>^</sup> Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
<sup>^</sup> Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	
<sup>^</sup> 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	
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	
<sup>^</sup> 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	
<sup>^</sup> 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	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93.7_U	KP93.8_U	KP93.8_L	KP102.7_U	KP102.7_L
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-001	EB2200550-002	EB2200550-003	EB2200550-004	EB2200550-005	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	94.4	95.2	93.8	86.8	85.8	
Toluene-D8	2037-26-5	0.2	%	82.1	82.8	82.7	78.9	74.5	
4-Bromofluorobenzene	460-00-4	0.2	%	96.7	97.0	97.2	93.8	87.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	98.4	92.9	98.4	75.3	111	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	50.8	49.9	46.6	60.2	45.8	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	50.0	65.0	67.5	50.0	52.5	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP103.1_U	KP103.1_L	KP103.5_U	KP104.9_U	KP106.0_U
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	06-Jan-2022 00:00	06-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-006	EB2200550-007	EB2200550-008	EB2200550-009	EB2200550-011	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.4	9.2	9.6	9.4	9.4	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.097	0.214	0.009	0.011	0.012	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	60	133	<10	<10	<10	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	21.4	7.44	34.9	36.4	43.5	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	4260	1480	6970	7270	8690	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	6.84	2.38	11.2	11.7	13.9	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.10	0.21	<0.02	<0.02	<0.02	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	60	133	<10	<10	<10	
Liming Rate excluding ANC	----	1	kg CaCO3/t	4	10	<1	<1	<1	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	25.8	22.7	30.4	33.8	27.6	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	4330	3810	2660	4320	4380	
Iron	7439-89-6	50	mg/kg	18400	15200	12000	26800	26600	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	14.3	13.3	13.1	17.6	15.4	
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	41.7	17.6	15.4	29.3	37.8	
Copper	7440-50-8	1.0	mg/kg	4.4	4.4	3.1	4.0	4.2	
Cobalt	7440-48-4	0.5	mg/kg	4.6	4.0	2.3	3.5	5.5	
Lead	7439-92-1	1.0	mg/kg	7.9	6.4	4.0	5.7	11.9	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP103.1_U	KP103.1_L	KP103.5_U	KP104.9_U	KP106.0_U
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	06-Jan-2022 00:00	06-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-006	EB2200550-007	EB2200550-008	EB2200550-009	EB2200550-011	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	102	77	158	155	216	
Nickel	7440-02-0	1.0	mg/kg	4.7	3.8	3.6	5.0	7.2	
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	7.4	5.3	6.8	9.4	10.5	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	0.01	0.01	0.01	0.01	0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	110	90	180	200	120	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	128	97	291	428	647	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.14	0.21	0.13	0.12	0.12	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	4	<3	6	
>C16 - C34 Fraction	----	3	mg/kg	9	5	11	6	10	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	9	5	15	6	16	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	4	<3	6	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	9	5	8	7	11	
C15 - C28 Fraction	----	3	mg/kg	6	4	8	5	9	
C29 - C36 Fraction	----	5	mg/kg	6	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	21	9	16	12	20	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP103.1_U	KP103.1_L	KP103.5_U	KP104.9_U	KP106.0_U
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	06-Jan-2022 00:00	06-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-006	EB2200550-007	EB2200550-008	EB2200550-009	EB2200550-011	
				Result	Result	Result	Result	Result	
<b>EP080-SD: BTEXN - Continued</b>									
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	
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	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP103.1_U	KP103.1_L	KP103.5_U	KP104.9_U	KP106.0_U
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	06-Jan-2022 00:00	06-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200550-006	EB2200550-007	EB2200550-008	EB2200550-009	EB2200550-011	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	94.2	94.6	93.6	91.4	93.9	
Toluene-D8	2037-26-5	0.2	%	83.0	83.2	83.3	79.7	82.9	
4-Bromofluorobenzene	460-00-4	0.2	%	98.2	98.3	98.1	93.4	97.2	
<b>EP090S: Organotin Surrogate</b>									
Tripropyltin	----	0.5	%	92.6	103	102	79.2	76.2	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	74.7	44.2	70.0	57.6	57.8	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	57.5	67.5	45.0	53.8	67.5	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Sample ID		KP106.0_L	KP106_U_A	----	----	----
		Sampling date / time		06-Jan-2022 00:00	06-Jan-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2200550-012	EB2200550-013	-----	-----	-----
				Result	Result	----	----	----
<b>EA033-A: Actual Acidity</b>								
pH KCl (23A)	----	0.1	pH Unit	9.5	9.4	----	----	----
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	----	----	----
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	----	----	----
<b>EA033-B: Potential Acidity</b>								
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.014	0.013	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	----	----	----
<b>EA033-C: Acid Neutralising Capacity</b>								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	48.5	43.5	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9680	8700	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.5	13.9	----	----	----
<b>EA033-E: Acid Base Accounting</b>								
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	<0.02	<0.02	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	----	----	----
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>								
Moisture Content	----	1.0	%	36.1	29.6	----	----	----
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>								
Aluminium	7429-90-5	50	mg/kg	3920	4890	----	----	----
Iron	7439-89-6	50	mg/kg	15400	23000	----	----	----
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	----	----	----
Arsenic	7440-38-2	1.00	mg/kg	12.3	13.0	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	----	----	----
Chromium	7440-47-3	1.0	mg/kg	23.9	26.8	----	----	----
Copper	7440-50-8	1.0	mg/kg	3.9	6.2	----	----	----
Cobalt	7440-48-4	0.5	mg/kg	3.4	4.6	----	----	----
Lead	7439-92-1	1.0	mg/kg	6.7	9.5	----	----	----



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP106.0_L	KP106_U_A	----	----	----
Sampling date / time				06-Jan-2022 00:00	06-Jan-2022 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EB2200550-012	EB2200550-013	-----	-----	-----	
				Result	Result	----	----	----	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	175	211	----	----	----	
Nickel	7440-02-0	1.0	mg/kg	4.8	6.5	----	----	----	
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	----	----	----	
Zinc	7440-66-6	1.0	mg/kg	8.4	9.4	----	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	0.02	0.01	----	----	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	220	170	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	290	282	----	----	----	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.18	0.14	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	5	7	----	----	----	
>C16 - C34 Fraction	----	3	mg/kg	10	11	----	----	----	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	----	----	----	
>C10 - C40 Fraction (sum)	----	3	mg/kg	15	18	----	----	----	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	5	7	----	----	----	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	----	----	----	
C10 - C14 Fraction	----	3	mg/kg	8	13	----	----	----	
C15 - C28 Fraction	----	3	mg/kg	8	9	----	----	----	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	----	----	----	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	16	22	----	----	----	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	----	----	----	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	----	----	----	
<b>EP080-SD: BTEXN</b>									
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	----	----	----	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP106.0_L	KP106_U_A	----	----	----
Sampling date / time				06-Jan-2022 00:00	06-Jan-2022 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EB2200550-012	EB2200550-013	-----	-----	-----	
				Result	Result	----	----	----	
<b>EP080-SD: BTEXN - Continued</b>									
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	----	----	----	
<b>EP090: Organotin Compounds</b>									
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	----	----	----	
<b>EP131A: Organochlorine Pesticides</b>									
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	72-54-8/72-55-9/50-29-3	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	----	----	----	
^ Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	----	----	----	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	----	----	----	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP106.0_L	KP106_U_A	----	----	----
Sampling date / time				06-Jan-2022 00:00	06-Jan-2022 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EB2200550-012	EB2200550-013	-----	-----	-----	
				Result	Result	----	----	----	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.50	µg/kg	<0.50	<0.50	----	----	----	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	----	----	----	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	----	----	----	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	----	----	----	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	----	----	----	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	----	----	----	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	----	----	----	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	----	----	----	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	----	----	----	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	87.5	90.0	----	----	----	
Toluene-D8	2037-26-5	0.2	%	78.2	78.8	----	----	----	
4-Bromofluorobenzene	460-00-4	0.2	%	90.3	92.0	----	----	----	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	45.2	88.7	----	----	----	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	46.6	45.2	----	----	----	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	51.2	48.8	----	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	EB	----	----	----	----
Sampling date / time				06-Jan-2022 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	EB2200550-010	-----	-----	-----	-----	
				Result	----	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	103	----	----	----	----	
Toluene-D8	2037-26-5	2	%	102	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	100	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
<b>EP090S: Organotin Surrogate</b>			
Tripropyltin	----	35	130
<b>EP131S: OC Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	10	119
<b>EP131T: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	10	106
Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

## Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EP131A: Organochlorine Pesticides

(SOIL) EP131S: OC Pesticide Surrogate

(SOIL) EP131B: Polychlorinated Biphenyls (as Aroclors)

(SOIL) EP131T: PCB Surrogate

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	<b>: EB2200737</b>	<b>Page</b>	: 1 of 16
<b>Client</b>	<b>: RPS AAP Consulting Pty Ltd</b>	<b>Laboratory</b>	: Environmental Division Brisbane
<b>Contact</b>	<b>: KAT THORNE</b>	<b>Contact</b>	: Nick Courts
<b>Address</b>	<b>: Level 2, 27-31 Troode St West Perth 6005</b>	<b>Address</b>	: 2 Byth Street Stafford QLD Australia 4053
<b>Telephone</b>	: ----	<b>Telephone</b>	: +61-7-3243 7222
<b>Project</b>	<b>: Marine Sediment Sampling</b>	<b>Date Samples Received</b>	: 12-Jan-2022 08:20
<b>Order number</b>	: ----	<b>Date Analysis Commenced</b>	: 13-Jan-2022
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 28-Jan-2022 09:11
<b>Sampler</b>	<b>: LUCIA &amp; KATE</b>		
<b>Site</b>	: ----		
<b>Quote number</b>	<b>: EP/875/21_V3</b>		
<b>No. of samples received</b>	<b>: 18</b>		
<b>No. of samples analysed</b>	<b>: 17</b>		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, 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.
- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- EK061G (Total Kjeldahl Nitrogen as N) / EK067G (Total Phosphorus as P): Sample EB2200737\_002 (KP92-95\_U\_1) Shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP93-23\_U' (EB2200737-001) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP120-6\_U' (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- AES 6318477 T/O 6314877
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP120-6\_U (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP92-95\_U\_1 (EB2200737-002) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EP071 (TRH Semivolatiles): Sample 'KP92-95\_U\_1' shows poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- 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<sub>3</sub>) 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/m<sup>3</sup> in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m<sup>3</sup>'.





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.8	9.6	9.9	9.7	9.1	
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.008	0.080	0.010	0.015	0.526	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	50	<10	<10	328	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	43.4	47.0	36.3	2.13	19.3	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	8680	9390	7250	425	3860	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	13.9	15.0	11.6	0.68	6.19	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.08	<0.02	<0.02	0.52	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	50	<10	<10	328	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	4	<1	<1	25	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	17.1	24.3	16.8	16.0	41.3	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	600	2620	760	340	9520	
Iron	7439-89-6	50	mg/kg	8560	10700	10000	1680	29100	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	17.8	18.5	18.6	1.21	27.3	
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	9.9	13.7	11.4	1.7	33.2	
Copper	7440-50-8	1.0	mg/kg	<1.0	1.8	1.3	1.1	5.7	
Cobalt	7440-48-4	0.5	mg/kg	1.2	2.5	1.4	<0.5	8.7	
Lead	7439-92-1	1.0	mg/kg	2.4	3.8	2.7	24.1	10.6	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	362	371	311	<10	173	
Nickel	7440-02-0	1.0	mg/kg	1.7	3.7	2.3	<1.0	9.8	
Selenium	7782-49-2	0.1	mg/kg	0.1	0.2	0.1	<0.1	0.6	
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	1.8	5.1	2.8	1.6	17.2	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	60	160	60	50	210	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	315	283	312	44	210	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.04	0.60	0.05	<0.02	0.53	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	3	3	<3	4	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	3	3	<3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	90.6	90.0	94.8	97.3	83.6	
Toluene-D8	2037-26-5	0.2	%	81.0	84.0	82.3	89.3	77.6	
4-Bromofluorobenzene	460-00-4	0.2	%	91.5	95.2	94.7	102	87.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	113	132	90.4	93.8	110	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	65.2	25.9	55.4	56.4	50.6	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	60.0	27.5	58.8	63.8	32.5	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time				10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.9	9.6	9.6	9.9	9.7	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.011	0.020	0.011	0.015	0.052	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	13	<10	<10	33	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	48.5	15.4	36.4	36.3	47.8	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9700	3070	7280	7250	9560	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.6	4.92	11.7	11.6	15.3	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.02	<0.02	<0.02	0.05	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	13	<10	<10	33	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	20.1	24.9	18.8	16.4	24.2	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	670	2430	2780	960	2670	
Iron	7439-89-6	50	mg/kg	5540	18500	9710	10500	11800	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	12.8	14.6	12.6	19.8	18.3	
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	6.4	15.6	13.3	15.0	16.4	
Copper	7440-50-8	1.0	mg/kg	<1.0	2.1	2.0	<1.0	1.6	
Cobalt	7440-48-4	0.5	mg/kg	0.9	3.0	2.8	1.4	2.4	
Lead	7439-92-1	1.0	mg/kg	1.9	7.8	4.1	2.9	3.8	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time				10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	250	167	177	512	397	
Nickel	7440-02-0	1.0	mg/kg	1.5	3.3	3.8	2.1	3.6	
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.2	0.2	0.1	0.2	
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	1.3	6.5	7.6	1.7	5.4	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	90	240	170	50	140	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	346	340	262	247	335	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.06	0.14	0.11	0.05	0.12	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	10	6	<3	4	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	10	9	<3	4	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	3	4	4	3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	4	<3	4	
C29 - C36 Fraction	----	5	mg/kg	<5	8	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	12	8	3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit		EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013
					Result	Result	Result	Result	Result
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		80.1	84.2	89.4	97.6	88.5
Toluene-D8	2037-26-5	0.2	%		70.2	76.8	81.4	88.9	82.6
4-Bromofluorobenzene	460-00-4	0.2	%		80.0	88.4	91.2	98.2	91.8
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%		106	121	84.3	103	128
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%		46.1	44.9	56.7	48.9	55.8
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%		47.5	52.5	52.5	68.8	55.0





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.4	9.2	9.4	9.9	9.9	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.042	0.340	0.102	0.010	0.014	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	26	212	64	<10	<10	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	14.2	40.8	23.6	35.0	45.5	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	2830	8160	4720	6990	9090	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	4.54	13.1	7.56	11.2	14.6	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.04	0.34	0.10	<0.02	<0.02	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	26	212	64	<10	<10	
Liming Rate excluding ANC	----	1	kg CaCO3/t	2	16	5	<1	<1	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	29.7	35.8	32.4	19.2	7.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	5840	6700	5590	720	760	
Iron	7439-89-6	50	mg/kg	32300	24700	22200	7960	8110	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	11.0	26.6	20.5	19.6	16.5	
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	28.5	27.8	37.0	9.3	11.6	
Copper	7440-50-8	1.0	mg/kg	6.1	3.6	3.2	<1.0	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	4.2	7.0	5.9	1.1	1.2	
Lead	7439-92-1	1.0	mg/kg	13.4	9.5	9.8	2.4	2.4	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	102	156	212	228	316	
Nickel	7440-02-0	1.0	mg/kg	5.3	7.6	6.5	1.7	1.9	
Selenium	7782-49-2	0.1	mg/kg	0.3	0.4	0.3	0.1	0.1	
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	10.2	12.1	11.0	1.6	1.8	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	110	40	60	60	80	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	181	27	35	292	355	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.15	0.56	0.20	0.04	0.06	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	4	3	4	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	4	3	4	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	3	<3	4	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	<3	7	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EP080-SD: BTEXN - Continued</b>									
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<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	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	
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	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	62.9	62.8	65.4	70.9	73.7	
Toluene-D8	2037-26-5	0.2	%	55.0	53.9	56.7	61.8	63.9	
4-Bromofluorobenzene	460-00-4	0.2	%	64.3	70.2	74.9	79.0	84.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	78.4	90.8	127	127	81.1	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	60.5	59.5	55.1	37.7	65.4	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	62.5	65.0	62.5	50.0	63.8	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	TB	FB	----	----	----
Sampling date / time				10-Jan-2022 00:00	10-Jan-2022 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EB2200737-010	EB2200737-011	-----	-----	-----	
				Result	Result	----	----	----	
<b>EP071: Total Petroleum Hydrocarbons</b>									
C10 - C14 Fraction	----	50	µg/L	----	<50	----	----	----	
C15 - C28 Fraction	----	100	µg/L	----	<100	----	----	----	
C29 - C36 Fraction	----	50	µg/L	----	<50	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	<50	----	----	----	
<b>EP071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	100	µg/L	----	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	----	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	----	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	<100	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	115	----	----	----	----	
Toluene-D8	2037-26-5	2	%	97.4	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	98.7	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
<b>EP090S: Organotin Surrogate</b>			
Tripropyltin	----	35	130
<b>EP131S: OC Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	10	119
<b>EP131T: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	10	106
Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

## Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (SOIL) EP131A: Organochlorine Pesticides
- (SOIL) EP131S: OC Pesticide Surrogate
- (SOIL) EP131B: Polychlorinated Biphenyls (as Aroclors)
- (SOIL) EP131T: PCB Surrogate




**WATER QUALITY DATA**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-3  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	2000 AMMONIA µg.N/L	4100 ORTHO-P µg.P/L	2100 NO3+NO2 µg.N/L	4700 TOTAL-P µg.P/L	2700 TOTAL-N µg.N/L	3000 CHLOROPHYLL'a' µg/L	3000 PHAEOPHYTIN'a' µg/L	2540D TSS mg/L
Reporting Limit		<3	<2	<2	<5	<50	<0.1	<0.2	<1
Analysis Date File		29/10/2021 21102902	29/10/2021 21102902	29/10/2021 21102902	2/11/2021 21110201,1001,1701,1702	2/11/2021	2/11/2021 21110201,1201	2/11/2021 21110201,1201	1/11/2021 211101-11
OP1S	16/10/2021	<3	3	<2	9	120	0.9	0.2	2.7
OP1B	16/10/2021	12	7	15	14	100	0.4	<0.2	3.2
OP2S	16/10/2021	<3	3	<2	9	100	1.2	0.2	1.8
OP2B	16/10/2021	4	6	5	15	100	0.5	<0.2	4.1
OP3S	16/10/2021	<3	<2	<2	9	130	1.2	0.4	3.0
OP3B	16/10/2021	3	6	11	14	100	0.5	<0.2	2.6
OP4S	16/10/2021	<3	<2	<2	13	150	1.2	0.5	2.5
OP4B	16/10/2021	4	6	6	13	100	0.7	<0.2	2.0
OP5S	16/10/2021	7	2	<2	12	130	1.0	0.5	2.5
OP5B	16/10/2021	<3	5	3	14	140	1.1	<0.2	2.0
OP6S	16/10/2021	<3	3	<2	13	140	1.0	0.6	3.0
OP6B	16/10/2021	4	6	2	12	80	1.3	0.5	2.7
OP7S	17/10/2021	<3	3	<2	11	110	1.5	0.3	1.7
OP7B	17/10/2021	3	4	4	13	110	0.8	0.2	1.7
OP8S	17/10/2021	<3	3	<2	14	110	0.6	<0.2	2.0
OP8B	17/10/2021	<3	2	<2	13	110	0.8	<0.2	3.5
OP9S	17/10/2021	<3	4	<2	12	100	0.7	<0.2	2.6
OP9B	17/10/2021	6	4	9	12	110	1.0	<0.2	3.1
OP10S	17/10/2021	<3	6	<2	16	90	0.8	<0.2	8.6

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.

  
Signatory: Jamie Woodward  
Date: 19/11/2021




**WATER QUALITY DATA**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-3  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	2000 AMMONIA µg.N/L	4100 ORTHO-P µg.P/L	2100 NO3+NO2 µg.N/L	4700 TOTAL-P µg.P/L	2700 TOTAL-N µg.N/L	3000 CHLOROPHYLL'a' µg/L	3000 PHAEOPHYTIN'a' µg/L	2540D TSS mg/L
Reporting Limit		<3	<2	<2	<5	<50	<0.1	<0.2	<1
Analysis Date File		29/10/2021 21102902	29/10/2021 21102902	29/10/2021 21102902	2/11/2021 21110201,1001,1701,1702	2/11/2021	2/11/2021 21110201,1201	2/11/2021 21110201,1201	1/11/2021 211101-11
SG1S	18/10/2021	<3	5	<2	12	110	0.4	<0.2	2.6
SG1B	18/10/2021	<3	6	<2	13	120	0.3	<0.2	2.7
SG12S	18/10/2021	<3	6	<2	11	100	0.4	<0.2	5.8
SG12B	18/10/2021	13	4	12	14	120	0.5	<0.2	2.4
SG13S	18/10/2021	<3	6	<2	16	100	0.5	<0.2	2.1
SG13B	18/10/2021	<3	5	<2	13	100	0.5	<0.2	3.9
SG8S	18/10/2021	<3	9	<2	14	90	0.4	<0.2	3.0
SG8B	18/10/2021	<3	5	<2	14	110	0.4	<0.2	3.7
SG4S	18/10/2021	<3	6	<2	14	100	0.4	<0.2	2.7
SG4B	18/10/2021	5	6	<2	13	110	0.3	<0.2	4.4
OP10B	17/10/2021	4	8	4	17	110	0.6	0.3	7.7
SG7S	17/10/2021	<3	6	<2	13	100	0.5	<0.2	1.4
SG7B	17/10/2021	<3	6	<2	13	100	0.5	<0.2	4.8
SG11S	17/10/2021	<3	6	<2	14	110	0.2	<0.2	2.1
SG11B	17/10/2021	3	5	4	14	110	0.4	<0.2	3.8
Triplicate A	17/10/2021	<3	3	<2	10	100	0.8	<0.2	2.3
Triplicate B	17/10/2021	<3	3	<2	11	110	0.6	<0.2	2.1
Triplicate C	18/10/2021	<3	6	<2	13	110	0.4	<0.2	6.2
Triplicate D	18/10/2021	<3	6	<2	14	110	0.3	<0.2	5.7

  
Signatory: Jamie Woodward  
Date: 19/11/2021

The results only apply to the sample as received and to the sample tested.  
Spare test items will be held for two months unless otherwise requested.






**WATER QUALITY DATA**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-3  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	2000 AMMONIA µg.N/L	4100 ORTHO-P µg.P/L	2100 NO3+NO2 µg.N/L	4700 TOTAL-P µg.P/L	2700 TOTAL-N µg.N/L	3000 CHLOROPHYLL'a' µg/L	3000 PHAEOPHYTIN'a' µg/L	2540D TSS mg/L
<b>Reporting Limit</b>		<3	<2	<2	<5	<50	<0.1	<0.2	<1
<b>Analysis Date</b>		29/10/2021	29/10/2021	29/10/2021	2/11/2021	2/11/2021	2/11/2021	2/11/2021	1/11/2021
<b>File</b>		21102902	21102902	21102902	21110201,1001,1701,1702		21110201,1201	21110201,1201	211101-11
Field Blank	18/10/2021	<3	<2	4	<5	<50			
Equipment Blank	18/10/2021	4	<2	2	<5	<50	<0.1	<0.2	<0.5
Trip Blank		<3	<2	<2	<5	<50			

Note: For results for compliance purposes uncertainty of measurement (MU) will sometimes affect the interpretation whether the result passes or fails the compliance limit.  
Tables for measurement uncertainty are available online at [www.mafrl.murdoch.edu.au](http://www.mafrl.murdoch.edu.au)

  
Signatory: Jamie Woodward  
Date: 19/11/2021

The results only apply to the sample as received and to the sample tested.  
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**WATER QUALITY DATA**

Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-3  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	MS001 Filtered Cr µg/L	MS001 Filtered Co µg/L	MS001 Filtered Ni µg/L	MS001 Filtered Cu µg/L	MS001 Filtered Zn µg/L	MS001 Filtered As µg/L	MS001 Filtered Cd µg/L	MS001 Filtered Pb µg/L	ICP006 Hg mg/L
Reporting Limit		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001
Analysis Date File		15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	29/10/2021 21102902
OP1S	16/10/2021	<0.2	<0.05	1.5	0.4	4	1.4	<0.1	0.2	<0.0001
OP1B	16/10/2021	0.2	<0.05	<0.3	0.4	9	1.9	<0.1	0.3	<0.0001
OP2S	16/10/2021	0.2	<0.05	<0.3	8.4	8	1.7	<0.1	0.8	<0.0001
OP2B	16/10/2021	<0.2	<0.05	<0.3	0.3	2	1.8	<0.1	<0.1	<0.0001
OP3S	16/10/2021	0.2	<0.05	<0.3	0.3	3	1.3	<0.1	0.3	<0.0001
OP3B	16/10/2021	<0.2	<0.05	<0.3	1.2	7	1.9	<0.1	0.1	<0.0001
OP4S	16/10/2021	0.2	<0.05	<0.3	0.5	2	1.4	<0.1	0.2	<0.0001
OP4B	16/10/2021	<0.2	<0.05	<0.3	0.4	2	1.9	<0.1	<0.1	<0.0001
OP5S	16/10/2021	0.2	<0.05	<0.3	0.5	8	1.3	<0.1	5.4	<0.0001
OP5B	16/10/2021	0.2	<0.05	<0.3	0.3	3	1.9	<0.1	0.2	<0.0001
OP6S	16/10/2021	<0.2	<0.05	<0.3	0.2	2	1.5	<0.1	0.3	<0.0001
OP6B	16/10/2021	<0.2	<0.05	<0.3	0.5	2	1.8	<0.1	<0.1	<0.0001
OP7S	17/10/2021	0.2	<0.05	<0.3	0.4	2	1.5	<0.1	<0.1	<0.0001
OP7B	17/10/2021	<0.2	<0.05	<0.3	0.4	2	1.8	<0.1	0.3	<0.0001
OP8S	17/10/2021	0.2	<0.05	<0.3	0.4	3	1.7	<0.1	0.1	<0.0001
OP8B	17/10/2021	<0.2	<0.05	<0.3	0.2	3	1.8	<0.1	0.3	<0.0001
OP9S	17/10/2021	<0.2	<0.05	<0.3	0.5	3	1.8	<0.1	0.2	<0.0001
OP9B	17/10/2021	<0.2	<0.05	<0.3	0.4	3	1.9	<0.1	<0.1	<0.0001
OP10S	17/10/2021	<0.2	<0.05	<0.3	0.3	1	1.9	<0.1	0.2	<0.0001

  
Signatory: Jamie Woodward  
Date: 19/11/2021

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Contact: Natalie Robson

Customer: RPS Australia Asia Pacific

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Date of Issue: 19/11/2021


Date Received: 25/10/2021

Our Reference: RPS21-3

Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	MS001 Filtered Cr µg/L	MS001 Filtered Co µg/L	MS001 Filtered Ni µg/L	MS001 Filtered Cu µg/L	MS001 Filtered Zn µg/L	MS001 Filtered As µg/L	MS001 Filtered Cd µg/L	MS001 Filtered Pb µg/L	ICP006 Hg mg/L
Reporting Limit		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001
Analysis Date		15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	29/10/2021
File		21111501	21111501	21111501	21111501	21111501	21111501	21111501	21111501	21102902
SG1S	18/10/2021	<0.2	<0.05	<0.3	0.3	8	1.8	<0.1	0.2	<0.0001
SG1B	18/10/2021	<0.2	<0.05	<0.3	0.3	6	1.8	<0.1	0.1	<0.0001
SG12S	18/10/2021	<0.2	<0.05	<0.3	<0.2	7	1.8	<0.1	<0.1	<0.0001
SG12B	18/10/2021	<0.2	<0.05	<0.3	0.2	6	1.8	<0.1	0.1	<0.0001
SG13S	18/10/2021	<0.2	<0.05	<0.3	<0.2	2	1.9	<0.1	0.2	<0.0001
SG13B	18/10/2021	<0.2	<0.05	0.3	0.3	2	1.8	<0.1	<0.1	<0.0001
SG8S	18/10/2021	<0.2	<0.05	<0.3	0.3	3	1.9	<0.1	<0.1	<0.0001
SG8B	18/10/2021	<0.2	<0.05	<0.3	0.3	2	1.9	<0.1	<0.1	<0.0001
SG4S	18/10/2021	<0.2	<0.05	<0.3	<0.2	2	1.8	<0.1	<0.1	<0.0001
SG4B	18/10/2021	<0.2	<0.05	0.4	0.4	18	1.9	<0.1	0.3	<0.0001
OP10B	17/10/2021	<0.2	<0.05	<0.3	<0.2	2	1.9	<0.1	<0.1	<0.0001
SG7S	17/10/2021	<0.2	<0.05	<0.3	0.2	3	1.6	<0.1	0.4	<0.0001
SG7B	17/10/2021	<0.2	<0.05	<0.3	<0.2	8	1.7	<0.1	0.4	<0.0001
SG11S	17/10/2021	<0.2	<0.05	<0.3	0.4	2	1.8	<0.1	0.1	<0.0001
SG11B	17/10/2021	<0.2	<0.05	<0.3	0.3	3	1.6	<0.1	0.2	<0.0001
Triplicate A	17/10/2021	<0.2	<0.05	<0.3	0.3	2	1.9	<0.1	0.1	<0.0001
Triplicate B	17/10/2021	<0.2	<0.05	<0.3	0.3	5	1.9	<0.1	0.3	<0.0001
Triplicate C	18/10/2021	<0.2	<0.05	0.3	0.2	6	1.9	<0.1	<0.1	<0.0001
Triplicate D	18/10/2021	<0.2	<0.05	<0.3	<0.2	14	1.6	<0.1	<0.1	<0.0001

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Signatory: Jamie Woodward  
Date: 19/11/2021




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Contact: Natalie Robson  
Customer: RPS Australia Asia Pacific  
Address: Level 2, 27-31 Troode Street, West Perth WA 6005

Date of Issue: 19/11/2021  
Date Received: 25/10/2021  
Our Reference: RPS21-3  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	MS001 Filtered Cr µg/L	MS001 Filtered Co µg/L	MS001 Filtered Ni µg/L	MS001 Filtered Cu µg/L	MS001 Filtered Zn µg/L	MS001 Filtered As µg/L	MS001 Filtered Cd µg/L	MS001 Filtered Pb µg/L	ICP006 Hg mg/L
<b>Reporting Limit</b>		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001
<b>Analysis Date</b>		15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	29/10/2021
<b>File</b>		21111501	21111501	21111501	21111501	21111501	21111501	21111501	21111501	21102902
Field Blank	18/10/2021	<0.2	<0.05	<0.3	<0.2	1	<0.5	<0.1	<0.1	<0.0001
Equipment Blank	18/10/2021	<0.2	<0.05	<0.3	<0.2	6	<0.5	<0.1	0.3	<0.0001
Trip Blank		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001

Note: Samples supplied field filtered

  
Signatory: Jamie Woodward  
Date: 19/11/2021

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METHOD SAMPLE CODE	Sampling Date	MS001 Unfiltered Cr µg/L	MS001 Unfiltered Co µg/L	MS001 Unfiltered Ni µg/L	MS001 Unfiltered Cu µg/L	MS001 Unfiltered Zn µg/L	MS001 Unfiltered As µg/L	MS001 Unfiltered Cd µg/L	MS001 Unfiltered Pb µg/L	ICP006 Total Ext Hg mg/L
Reporting Limit		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001
Analysis Date File		15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	29/10/2021 21102902
OP1S	16/10/2021	0.3	<0.05	<0.3	1.6	9	1.6	<0.1	0.2	<0.0001
OP1B	16/10/2021	0.2	<0.05	<0.3	0.4	4	1.9	<0.1	<0.1	<0.0001
OP2S	16/10/2021	0.2	<0.05	<0.3	0.3	2	1.7	<0.1	0.2	<0.0001
OP2B	16/10/2021	<0.2	<0.05	<0.3	0.3	2	1.8	<0.1	<0.1	<0.0001
OP3S	16/10/2021	0.2	<0.05	<0.3	0.6	1	1.8	<0.1	0.3	<0.0001
OP3B	16/10/2021	0.2	<0.05	<0.3	0.7	2	1.8	<0.1	<0.1	<0.0001
OP4S	16/10/2021	0.2	<0.05	<0.3	0.6	2	1.9	<0.1	0.2	<0.0001
OP4B	16/10/2021	0.2	<0.05	0.5	0.4	2	1.8	<0.1	0.1	<0.0001
OP5S	16/10/2021	<0.2	<0.05	<0.3	0.5	9	1.9	<0.1	1.4	<0.0001
OP5B	16/10/2021	0.2	<0.05	<0.3	0.3	1	1.9	<0.1	<0.1	<0.0001
OP6S	16/10/2021	<0.2	<0.05	<0.3	1.1	2	1.9	<0.1	0.3	<0.0001
OP6B	16/10/2021	0.2	<0.05	<0.3	0.5	2	1.9	<0.1	0.1	<0.0001
OP7S	17/10/2021	0.2	<0.05	<0.3	0.5	3	1.8	<0.1	0.1	<0.0001
OP7B	17/10/2021	<0.2	<0.05	<0.3	0.4	2	1.8	<0.1	0.3	<0.0001
OP8S	17/10/2021	<0.2	<0.05	<0.3	0.4	3	1.7	<0.1	<0.1	<0.0001
OP8B	17/10/2021	<0.2	<0.05	<0.3	0.5	2	1.9	<0.1	0.2	<0.0001
OP9S	17/10/2021	<0.2	<0.05	<0.3	0.5	2	1.9	<0.1	<0.1	<0.0001
OP9B	17/10/2021	<0.2	<0.05	<0.3	0.4	2	1.8	<0.1	<0.1	<0.0001
OP10S	17/10/2021	0.2	<0.05	<0.3	0.3	1	1.9	<0.1	0.2	<0.0001

  
Signatory: Jamie Woodward  
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METHOD SAMPLE CODE	Sampling Date	MS001 Unfiltered Cr µg/L	MS001 Unfiltered Co µg/L	MS001 Unfiltered Ni µg/L	MS001 Unfiltered Cu µg/L	MS001 Unfiltered Zn µg/L	MS001 Unfiltered As µg/L	MS001 Unfiltered Cd µg/L	MS001 Unfiltered Pb µg/L	ICP006 Total Ext Hg mg/L
Reporting Limit		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001
Analysis Date File		15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	15/11/2021 21111501	29/10/2021 21102902
SG1S	18/10/2021	<0.2	<0.05	<0.3	0.3	2	1.9	<0.1	0.1	<0.0001
SG1B	18/10/2021	<0.2	<0.05	<0.3	0.2	<1	1.8	<0.1	<0.1	<0.0001
SG12S	18/10/2021	<0.2	<0.05	<0.3	0.5	2	1.9	<0.1	0.1	<0.0001
SG12B	18/10/2021	<0.2	<0.05	<0.3	0.2	1	1.8	<0.1	0.2	<0.0001
SG13S	18/10/2021	<0.2	<0.05	<0.3	0.4	2	1.9	<0.1	0.2	<0.0001
SG13B	18/10/2021	<0.2	<0.05	<0.3	0.4	2	1.9	<0.1	0.1	<0.0001
SG8S	18/10/2021	<0.2	<0.05	<0.3	0.3	<1	1.8	<0.1	<0.1	<0.0001
SG8B	18/10/2021	<0.2	<0.05	<0.3	0.3	1	1.9	<0.1	0.1	<0.0001
SG4S	18/10/2021	<0.2	<0.05	<0.3	0.3	1	1.9	<0.1	0.1	<0.0001
SG4B	18/10/2021	<0.2	<0.05	<0.3	0.2	1	1.7	<0.1	0.1	<0.0001
OP10B	17/10/2021	0.3	0.06	<0.3	<0.2	<1	1.7	<0.1	<0.1	<0.0001
SG7S	17/10/2021	<0.2	<0.05	<0.3	0.3	3	1.8	<0.1	0.3	<0.0001
SG7B	17/10/2021	<0.2	<0.05	<0.3	<0.2	<1	1.8	<0.1	0.1	<0.0001
SG11S	17/10/2021	<0.2	<0.05	<0.3	0.6	<1	1.8	<0.1	<0.1	<0.0001
SG11B	17/10/2021	<0.2	<0.05	<0.3	0.3	1	1.7	<0.1	0.2	<0.0001
Triplicate A	17/10/2021	0.2	<0.05	<0.3	0.6	4	1.9	<0.1	<0.1	<0.0001
Triplicate B	17/10/2021	0.3	<0.05	0.4	1.6	3	1.9	<0.1	<0.1	<0.0001
Triplicate C	18/10/2021	<0.2	<0.05	<0.3	<0.2	2	1.9	<0.1	<0.1	<0.0001
Triplicate D	18/10/2021									<0.0001

  
Signatory: Jamie Woodward  
Date: 19/11/2021

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Date of Issue: 19/11/2021  
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Our Reference: RPS21-3  
Your Reference: AU213002038.001

METHOD SAMPLE CODE	Sampling Date	MS001 Unfiltered Cr µg/L	MS001 Unfiltered Co µg/L	MS001 Unfiltered Ni µg/L	MS001 Unfiltered Cu µg/L	MS001 Unfiltered Zn µg/L	MS001 Unfiltered As µg/L	MS001 Unfiltered Cd µg/L	MS001 Unfiltered Pb µg/L	ICP006 Total Ext Hg mg/L
Reporting Limit		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001
Analysis Date		15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021	29/10/2021
File		21111501	21111501	21111501	21111501	21111501	21111501	21111501	21111501	21102902
Field Blank	18/10/2021	<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001
Equipment Blank	18/10/2021	<0.2	<0.05	<0.3	<0.2	2	<0.5	<0.1	<0.1	<0.0001
Trip Blank		<0.2	<0.05	<0.3	<0.2	<1	<0.5	<0.1	<0.1	<0.0001

  
Signatory: Jamie Woodward  
Date: 19/11/2021

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## **Appendix H**

### **Laboratory sediment and water hydrocarbon, pesticides, tributyl tin and acid sulfate soils data**









## 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  
∅ = 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.
- EP080-SD: Surrogate recovery bias low due to sample matrix interferences, confirmed by re-extraction and re-analysis.



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	OP10	OP11	OP12	OP13	OP14
Sampling date / time				15-Oct-2021 00:00	15-Oct-2021 00:00	15-Oct-2021 00:00	15-Oct-2021 00:00	15-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-046	ES2137956-047	ES2137956-048	ES2137956-049	ES2137956-050	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	29.3	30.5	30.0	26.6	25.3	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	76.3	92.3	99.8	101	100	
Toluene-D8	2037-26-5	0.2	%	75.0	87.3	93.9	93.4	92.3	
4-Bromofluorobenzene	460-00-4	0.2	%	77.4	80.6	84.6	82.3	84.7	



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	OP15	OP16	OP17	OP18	OP19
Sampling date / time				15-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-051	ES2137956-052	ES2137956-053	ES2137956-054	ES2137956-055	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	30.8	33.5	32.1	38.2	35.4	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	97.5	102	92.4	90.5	86.6	
Toluene-D8	2037-26-5	0.2	%	83.6	91.2	84.5	80.9	78.2	
4-Bromofluorobenzene	460-00-4	0.2	%	87.2	82.2	79.4	73.5	73.7	



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	OP20	OP21	OP22	OP23	OP24
Sampling date / time				16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	17-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-056	ES2137956-057	ES2137956-058	ES2137956-059	ES2137956-060	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	39.3	37.0	32.6	39.4	37.0	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	83.7	100	94.1	115	112	
Toluene-D8	2037-26-5	0.2	%	79.2	91.2	74.2	89.0	89.5	
4-Bromofluorobenzene	460-00-4	0.2	%	73.0	82.0	78.3	86.7	89.7	



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	OP25	OP26	OP27	OP28	OP29
Sampling date / time				17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-061	ES2137956-062	ES2137956-063	ES2137956-064	ES2137956-065	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	37.6	41.1	43.8	39.0	38.4	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	107	80.6	75.6	96.6	97.0	
Toluene-D8	2037-26-5	0.2	%	93.1	79.7	75.4	83.3	81.1	
4-Bromofluorobenzene	460-00-4	0.2	%	89.7	80.3	98.4	84.0	83.2	



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	OP30	SG1	SG2	SG3	SG4
Sampling date / time				17-Oct-2021 00:00	18-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-066	ES2137956-071	ES2137956-072	ES2137956-073	ES2137956-074	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	49.3	39.8	38.4	37.5	40.8	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	81.4	110	103	96.3	93.4	
Toluene-D8	2037-26-5	0.2	%	75.9	90.9	81.6	79.8	76.0	
4-Bromofluorobenzene	460-00-4	0.2	%	77.5	92.3	84.2	80.3	80.3	



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	SG5	SG6	SG7	SG8	SG9
Sampling date / time				17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-075	ES2137956-076	ES2137956-077	ES2137956-078	ES2137956-079	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	36.3	38.8	37.4	40.5	38.5	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	117	95.2	127	75.7	91.2	
Toluene-D8	2037-26-5	0.2	%	116	81.0	123	57.2	74.5	
4-Bromofluorobenzene	460-00-4	0.2	%	106	81.8	112	64.8	76.5	





## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	SG10	SG11	SG12	SG13	Triplicate A
Sampling date / time				18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	15-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-080	ES2137956-081	ES2137956-082	ES2137956-083	ES2137956-084	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	36.8	35.1	37.0	38.0	27.0	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	86.6	85.6	102	115	107	
Toluene-D8	2037-26-5	0.2	%	79.2	74.9	97.6	108	107	
4-Bromofluorobenzene	460-00-4	0.2	%	77.4	73.1	86.8	99.8	94.8	



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	Triplicate B	Duplicate A	Triplicate C	Trip Blank	----
Sampling date / time				17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	18-Oct-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2137956-085	ES2137956-086	ES2137956-087	ES2137956-089	-----	----
				Result	Result	Result	Result	----	----
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	42.4	40.2	43.0	1.4	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	----	----
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	----	----
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	----	----
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	----	----
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	----	----
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	----	----
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	----	----
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	----	----
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	----	----
<b>EP080-SD: BTEXN</b>									
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	----	----
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	103	95.4	102	104	----	----
Toluene-D8	2037-26-5	0.2	%	105	95.3	101	105	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	87.3	82.7	87.1	88.4	----	----



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Triplicate A	Triplicate B	Triplicate C	Triplicate D	Equip Blank
Sampling date / time				17-Oct-2021 00:00	17-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137956-067	ES2137956-068	ES2137956-069	ES2137956-070	ES2137956-088	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	----	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	<50	<50	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	----	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	<100	<100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	<100	<100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	<100	<100	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	131	107	131	131	120	
Toluene-D8	2037-26-5	2	%	127	106	126	131	121	
4-Bromofluorobenzene	460-00-4	2	%	118	101	118	119	113	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Field Blank	----	----	----	----
Sampling date / time				18-Oct-2021 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2137956-090	-----	-----	-----	-----	
				Result	----	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
<sup>^</sup> C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	----	----	----	----	
<sup>^</sup> Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	108	----	----	----	----	
Toluene-D8	2037-26-5	2	%	106	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	99.5	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: SAND		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

## CERTIFICATE OF ANALYSIS

<b>Work Order</b> : <b>ES2137835</b> <b>Client</b> : <b>RPS AAP Consulting Pty Ltd</b> <b>Contact</b> : Natalie Robson <b>Address</b> : Level 2, 27-31 Troode St West Perth 6005  <b>Telephone</b> : ---- <b>Project</b> : RPS Sediment & Water Quality <b>Order number</b> : ---- <b>C-O-C number</b> : ---- <b>Sampler</b> : Natalie Robson <b>Site</b> : Timor Sea <b>Quote number</b> : EP/145/21 <b>No. of samples received</b> : 45 <b>No. of samples analysed</b> : 45	<b>Page</b> : 1 of 13 <b>Laboratory</b> : Environmental Division Sydney <b>Contact</b> : Nick Courts <b>Address</b> : 277-289 Woodpark Road Smithfield NSW Australia 2164  <b>Telephone</b> : +61-2-8784 8555 <b>Date Samples Received</b> : 21-Oct-2021 06:30 <b>Date Analysis Commenced</b> : 22-Oct-2021 <b>Issue Date</b> : 28-Oct-2021 13:54
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



## 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.



## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	OP1	OP2	OP3	OP4	OP5
Sampling date / time				15-Oct-2021 00:00	15-Oct-2021 00:00	15-Oct-2021 00:00	15-Oct-2021 00:00	15-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-038	ES2137835-039	ES2137835-040	ES2137835-041	ES2137835-042	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	27.2	28.2	37.9	28.4	26.6	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	104	99.9	90.3	104	91.4	
Toluene-D8	2037-26-5	0.2	%	85.9	86.5	81.5	91.1	95.0	
4-Bromofluorobenzene	460-00-4	0.2	%	79.8	73.8	81.6	81.8	85.1	





## Analytical Results

Sub-Matrix: SAND (Matrix: SOIL)				Sample ID	OP6	OP7	OP9	----	----
Sampling date / time				15-Oct-2021 00:00	15-Oct-2021 00:00	15-Oct-2021 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2137835-043	ES2137835-044	ES2137835-045	-----	-----	
				Result	Result	Result	----	----	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%	30.2	28.8	32.6	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	----	----	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	----	----	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	----	----	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	----	----	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	----	----	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	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	----	----	
<b>EP080-SD: BTEXN</b>									
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	----	----	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	115	93.8	109	----	----	
Toluene-D8	2037-26-5	0.2	%	105	90.6	96.3	----	----	
4-Bromofluorobenzene	460-00-4	0.2	%	93.9	74.6	85.4	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	OP1S	OP1B	OP2S	OP2B	OP3S
Sampling date / time				16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-001	ES2137835-002	ES2137835-003	ES2137835-004	ES2137835-005	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	122	130	115	126	122	
Toluene-D8	2037-26-5	2	%	114	117	106	118	105	
4-Bromofluorobenzene	460-00-4	2	%	118	122	110	124	114	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	OP3B	OP4S	OP4B	OP5S	OP5B
Sampling date / time				16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	16-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-006	ES2137835-007	ES2137835-008	ES2137835-009	ES2137835-010	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	120	111	126	123	126	
Toluene-D8	2037-26-5	2	%	110	103	111	109	116	
4-Bromofluorobenzene	460-00-4	2	%	112	107	113	111	122	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	OP6S	OP6B	OP7S	OP7B	OP8S
Sampling date / time				16-Oct-2021 00:00	16-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-011	ES2137835-012	ES2137835-013	ES2137835-014	ES2137835-015	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	128	115	124	124	126	
Toluene-D8	2037-26-5	2	%	113	105	112	110	113	
4-Bromofluorobenzene	460-00-4	2	%	116	107	115	109	115	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	OP8B	OP9S	OP9B	OP10S	OP10B
Sampling date / time				17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-016	ES2137835-017	ES2137835-018	ES2137835-019	ES2137835-020	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	117	128	129	118	126	
Toluene-D8	2037-26-5	2	%	108	116	119	109	108	
4-Bromofluorobenzene	460-00-4	2	%	110	120	121	111	108	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SG1S	SG1B	SG12S	SG12B	SG13S
Sampling date / time				18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-021	ES2137835-022	ES2137835-023	ES2137835-024	ES2137835-025	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	123	116	114	117	114	
Toluene-D8	2037-26-5	2	%	110	104	102	106	102	
4-Bromofluorobenzene	460-00-4	2	%	108	103	102	103	98.4	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SG13B	SG8S	SG8B	SG4S	SG4B
Sampling date / time				18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	18-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-026	ES2137835-027	ES2137835-028	ES2137835-029	ES2137835-030	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	117	108	121	116	118	
Toluene-D8	2037-26-5	2	%	106	96.4	111	104	107	
4-Bromofluorobenzene	460-00-4	2	%	104	92.8	107	101	96.8	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SG7S	SG7B	SG11S	SG11B	Trip Blank
Sampling date / time				17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	17-Oct-2021 00:00	18-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2137835-031	ES2137835-032	ES2137835-033	ES2137835-034	ES2137835-035	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	102	116	120	116	119	
Toluene-D8	2037-26-5	2	%	89.4	104	108	111	107	
4-Bromofluorobenzene	460-00-4	2	%	91.6	102	105	105	101	





## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Equip Blank	Field Blank	----	----	----
Sampling date / time				18-Oct-2021 00:00	18-Oct-2021 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES2137835-036	ES2137835-037	-----	-----	-----	
				Result	Result	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	<2	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	118	114	----	----	----	
Toluene-D8	2037-26-5	2	%	112	105	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	105	98.2	----	----	----	



## Surrogate Control Limits

Sub-Matrix: SAND		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>ES2136788</b>	Page	: 1 of 49
<b>Client</b>	: <b>RPS AAP Consulting Pty Ltd</b>	<b>Laboratory</b>	: Environmental Division Sydney
<b>Contact</b>	: Natalie Robson	<b>Contact</b>	: Nick Courts
<b>Address</b>	: Level 2, 27-31 Troode St West Perth 6005	<b>Address</b>	: 277-289 Woodpark Road Smithfield NSW Australia 2164
<b>Telephone</b>	: ----	<b>Telephone</b>	: +61-2-8784 8555
<b>Project</b>	: Sediment Quality	<b>Date Samples Received</b>	: 27-Oct-2021 07:00
<b>Order number</b>	: ----	<b>Date Analysis Commenced</b>	: 28-Oct-2021
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 09-Nov-2021 16:51
<b>Sampler</b>	: Natalie Robson		
<b>Site</b>	: ----		
<b>Quote number</b>	: EP/875/21_V3		
<b>No. of samples received</b>	: 54		
<b>No. of samples analysed</b>	: 54		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Morgan Lennox	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



## 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.

- EP090 Organotins: High LCS recovery for MBT deemed acceptable as all associated analyte results are less than LOR.
- EP090-Organotins: High surrogate recovery for particular samples are deemed acceptable as all associated analyte results are less than LOR.
- 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.
- EP131B : LOR is raised due to high amount of moistures is present.
- EG020: Poor precision was obtained for some elements on samples ES2136788 - #001, #011 and #32 due to sample heterogeneity. Results have been confirmed by re-extraction and reanalysis.
- EK067G: Poor spike recovery for Total Phosphorus due to matrix interferences.
- EG094: Results for sample ES2136788-#013 have been confirmed by re-digestion and reanalysis.
- EG020: Poor precision was obtained for Arsenic and Manganese on sample ES2136788-#001. Results have been confirmed by re-extraction and reanalysis.
- EG020: Poor precision was obtained for Chromium on samples ES2136788-#011 and #032. Results have been confirmed by re-extraction and reanalysis.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.
- 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: SEDIMENT (Matrix: SOIL)				Sample ID	HS13	HS12	HS11	HS10	HS09
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-001	ES2136788-002	ES2136788-003	ES2136788-004	ES2136788-005	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.5	8.3	8.5	8.4	8.5	
ø pH (Fox)	----	0.1	pH Unit	6.9	7.3	7.9	8.5	8.5	
ø Reaction Rate	----	1	-	2	4	4	4	4	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	32.7	33.2	31.1	30.3	28.6	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	8700	8700	5700	6390	6400	
Iron	7439-89-6	50	mg/kg	58100	57100	51700	55500	47100	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	0.61	0.86	0.97	0.90	0.95	
Arsenic	7440-38-2	1.00	mg/kg	66.1	94.3	108	106	73.4	
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	26.3	41.0	35.2	45.4	41.4	
Copper	7440-50-8	1.0	mg/kg	2.5	3.0	2.3	2.4	3.2	
Cobalt	7440-48-4	0.5	mg/kg	6.5	9.0	8.6	10.6	7.3	
Lead	7439-92-1	1.0	mg/kg	7.9	14.8	11.0	11.7	11.9	
Manganese	7439-96-5	10	mg/kg	304	392	632	616	475	
Nickel	7440-02-0	1.0	mg/kg	6.0	8.4	7.0	8.0	6.0	
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	9.8	13.8	12.3	14.5	11.7	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	360	290	270	330	300	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	661	1130	697	631	589	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.28	0.23	0.22	0.22	0.20	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	4	<3	8	6	12	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	4	<3	8	6	12	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS13	HS12	HS11	HS10	HS09
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-001	ES2136788-002	ES2136788-003	ES2136788-004	ES2136788-005	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	3	<3	6	4	9	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	<3	6	4	9	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS13	HS12	HS11	HS10	HS09
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-001	ES2136788-002	ES2136788-003	ES2136788-004	ES2136788-005	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	100	79.6	99.5	105	122	
Toluene-D8	2037-26-5	0.2	%	87.6	75.6	101	107	118	
4-Bromofluorobenzene	460-00-4	0.2	%	86.0	77.2	98.3	97.7	114	
<b>EP090S: Organotin Surrogate</b>									
Tripropyltin	----	0.5	%	96.2	124	89.4	37.4	81.3	



**Analytical Results**

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS13	HS12	HS11	HS10	HS09
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00
Compound	CAS Number	LOR	Unit	ES2136788-001	ES2136788-002	ES2136788-003	ES2136788-004	ES2136788-005	Result
				Result	Result	Result	Result	Result	Result
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	58.0	42.9	44.6	48.4	58.8	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	72.5	54.4	56.2	58.1	55.6	





## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS08	HS07	HS06	HS05	HS04
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-006	ES2136788-007	ES2136788-008	ES2136788-009	ES2136788-010	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.4	8.6	8.3	8.5	8.2	
ø pH (Fox)	----	0.1	pH Unit	7.1	7.1	7.5	6.7	6.8	
ø Reaction Rate	----	1	-	4	4	4	2	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	35.1	35.2	27.9	43.2	40.9	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	8640	9750	7770	12000	9340	
Iron	7439-89-6	50	mg/kg	55200	56900	54300	35600	34000	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	0.89	1.07	0.80	0.67	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	84.3	85.7	74.4	22.6	26.4	
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	35.9	73.4	42.7	29.7	18.1	
Copper	7440-50-8	1.0	mg/kg	3.1	3.7	4.3	5.7	5.4	
Cobalt	7440-48-4	0.5	mg/kg	8.9	10.9	9.1	6.2	7.2	
Lead	7439-92-1	1.0	mg/kg	13.1	11.2	9.7	9.7	10.1	
Manganese	7439-96-5	10	mg/kg	527	498	396	185	230	
Nickel	7440-02-0	1.0	mg/kg	7.5	9.8	7.6	9.6	9.4	
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	13.0	17.4	13.3	20.3	19.8	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	330	300	180	540	370	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	834	635	1120	416	297	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.24	0.24	0.21	0.55	0.46	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	5	6	9	5	8	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	5	6	9	5	8	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS08	HS07	HS06	HS05	HS04
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-006	ES2136788-007	ES2136788-008	ES2136788-009	ES2136788-010	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	3	4	7	4	5	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	4	7	4	5	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS08	HS07	HS06	HS05	HS04
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-006	ES2136788-007	ES2136788-008	ES2136788-009	ES2136788-010	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	104	113	117	110	116	
Toluene-D8	2037-26-5	0.2	%	107	114	119	113	118	
4-Bromofluorobenzene	460-00-4	0.2	%	102	104	113	104	112	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltn	----	0.5	%	91.0	86.2	122	51.6	116	



### Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS08	HS07	HS06	HS05	HS04
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00
Compound	CAS Number	LOR	Unit	ES2136788-006	ES2136788-007	ES2136788-008	ES2136788-009	ES2136788-010	ES2136788-010
				Result	Result	Result	Result	Result	Result
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	41.6	42.4	45.2	63.6	47.1	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	60.0	50.0	54.4	71.2	59.4	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS03	HS02	HS01	HS19	HS18
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-011	ES2136788-012	ES2136788-014	ES2136788-015	ES2136788-016	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.4	8.2	8.1	8.2	8.2	
ø pH (Fox)	----	0.1	pH Unit	7.2	7.3	6.8	8.5	8.7	
ø Reaction Rate	----	1	-	4	4	2	4	4	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	38.7	38.1	33.2	31.5	56.4	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	9740	10200	5380	9570	14500	
Iron	7439-89-6	50	mg/kg	37800	43600	37900	43100	23300	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	0.64	<0.50	0.57	0.59	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	32.4	64.0	28.0	61.1	20.8	
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	30.3	28.9	19.8	57.9	21.5	
Copper	7440-50-8	1.0	mg/kg	6.5	5.2	3.2	4.0	4.6	
Cobalt	7440-48-4	0.5	mg/kg	8.0	8.0	6.1	7.0	6.2	
Lead	7439-92-1	1.0	mg/kg	10.6	9.4	7.2	9.4	7.1	
Manganese	7439-96-5	10	mg/kg	344	437	202	323	401	
Nickel	7440-02-0	1.0	mg/kg	7.4	7.9	4.9	7.8	8.5	
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	16.9	15.0	11.3	15.3	18.6	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	380	350	280	260	480	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	540	428	549	626	696	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.26	0.34	0.36	0.19	0.14	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	8	6	9	4	6	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	8	6	9	4	6	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS03	HS02	HS01	HS19	HS18
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-011	ES2136788-012	ES2136788-014	ES2136788-015	ES2136788-016	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	6	5	7	<3	4	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	6	5	7	<3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS03	HS02	HS01	HS19	HS18
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-011	ES2136788-012	ES2136788-014	ES2136788-015	ES2136788-016	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	81.6	112	115	90.8	108	
Toluene-D8	2037-26-5	0.2	%	74.3	97.2	100	92.4	95.7	
4-Bromofluorobenzene	460-00-4	0.2	%	79.3	98.8	100	84.2	92.5	
<b>EP090S: Organotin Surrogate</b>									
Tripropyltin	----	0.5	%	130	106	129	136	117	



### Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS03	HS02	HS01	HS19	HS18
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00
Compound	CAS Number	LOR	Unit	ES2136788-011	ES2136788-012	ES2136788-014	ES2136788-015	ES2136788-016	ES2136788-016
				Result	Result	Result	Result	Result	Result
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	51.0	88.9	59.6	49.3	55.4	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	56.9	59.4	65.0	60.0	60.0	





## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS17	HS16	HS15	HS14	HS20
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-017	ES2136788-018	ES2136788-019	ES2136788-020	ES2136788-021	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.2	8.4	8.1	8.4	8.4	
ø pH (Fox)	----	0.1	pH Unit	8.9	6.9	7.0	6.8	7.6	
ø Reaction Rate	----	1	-	4	2	2	2	4	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	30.8	32.4	33.4	36.8	27.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	6220	8620	9380	10200	6900	
Iron	7439-89-6	50	mg/kg	45000	27500	39500	38600	43100	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	0.71	<0.50	<0.50	<0.50	0.68	
Arsenic	7440-38-2	1.00	mg/kg	49.5	24.5	34.7	46.5	70.1	
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	39.0	22.3	41.5	31.4	19.1	
Copper	7440-50-8	1.0	mg/kg	3.8	3.6	5.2	3.5	4.1	
Cobalt	7440-48-4	0.5	mg/kg	6.6	4.8	5.7	7.3	8.5	
Lead	7439-92-1	1.0	mg/kg	10.3	6.6	8.2	8.5	11.0	
Manganese	7439-96-5	10	mg/kg	382	235	240	268	531	
Nickel	7440-02-0	1.0	mg/kg	6.2	6.6	6.9	7.4	7.2	
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	12.0	12.2	13.6	13.9	10.4	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	280	270	270	310	130	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	483	485	322	555	569	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.14	0.32	0.31	0.34	0.20	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	3	4	6	5	4	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	3	4	6	5	4	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS17	HS16	HS15	HS14	HS20
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-017	ES2136788-018	ES2136788-019	ES2136788-020	ES2136788-021	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	3	5	3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	3	5	3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS17	HS16	HS15	HS14	HS20
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-017	ES2136788-018	ES2136788-019	ES2136788-020	ES2136788-021	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	105	111	130	119	117	
Toluene-D8	2037-26-5	0.2	%	90.5	99.9	114	102	106	
4-Bromofluorobenzene	460-00-4	0.2	%	90.2	95.3	111	99.7	99.8	
<b>EP090S: Organotin Surrogate</b>									
Tripropyltin	----	0.5	%	144	138	127	111	113	



**Analytical Results**

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS17	HS16	HS15	HS14	HS20
Sampling date / time				21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	21-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-017	ES2136788-018	ES2136788-019	ES2136788-020	ES2136788-021	
				Result	Result	Result	Result	Result	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	61.5	39.1	72.2	64.6	63.6	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	71.2	62.5	86.2	80.0	67.5	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS21	HS22	HS23	HS24	Duplicate A
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-022	ES2136788-023	ES2136788-024	ES2136788-025	ES2136788-026	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.5	8.7	8.4	8.5	8.5	
ø pH (Fox)	----	0.1	pH Unit	8.9	9.0	7.2	7.5	7.1	
ø Reaction Rate	----	1	-	4	4	4	4	4	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	29.8	12.5	33.5	24.7	33.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	6220	2790	5630	6360	6230	
Iron	7439-89-6	50	mg/kg	24400	31900	19200	50900	22100	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	0.66	<0.50	1.02	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	37.5	58.0	28.1	80.9	27.9	
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	17.2	45.8	13.8	45.6	21.1	
Copper	7440-50-8	1.0	mg/kg	2.4	1.9	2.4	7.6	2.1	
Cobalt	7440-48-4	0.5	mg/kg	4.9	4.5	4.0	9.6	3.8	
Lead	7439-92-1	1.0	mg/kg	7.0	6.2	5.3	28.0	5.6	
Manganese	7439-96-5	10	mg/kg	325	309	217	484	276	
Nickel	7440-02-0	1.0	mg/kg	5.0	4.5	4.7	8.6	5.2	
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	9.9	6.6	9.4	9.2	7.5	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	250	220	220	120	220	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	422	704	482	758	398	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.26	0.09	0.22	0.14	0.20	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	5	5	6	4	6	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	5	5	6	4	6	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS21	HS22	HS23	HS24	Duplicate A
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-022	ES2136788-023	ES2136788-024	ES2136788-025	ES2136788-026	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	4	4	4	<3	5	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	4	4	4	<3	5	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	----	<1	
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	<1	----	<1	
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	----	<0.5	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS21	HS22	HS23	HS24	Duplicate A
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-022	ES2136788-023	ES2136788-024	ES2136788-025	ES2136788-026	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	80.9	72.2	85.9	99.7	85.8	
Toluene-D8	2037-26-5	0.2	%	86.8	76.6	91.4	104	89.3	
4-Bromofluorobenzene	460-00-4	0.2	%	78.4	76.9	81.0	88.9	81.8	
<b>EP090S: Organotin Surrogate</b>									
Tripropyltin	----	0.5	%	106	134	96.7	----	114	



### Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS21	HS22	HS23	HS24	Duplicate A
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00
Compound	CAS Number	LOR	Unit	ES2136788-022	ES2136788-023	ES2136788-024	ES2136788-025	ES2136788-026	ES2136788-026
				Result	Result	Result	Result	Result	Result
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	53.6	37.8	44.7	43.4	53.8	53.8
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	51.2	68.8	53.8	47.5	71.2	71.2





## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	Duplicate B	HS36	HS37	HS38	HS39
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-027	ES2136788-028	ES2136788-029	ES2136788-030	ES2136788-031	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.5	8.7	8.8	8.4	8.7	
ø pH (Fox)	----	0.1	pH Unit	7.2	6.9	6.8	7.1	6.8	
ø Reaction Rate	----	1	-	4	2	2	4	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	24.9	16.0	12.0	27.5	10.1	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	1800	1750	2630	3120	2090	
Iron	7439-89-6	50	mg/kg	15100	11300	16900	22100	12000	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	28.8	28.4	34.8	24.0	21.6	
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	11.9	9.6	12.0	16.2	11.1	
Copper	7440-50-8	1.0	mg/kg	<1.0	<1.0	<1.0	1.3	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	2.2	2.0	2.2	2.2	1.6	
Lead	7439-92-1	1.0	mg/kg	3.2	3.1	3.2	4.6	2.7	
Manganese	7439-96-5	10	mg/kg	695	673	608	428	504	
Nickel	7440-02-0	1.0	mg/kg	2.8	2.5	3.2	3.7	2.4	
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	4.7	3.5	4.0	7.5	3.2	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	60	60	20	160	50	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	371	338	219	281	250	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.09	0.09	0.08	0.15	2.24	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	4	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	4	<3	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	Duplicate B	HS36	HS37	HS38	HS39
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-027	ES2136788-028	ES2136788-029	ES2136788-030	ES2136788-031	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	Duplicate B	HS36	HS37	HS38	HS39
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-027	ES2136788-028	ES2136788-029	ES2136788-030	ES2136788-031	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	99.0	114	87.6	108	119	
Toluene-D8	2037-26-5	0.2	%	101	120	89.4	112	124	
4-Bromofluorobenzene	460-00-4	0.2	%	91.3	105	84.1	97.9	109	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltn	----	0.5	%	116	120	130	135	143	



## Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	Duplicate B	HS36	HS37	HS38	HS39
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-027	ES2136788-028	ES2136788-029	ES2136788-030	ES2136788-031	
				Result	Result	Result	Result	Result	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	44.9	39.2	42.4	45.8	42.2	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	68.8	46.2	55.0	50.0	51.2	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS40	HS41	HS42	HS43	HS44
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-032	ES2136788-033	ES2136788-034	ES2136788-035	ES2136788-036	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.5	8.2	8.0	8.3	8.6	
ø pH (Fox)	----	0.1	pH Unit	6.9	7.9	7.0	7.2	6.9	
ø Reaction Rate	----	1	-	2	4	2	4	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	23.9	24.7	35.7	9.7	14.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	2480	2290	8520	2060	1780	
Iron	7439-89-6	50	mg/kg	18800	14200	16100	13900	11300	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	23.4	21.8	14.9	32.0	26.4	
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	18.2	12.3	16.1	8.7	9.9	
Copper	7440-50-8	1.0	mg/kg	1.3	<1.0	2.4	<1.0	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	2.0	1.8	3.5	2.5	2.0	
Lead	7439-92-1	1.0	mg/kg	3.4	3.1	4.6	3.2	2.7	
Manganese	7439-96-5	10	mg/kg	421	463	363	800	763	
Nickel	7440-02-0	1.0	mg/kg	2.7	2.5	5.4	3.0	2.6	
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	5.0	4.4	10.6	3.2	2.8	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	100	230	180	40	40	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	308	197	403	291	256	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.10	0.11	0.22	0.08	0.08	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	5	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	5	<3	<3	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS40	HS41	HS42	HS43	HS44
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-032	ES2136788-033	ES2136788-034	ES2136788-035	ES2136788-036	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	4	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	4	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS40	HS41	HS42	HS43	HS44
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-032	ES2136788-033	ES2136788-034	ES2136788-035	ES2136788-036	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	107	103	81.5	113	119	
Toluene-D8	2037-26-5	0.2	%	104	110	80.8	115	121	
4-Bromofluorobenzene	460-00-4	0.2	%	87.0	94.9	73.2	101	107	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltn	----	0.5	%	143	124	124	115	59.9	



### Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS40	HS41	HS42	HS43	HS44
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00
Compound	CAS Number	LOR	Unit	ES2136788-032	ES2136788-033	ES2136788-034	ES2136788-035	ES2136788-036	ES2136788-036
				Result	Result	Result	Result	Result	Result
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	47.5	41.7	46.9	50.0	48.9	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	56.2	58.8	63.8	63.8	67.5	





## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS45	HS46	HS47	HS48	HS49
Sampling date / time				19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-037	ES2136788-038	ES2136788-039	ES2136788-040	ES2136788-041	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.6	8.9	8.5	8.7	8.8	
ø pH (Fox)	----	0.1	pH Unit	6.8	6.6	7.1	6.9	6.9	
ø Reaction Rate	----	1	-	2	2	4	2	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	8.8	5.6	43.0	44.0	51.1	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	2610	1330	8120	9260	14600	
Iron	7439-89-6	50	mg/kg	19100	8140	12200	17500	19900	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	23.5	15.8	8.27	11.0	9.86	
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	22.2	6.9	13.0	18.4	24.9	
Copper	7440-50-8	1.0	mg/kg	1.3	<1.0	2.5	2.7	4.6	
Cobalt	7440-48-4	0.5	mg/kg	3.4	1.0	3.4	3.8	5.6	
Lead	7439-92-1	1.0	mg/kg	3.1	1.6	4.8	5.6	7.2	
Manganese	7439-96-5	10	mg/kg	416	264	281	248	273	
Nickel	7440-02-0	1.0	mg/kg	4.5	1.6	5.2	5.9	9.5	
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	3.9	2.0	10.4	12.3	17.7	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	40	30	270	300	470	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	212	200	353	310	341	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.08	0.08	0.17	0.35	0.51	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	7	8	10	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	7	8	10	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS45	HS46	HS47	HS48	HS49
Sampling date / time				19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-037	ES2136788-038	ES2136788-039	ES2136788-040	ES2136788-041	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	6	6	8	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	6	6	8	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS45	HS46	HS47	HS48	HS49
Sampling date / time				19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-037	ES2136788-038	ES2136788-039	ES2136788-040	ES2136788-041	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	98.9	108	100.0	91.6	111	
Toluene-D8	2037-26-5	0.2	%	98.6	110	103	94.0	110	
4-Bromofluorobenzene	460-00-4	0.2	%	91.7	95.2	94.6	84.5	97.4	
<b>EP090S: Organotin Surrogate</b>									
Tripropyltin	----	0.5	%	109	110	109	65.0	122	



### Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS45	HS46	HS47	HS48	HS49
Sampling date / time				19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	19-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-037	ES2136788-038	ES2136788-039	ES2136788-040	ES2136788-041	
				Result	Result	Result	Result	Result	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	55.7	44.8	57.4	51.1	43.9	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	67.5	62.5	70.0	71.2	58.8	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS25	HS26	HS27	HS31	HS70
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-042	ES2136788-043	ES2136788-044	ES2136788-045	ES2136788-046	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.7	8.6	8.6	8.5	8.6	
ø pH (Fox)	----	0.1	pH Unit	8.9	7.7	7.9	7.7	7.1	
ø Reaction Rate	----	1	-	4	4	4	4	4	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	23.2	27.5	28.3	19.1	28.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	5430	7870	4880	4610	7010	
Iron	7439-89-6	50	mg/kg	28600	35400	29500	28400	22600	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	0.59	<0.50	0.51	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	42.4	39.4	32.6	25.4	25.1	
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	60.4	30.9	29.1	114	19.4	
Copper	7440-50-8	1.0	mg/kg	3.2	4.4	2.6	2.2	2.6	
Cobalt	7440-48-4	0.5	mg/kg	5.3	6.0	5.4	2.4	4.2	
Lead	7439-92-1	1.0	mg/kg	5.9	7.7	6.6	9.6	6.2	
Manganese	7439-96-5	10	mg/kg	373	312	243	169	222	
Nickel	7440-02-0	1.0	mg/kg	5.4	7.6	4.5	3.7	5.5	
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	7.9	12.7	6.2	6.6	8.9	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	150	240	190	160	180	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	499	394	152	86	244	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.15	0.19	0.12	0.16	0.22	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	6	<3	4	5	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	6	<3	4	5	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS25	HS26	HS27	HS31	HS70
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-042	ES2136788-043	ES2136788-044	ES2136788-045	ES2136788-046	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	4	<3	<3	4	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	4	<3	<3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
Monobutyltin	78763-54-9	1	µgSn/kg	----	<1	<1	<1	<1	
Dibutyltin	1002-53-5	1	µgSn/kg	----	<1	<1	<1	<1	
Tributyltin	56573-85-4	0.5	µgSn/kg	----	<0.5	<0.5	<0.5	<0.5	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS25	HS26	HS27	HS31	HS70
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-042	ES2136788-043	ES2136788-044	ES2136788-045	ES2136788-046	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	95.8	77.0	101	104	75.2	
Toluene-D8	2037-26-5	0.2	%	84.4	82.8	114	115	79.8	
4-Bromofluorobenzene	460-00-4	0.2	%	92.3	91.8	113	113	83.9	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltn	----	0.5	%	----	89.0	114	99.1	97.5	



## Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS25	HS26	HS27	HS31	HS70
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00
Compound	CAS Number	LOR	Unit	ES2136788-042	ES2136788-043	ES2136788-044	ES2136788-045	ES2136788-046	Result
				Result	Result	Result	Result	Result	Result
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	56.4	49.7	74.9	42.3	51.6	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	67.5	57.5	58.8	58.8	62.5	





## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS74	HS75	HS77	HS32	HS33
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-047	ES2136788-048	ES2136788-049	ES2136788-050	ES2136788-051	
				Result	Result	Result	Result	Result	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.1	8.2	8.3	8.5	8.7	
ø pH (Fox)	----	0.1	pH Unit	7.1	7.5	7.0	7.5	7.1	
ø Reaction Rate	----	1	-	4	4	4	4	4	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	35.9	28.7	26.8	23.4	15.4	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	9010	5080	5330	2480	1890	
Iron	7439-89-6	50	mg/kg	27200	15100	18000	14000	12000	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	22.1	19.1	18.9	29.6	22.5	
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	19.6	14.1	20.6	17.9	10.4	
Copper	7440-50-8	1.0	mg/kg	3.6	1.7	1.9	1.3	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	4.1	3.1	2.9	2.7	2.1	
Lead	7439-92-1	1.0	mg/kg	5.9	3.8	4.7	3.3	3.2	
Manganese	7439-96-5	10	mg/kg	419	261	336	751	586	
Nickel	7440-02-0	1.0	mg/kg	5.6	3.9	4.1	3.5	2.6	
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	9.5	6.7	9.5	5.1	3.3	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	380	240	410	80	110	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	508	553	270	331	344	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.18	0.19	0.21	0.09	0.11	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	5	8	6	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	5	8	6	<3	<3	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS74	HS75	HS77	HS32	HS33
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-047	ES2136788-048	ES2136788-049	ES2136788-050	ES2136788-051	
				Result	Result	Result	Result	Result	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	3	6	5	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	6	5	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<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	<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS74	HS75	HS77	HS32	HS33
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	
Compound	CAS Number	LOR	Unit	ES2136788-047	ES2136788-048	ES2136788-049	ES2136788-050	ES2136788-051	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	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	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	88.1	102	82.3	98.9	112	
Toluene-D8	2037-26-5	0.2	%	96.6	108	91.9	101	122	
4-Bromofluorobenzene	460-00-4	0.2	%	102	108	97.3	105	120	
<b>EP090S: Organotin Surrogate</b>									
Tripropyltin	----	0.5	%	108	112	104	109	107	



**Analytical Results**

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS74	HS75	HS77	HS32	HS33
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00	20-Oct-2021 00:00
Compound	CAS Number	LOR	Unit	ES2136788-047	ES2136788-048	ES2136788-049	ES2136788-050	ES2136788-051	
				Result	Result	Result	Result	Result	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	43.9	45.7	40.2	38.0	40.1	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	66.2	58.8	40.0	51.2	50.0	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS34	HS35	Duplicate C	----	----
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	21-Oct-2021 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2136788-052	ES2136788-053	ES2136788-054	-----	-----	
				Result	Result	Result	----	----	
<b>EA037: Ass Field Screening Analysis</b>									
ø pH (F)	----	0.1	pH Unit	8.5	8.5	8.3	----	----	
ø pH (Fox)	----	0.1	pH Unit	7.2	7.6	8.7	----	----	
ø Reaction Rate	----	1	-	4	4	4	----	----	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	19.8	31.6	27.9	----	----	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	1570	1970	3700	----	----	
Iron	7439-89-6	50	mg/kg	13300	10300	25200	----	----	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	----	----	
Arsenic	7440-38-2	1.00	mg/kg	26.5	18.8	28.2	----	----	
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	----	----	
Chromium	7440-47-3	1.0	mg/kg	12.5	11.3	43.3	----	----	
Copper	7440-50-8	1.0	mg/kg	<1.0	<1.0	2.1	----	----	
Cobalt	7440-48-4	0.5	mg/kg	2.1	1.8	3.3	----	----	
Lead	7439-92-1	1.0	mg/kg	3.0	3.0	5.6	----	----	
Manganese	7439-96-5	10	mg/kg	738	589	339	----	----	
Nickel	7440-02-0	1.0	mg/kg	2.7	2.5	3.6	----	----	
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	----	----	
Zinc	7440-66-6	1.0	mg/kg	3.8	4.1	6.5	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	----	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	90	180	270	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	408	317	319	----	----	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.08	0.13	0.22	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
>C16 - C34 Fraction	----	3	mg/kg	<3	4	4	----	----	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	----	----	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	4	4	----	----	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS34	HS35	Duplicate C	----	----
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	21-Oct-2021 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2136788-052	ES2136788-053	ES2136788-054	-----	-----	
				Result	Result	Result	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	----	----	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	----	----	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	----	----	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	----	----	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	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	----	----	
<b>EP080-SD: BTEXN</b>									
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	----	----	
<b>EP090: Organotin Compounds</b>									
Monobutyltin	78763-54-9	1	µgSn/kg	<1	<1	<1	----	----	
Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	<1	----	----	
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	----	----	
<b>EP131A: Organochlorine Pesticides</b>									
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	



## Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	HS34	HS35	Duplicate C	----	----
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	21-Oct-2021 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2136788-052	ES2136788-053	ES2136788-054	-----	-----	
				Result	Result	Result	----	----	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	----	----	
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	<0.25	----	----	
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	----	----	
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	----	----	
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	----	----	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	----	----	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	87.9	107	93.0	----	----	
Toluene-D8	2037-26-5	0.2	%	82.1	116	100	----	----	
4-Bromofluorobenzene	460-00-4	0.2	%	92.2	121	106	----	----	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltn	----	0.5	%	95.8	109	141	----	----	



### Analytical Results

Sub-Matrix: <b>SEDIMENT</b> (Matrix: <b>SOIL</b> )				Sample ID	HS34	HS35	Duplicate C	----	----
Sampling date / time				20-Oct-2021 00:00	20-Oct-2021 00:00	21-Oct-2021 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2136788-052	ES2136788-053	ES2136788-054	-----	-----	
				Result	Result	Result	----	----	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	47.3	58.9	43.9	----	----	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	48.8	48.8	45.0	----	----	





## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		Equipment Blank	----	----	----	----
Sampling date / time		21-Oct-2021 00:00		----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2136788-013	-----	-----	-----	-----
				Result	----	----	----	----
<b>EG035T: Total Mercury by FIMS</b>								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	----	----	----	----
<b>EG094T: Total metals in Fresh water by ORC-ICPMS</b>								
Arsenic	7440-38-2	0.2	µg/L	2.3	----	----	----	----
Chromium	7440-47-3	0.2	µg/L	6.1	----	----	----	----
Cobalt	7440-48-4	0.1	µg/L	1.2	----	----	----	----
Copper	7440-50-8	0.5	µg/L	3.9	----	----	----	----
Lead	7439-92-1	0.1	µg/L	6.7	----	----	----	----
Nickel	7440-02-0	0.5	µg/L	3.8	----	----	----	----
Zinc	7440-66-6	1	µg/L	87	----	----	----	----
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	----	----	----	----
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>								
Total Phosphorus as P	----	0.01	mg/L	<0.01	----	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
<b>EP080: BTEXN</b>								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----



### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Equipment Blank	----	----	----	----
Sampling date / time				21-Oct-2021 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2136788-013	-----	-----	-----	-----	
				Result	----	----	----	----	
<b>EP080: BTEXN - Continued</b>									
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	120	----	----	----	----	
Toluene-D8	2037-26-5	2	%	114	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	104	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: <b>SEDIMENT</b>		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
<b>EP090S: Organotin Surrogate</b>			
Tripropyltin	----	35	130
<b>EP131S: OC Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	10	119
<b>EP131T: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	10	106
Sub-Matrix: <b>WATER</b>		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

## Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EP090: Organotin Compounds

(SOIL) EP090S: Organotin Surrogate

(SOIL) EP003: Total Organic Carbon (TOC) in Soil

(SOIL) EA037: Ass Field Screening Analysis

## CERTIFICATE OF ANALYSIS

<b>Work Order</b> : <b>EB2202010</b> <b>Client</b> : <b>RPS AAP Consulting Pty Ltd</b> <b>Contact</b> : <b>KAT THORNE</b> <b>Address</b> : <b>Level 2, 27-31 Troode St West Perth 6005</b>  <b>Telephone</b> : ---- <b>Project</b> : <b>Marine Sediment Sampling</b> <b>Order number</b> : ---- <b>C-O-C number</b> : ---- <b>Sampler</b> : <b>LUCIA &amp; KATE</b> <b>Site</b> : ---- <b>Quote number</b> : <b>EP/875/21_V3</b> <b>No. of samples received</b> : <b>11</b> <b>No. of samples analysed</b> : <b>11</b>	<b>Page</b> : 1 of 6 <b>Laboratory</b> : Environmental Division Brisbane <b>Contact</b> : Nick Courts <b>Address</b> : 2 Byth Street Stafford QLD Australia 4053  <b>Telephone</b> : +61-7-3243 7222 <b>Date Samples Received</b> : 25-Jan-2022 14:29 <b>Date Analysis Commenced</b> : 28-Jan-2022 <b>Issue Date</b> : 07-Feb-2022 10:10
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW



## 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.

- Analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93.8_U	KP93.8_L	KP102.7_U	KP102.7_L	KP103.1_U
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2202010-001	EB2202010-002	EB2202010-003	EB2202010-004	EB2202010-005	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	28.2	18.5	32.9	33.3	18.3	
<b>EP132B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5	
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5	
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4	
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4	
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4	
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4	
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4	
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4	
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4	
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4	
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4	
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4	
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4	
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5	
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	<4	
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	<4	<4	<4	<4	<4	
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	5	5	5	5	5	
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	10	10	10	10	10	
<b>EP132T: Base/Neutral Extractable Surrogates</b>									
2-Fluorobiphenyl	321-60-8	10	%	77.2	108	92.1	96.2	85.6	
Anthracene-d10	1719-06-8	10	%	81.8	108	102	97.7	98.3	
4-Terphenyl-d14	1718-51-0	10	%	84.9	110	97.0	92.7	91.4	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP103.1_L	KP103.5_U	KP104.9_U	KP106.0_U	KP106.0_L
Sampling date / time				07-Jan-2022 00:00	07-Jan-2022 00:00	07-Jan-2022 00:00	06-Jan-2022 00:00	06-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2202010-006	EB2202010-007	EB2202010-008	EB2202010-009	EB2202010-010	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	22.4	25.5	37.0	27.7	34.9	
<b>EP132B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5	
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5	
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4	
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4	
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4	
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4	
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4	
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4	
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4	
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4	
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4	
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4	
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4	
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4	
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5	
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	<4	
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	<4	<4	<4	<4	<4	
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	5	5	5	5	5	
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	10	10	10	10	10	
<b>EP132T: Base/Neutral Extractable Surrogates</b>									
2-Fluorobiphenyl	321-60-8	10	%	101	107	86.1	101	99.3	
Anthracene-d10	1719-06-8	10	%	106	119	86.9	100.0	104	
4-Terphenyl-d14	1718-51-0	10	%	103	119	81.6	103	99.5	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Sample ID		KP106_U_A	----	----	----	----
		Sampling date / time		06-Jan-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2202010-011	-----	-----	-----	-----
				Result	----	----	----	----
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>								
Moisture Content	----	0.1	%	<b>31.2</b>	----	----	----	----
<b>EP132B: Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	91-20-3	5	µg/kg	<5	----	----	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	----	----	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	----	----	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	----	----	----	----
Fluorene	86-73-7	4	µg/kg	<4	----	----	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	----	----	----	----
Anthracene	120-12-7	4	µg/kg	<4	----	----	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	----	----	----	----
Pyrene	129-00-0	4	µg/kg	<4	----	----	----	----
Benzo(a)anthracene	56-55-3	4	µg/kg	<4	----	----	----	----
Chrysene	218-01-9	4	µg/kg	<4	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	----	----	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	----	----	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	----	----	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	----	----	----	----
Perylene	198-55-0	4	µg/kg	<4	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	----	----	----	----
Coronene	191-07-1	5	µg/kg	<5	----	----	----	----
^ Sum of PAHs	----	4	µg/kg	<4	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	<4	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	<b>5</b>	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	<b>10</b>	----	----	----	----
<b>EP132T: Base/Neutral Extractable Surrogates</b>								
2-Fluorobiphenyl	321-60-8	10	%	<b>95.9</b>	----	----	----	----
Anthracene-d10	1719-06-8	10	%	<b>96.8</b>	----	----	----	----
4-Terphenyl-d14	1718-51-0	10	%	<b>94.1</b>	----	----	----	----





## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP132T: Base/Neutral Extractable Surrogates</b>			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

## Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EP132B: Polynuclear Aromatic Hydrocarbons

(SOIL) EP132T: Base/Neutral Extractable Surrogates

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

## CERTIFICATE OF ANALYSIS

<b>Work Order</b> : <b>EB2202012</b> <b>Client</b> : <b>RPS AAP Consulting Pty Ltd</b> <b>Contact</b> : <b>KAT THORNE</b> <b>Address</b> : <b>Level 2, 27-31 Troode St West Perth 6005</b>  <b>Telephone</b> : ---- <b>Project</b> : <b>Marine Sediment Sampling</b> <b>Order number</b> : ---- <b>C-O-C number</b> : ---- <b>Sampler</b> : <b>LUCIA &amp; KATE</b> <b>Site</b> : ---- <b>Quote number</b> : <b>EP/875/21_V3</b> <b>No. of samples received</b> : <b>8</b> <b>No. of samples analysed</b> : <b>8</b>	<b>Page</b> : 1 of 5 <b>Laboratory</b> : Environmental Division Brisbane <b>Contact</b> : Nick Courts <b>Address</b> : 2 Byth Street Stafford QLD Australia 4053  <b>Telephone</b> : +61-7-3243 7222 <b>Date Samples Received</b> : 25-Jan-2022 14:34 <b>Date Analysis Commenced</b> : 28-Jan-2022 <b>Issue Date</b> : 07-Feb-2022 10:12
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



## 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.

- Analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Sample ID		KP119-7_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
		Sampling date / time		08-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2202012-001	EB2202012-002	EB2202012-003	EB2202012-004	EB2202012-005
				Result	Result	Result	Result	Result
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>								
Moisture Content	----	0.1	%	40.0	34.1	20.0	20.2	23.8
<b>EP132B: Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	<4
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	<4	<4	<4	<4	<4
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	5	5	5	5	5
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	10	10	10	10	10
<b>EP132T: Base/Neutral Extractable Surrogates</b>								
2-Fluorobiphenyl	321-60-8	10	%	85.1	97.1	111	86.5	96.4
Anthracene-d10	1719-06-8	10	%	94.5	97.3	115	96.0	106
4-Terphenyl-d14	1718-51-0	10	%	87.4	94.0	117	95.7	110



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Sample ID		KP120-6_U	KP119-7_U	KP119-8_U	----	----
		Sampling date / time		08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2202012-006	EB2202012-007	EB2202012-008	-----	-----
				Result	Result	Result	----	----
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>								
Moisture Content	----	0.1	%	30.3	33.3	25.0	----	----
<b>EP132B: Polynuclear Aromatic Hydrocarbons</b>								
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	<4	<4	<4	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	----	----
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	----	----
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	----	----
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	----	----
Benzo(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	----	----
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	<4	<4	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	----	----
Perylene	198-55-0	4	µg/kg	<4	<4	<4	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	----	----
Coronene	191-07-1	5	µg/kg	<5	<5	<5	----	----
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	----	----
^ Benzo(a)pyrene TEQ (zero)	----	4	µg/kg	<4	<4	<4	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	4	µg/kg	5	5	5	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	4	µg/kg	10	10	10	----	----
<b>EP132T: Base/Neutral Extractable Surrogates</b>								
2-Fluorobiphenyl	321-60-8	10	%	107	93.2	103	----	----
Anthracene-d10	1719-06-8	10	%	120	96.4	116	----	----
4-Terphenyl-d14	1718-51-0	10	%	119	97.5	111	----	----



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP132T: Base/Neutral Extractable Surrogates</b>			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

## Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EP132B: Polynuclear Aromatic Hydrocarbons

(SOIL) EP132T: Base/Neutral Extractable Surrogates

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>EB2200737</b>	<b>Page</b>	: 1 of 16
<b>Client</b>	: <b>RPS AAP Consulting Pty Ltd</b>	<b>Laboratory</b>	: Environmental Division Brisbane
<b>Contact</b>	: <b>KAT THORNE</b>	<b>Contact</b>	: Nick Courts
<b>Address</b>	: Level 2, 27-31 Troode St West Perth 6005	<b>Address</b>	: 2 Byth Street Stafford QLD Australia 4053
<b>Telephone</b>	: ----	<b>Telephone</b>	: +61-7-3243 7222
<b>Project</b>	: Marine Sediment Sampling	<b>Date Samples Received</b>	: 12-Jan-2022 08:20
<b>Order number</b>	: ----	<b>Date Analysis Commenced</b>	: 13-Jan-2022
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 28-Jan-2022 09:11
<b>Sampler</b>	: LUCIA & KATE		
<b>Site</b>	: ----		
<b>Quote number</b>	: EP/875/21_V3		
<b>No. of samples received</b>	: 18		
<b>No. of samples analysed</b>	: 17		



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

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- 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, 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.
- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- EK061G (Total Kjeldahl Nitrogen as N) / EK067G (Total Phosphorus as P): Sample EB2200737\_002 (KP92-95\_U\_1) Shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP93-23\_U' (EB2200737-001) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG005T-Total Metals by ICP-AES: Sample 'KP120-6\_U' (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- AES 6318477 T/O 6314877
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP120-6\_U (EB2200737-014) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG020-SD (Total Metals in Sediments by ICP-MS): Sample KP92-95\_U\_1 (EB2200737-002) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EP071 (TRH Semivolatiles): Sample 'KP92-95\_U\_1' shows poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- 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<sub>3</sub>) 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/m<sup>3</sup> in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m<sup>3</sup>'.





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.8	9.6	9.9	9.7	9.1	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.008	0.080	0.010	0.015	0.526	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	50	<10	<10	328	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	43.4	47.0	36.3	2.13	19.3	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	8680	9390	7250	425	3860	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	13.9	15.0	11.6	0.68	6.19	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.08	<0.02	<0.02	0.52	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	50	<10	<10	328	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	4	<1	<1	25	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	17.1	24.3	16.8	16.0	41.3	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	600	2620	760	340	9520	
Iron	7439-89-6	50	mg/kg	8560	10700	10000	1680	29100	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	17.8	18.5	18.6	1.21	27.3	
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	9.9	13.7	11.4	1.7	33.2	
Copper	7440-50-8	1.0	mg/kg	<1.0	1.8	1.3	1.1	5.7	
Cobalt	7440-48-4	0.5	mg/kg	1.2	2.5	1.4	<0.5	8.7	
Lead	7439-92-1	1.0	mg/kg	2.4	3.8	2.7	24.1	10.6	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time				08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	362	371	311	<10	173	
Nickel	7440-02-0	1.0	mg/kg	1.7	3.7	2.3	<1.0	9.8	
Selenium	7782-49-2	0.1	mg/kg	0.1	0.2	0.1	<0.1	0.6	
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	1.8	5.1	2.8	1.6	17.2	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	60	160	60	50	210	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	315	283	312	44	210	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.04	0.60	0.05	<0.02	0.53	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	<3	<3	<3	3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	3	3	<3	4	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	<3	3	3	<3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP93-23_U	KP92-95_U_1	KP92-85_U	KP112-4_U	KP119-7_L
Sampling date / time					08-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	06-Jan-2022 00:00	08-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-001	EB2200737-002	EB2200737-003	EB2200737-005	EB2200737-006	EB2200737-006
				Result	Result	Result	Result	Result	Result
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	27304-13-8	0.50	µg/kg	<0.50	<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	<0.50
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	90.6	90.0	94.8	97.3	83.6	
Toluene-D8	2037-26-5	0.2	%	81.0	84.0	82.3	89.3	77.6	
4-Bromofluorobenzene	460-00-4	0.2	%	91.5	95.2	94.7	102	87.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	113	132	90.4	93.8	110	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	65.2	25.9	55.4	56.4	50.6	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	60.0	27.5	58.8	63.8	32.5	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.9	9.6	9.6	9.9	9.7	
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.011	0.020	0.011	0.015	0.052	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	13	<10	<10	33	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	48.5	15.4	36.4	36.3	47.8	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9700	3070	7280	7250	9560	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.6	4.92	11.7	11.6	15.3	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.02	<0.02	<0.02	0.05	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	13	<10	<10	33	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	2	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	20.1	24.9	18.8	16.4	24.2	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	670	2430	2780	960	2670	
Iron	7439-89-6	50	mg/kg	5540	18500	9710	10500	11800	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	12.8	14.6	12.6	19.8	18.3	
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	6.4	15.6	13.3	15.0	16.4	
Copper	7440-50-8	1.0	mg/kg	<1.0	2.1	2.0	<1.0	1.6	
Cobalt	7440-48-4	0.5	mg/kg	0.9	3.0	2.8	1.4	2.4	
Lead	7439-92-1	1.0	mg/kg	1.9	7.8	4.1	2.9	3.8	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time				10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	250	167	177	512	397	
Nickel	7440-02-0	1.0	mg/kg	1.5	3.3	3.8	2.1	3.6	
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.2	0.2	0.1	0.2	
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	1.3	6.5	7.6	1.7	5.4	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	90	240	170	50	140	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	346	340	262	247	335	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.06	0.14	0.11	0.05	0.12	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	<3	10	6	<3	4	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	<3	10	9	<3	4	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	3	4	4	3	<3	
C15 - C28 Fraction	----	3	mg/kg	<3	<3	4	<3	4	
C29 - C36 Fraction	----	5	mg/kg	<5	8	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	12	8	3	4	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit		EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013
					Result	Result	Result	Result	Result
<b>EP080-SD: BTEXN - Continued</b>									
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg		<0.2	<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	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	91-20-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
<b>EP090: Organotin Compounds</b>									
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
<b>EP131A: Organochlorine Pesticides</b>									
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
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



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP92-85_L	KP120-5_U	KP110-4_U	KP92-75_U	KP92-95_U
Sampling date / time					10-Jan-2022 00:00	08-Jan-2022 00:00	06-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00
Compound	CAS Number	LOR	Unit		EB2200737-007	EB2200737-008	EB2200737-009	EB2200737-012	EB2200737-013
					Result	Result	Result	Result	Result
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		80.1	84.2	89.4	97.6	88.5
Toluene-D8	2037-26-5	0.2	%		70.2	76.8	81.4	88.9	82.6
4-Bromofluorobenzene	460-00-4	0.2	%		80.0	88.4	91.2	98.2	91.8
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%		106	121	84.3	103	128
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%		46.1	44.9	56.7	48.9	55.8
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%		47.5	52.5	52.5	68.8	55.0





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EA033-A: Actual Acidity</b>									
pH KCl (23A)	----	0.1	pH Unit	9.4	9.2	9.4	9.9	9.9	
Titration Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titration Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
<b>EA033-B: Potential Acidity</b>									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.042	0.340	0.102	0.010	0.014	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	26	212	64	<10	<10	
<b>EA033-C: Acid Neutralising Capacity</b>									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	14.2	40.8	23.6	35.0	45.5	
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	2830	8160	4720	6990	9090	
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	4.54	13.1	7.56	11.2	14.6	
<b>EA033-E: Acid Base Accounting</b>									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.04	0.34	0.10	<0.02	<0.02	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	26	212	64	<10	<10	
Liming Rate excluding ANC	----	1	kg CaCO3/t	2	16	5	<1	<1	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	29.7	35.8	32.4	19.2	7.7	
<b>EG005(ED093)-SD: Total Metals in Sediments by ICP-AES</b>									
Aluminium	7429-90-5	50	mg/kg	5840	6700	5590	720	760	
Iron	7439-89-6	50	mg/kg	32300	24700	22200	7960	8110	
<b>EG020-SD: Total Metals in Sediments by ICPMS</b>									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	11.0	26.6	20.5	19.6	16.5	
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	28.5	27.8	37.0	9.3	11.6	
Copper	7440-50-8	1.0	mg/kg	6.1	3.6	3.2	<1.0	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	4.2	7.0	5.9	1.1	1.2	
Lead	7439-92-1	1.0	mg/kg	13.4	9.5	9.8	2.4	2.4	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EG020-SD: Total Metals in Sediments by ICPMS - Continued</b>									
Manganese	7439-96-5	10	mg/kg	102	156	212	228	316	
Nickel	7440-02-0	1.0	mg/kg	5.3	7.6	6.5	1.7	1.9	
Selenium	7782-49-2	0.1	mg/kg	0.3	0.4	0.3	0.1	0.1	
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	10.2	12.1	11.0	1.6	1.8	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	110	40	60	60	80	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	2	mg/kg	181	27	35	292	355	
<b>EP003: Total Organic Carbon (TOC) in Soil</b>									
Total Organic Carbon	----	0.02	%	0.15	0.56	0.20	0.04	0.06	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
>C16 - C34 Fraction	----	3	mg/kg	4	3	4	<3	<3	
>C34 - C40 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
>C10 - C40 Fraction (sum)	----	3	mg/kg	4	3	4	<3	<3	
>C10 - C16 Fraction minus Naphthalene (F2)	----	3	mg/kg	<3	<3	<3	<3	<3	
<b>EP080-SD / EP071-SD: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3	
C10 - C14 Fraction	----	3	mg/kg	<3	<3	3	<3	<3	
C15 - C28 Fraction	----	3	mg/kg	3	<3	4	<3	<3	
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5	
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	<3	7	<3	<3	
<b>EP080-SD / EP071-SD: Total Recoverable Hydrocarbons</b>									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	
<b>EP080-SD: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EP080-SD: BTEXN - Continued</b>									
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<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	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
<b>EP090: Organotin Compounds</b>									
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	
<b>EP131A: Organochlorine Pesticides</b>									
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	
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	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	KP120-6_U	KP119-7_U	KP119-8_U	KP92-75_L	KP92-85_U_1
Sampling date / time				08-Jan-2022 00:00	08-Jan-2022 00:00	11-Jan-2022 00:00	10-Jan-2022 00:00	10-Jan-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2200737-014	EB2200737-015	EB2200737-016	EB2200737-017	EB2200737-018	
				Result	Result	Result	Result	Result	
<b>EP131A: Organochlorine Pesticides - Continued</b>									
Oxychlorthane	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	
<b>EP131B: Polychlorinated Biphenyls (as Aroclors)</b>									
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	62.9	62.8	65.4	70.9	73.7	
Toluene-D8	2037-26-5	0.2	%	55.0	53.9	56.7	61.8	63.9	
4-Bromofluorobenzene	460-00-4	0.2	%	64.3	70.2	74.9	79.0	84.5	
<b>EP090S: Organotin Surrogate</b>									
Tripopyltin	----	0.5	%	78.4	90.8	127	127	81.1	
<b>EP131S: OC Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.50	%	60.5	59.5	55.1	37.7	65.4	
<b>EP131T: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.5	%	62.5	65.0	62.5	50.0	63.8	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	TB	FB	----	----	----
Sampling date / time				10-Jan-2022 00:00	10-Jan-2022 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EB2200737-010	EB2200737-011	-----	-----	-----	
				Result	Result	----	----	----	
<b>EP071: Total Petroleum Hydrocarbons</b>									
C10 - C14 Fraction	----	50	µg/L	----	<50	----	----	----	
C15 - C28 Fraction	----	100	µg/L	----	<100	----	----	----	
C29 - C36 Fraction	----	50	µg/L	----	<50	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	<50	----	----	----	
<b>EP071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
>C10 - C16 Fraction	----	100	µg/L	----	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	----	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	----	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	<100	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	115	----	----	----	----	
Toluene-D8	2037-26-5	2	%	97.4	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	98.7	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080-SD: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	51	145
Toluene-D8	2037-26-5	42	144
4-Bromofluorobenzene	460-00-4	58	142
<b>EP090S: Organotin Surrogate</b>			
Tripropyltin	----	35	130
<b>EP131S: OC Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	10	119
<b>EP131T: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	10	106
Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

## Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (SOIL) EP131A: Organochlorine Pesticides
- (SOIL) EP131S: OC Pesticide Surrogate
- (SOIL) EP131B: Polychlorinated Biphenyls (as Aroclors)
- (SOIL) EP131T: PCB Surrogate