**ENVIRONMENT PROTECTION AUTHORITY**

**THIS IS THE APPROVED** Dredge Management Plan

**REFERRED TO IN CONDITION** S288 and T1036

**OF EPA AUTHORISATION NUMBER** 52466

**DELEGATE** **DATE** 11 September 2026

Principal Adviser, WAFSE

Heron Construction Co. Ltd.

# ADELAIDE BEACH MANAGEMENT REVIEW IMPLEMENTATION (AMBRI) PROJECT

PHASE II DREDGE TRIAL

# DREDGE MANAGEMENT PLAN (DMP)

**Document No: HC-DEW-ABM_DOC-HSE-003_DMP_V1.6**

**Project: AMBRI PROJECT PHASE II DREDGE TRIAL**

**Location: ADELAIDE, SOUTH AUSTRALIA**

**Prepared for: DEPARTMENT FOR ENVIRONMENT AND WATER**

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# Abbreviations

| Abbreviation | |
|---|---|
| ABMRI | Adelaide Beach Management Review Implementation Project |
| ADS | Adelaide Dolphin Sanctuary |
| AHD | Australian Height Datum |
| ANZG | Australian and New Zealand Guidelines for Fresh and Marine Water Quality |
| BHD | Backhoe Dredge |
| CD | Chart Datum |
| CSD | Cutter Suction Dredger |
| DIT | Department for Infrastructure and Transport (SA) |
| DMP | Dredge Management Plan |
| DEW | Department for Environment and Water (SA) |
| DO | Dissolved Oxygen |
| EC | Electrical Conductivity (a measure of water salinity) |
| EPA | Environment Protection Authority (SA) |
| EPBC | Environment Protection and Biodiversity Conservation |
| HAT | Highest Astronomical Tide |
| HEN | Henley Beach |
| IMS | Integrated Management System |
| LAT | Lowest Astronomical Tide |
| MFO/MMO | Marine Fauna Observer / Marine Mammal Observer |
| MNES | Matters of National Environmental Significance |
| NAGD | National Assessment Guidelines for Dredging (C'wth) |
| NBA | Nearshore Borrow Area |
| NH | North Haven |
| NMP | Noise Management Plan |
| NTU | Nephelometric Turbidity Units (measure of turbidity or water clarity) |
| PA | Placement Area |
| PIRSA | Department of Primary Industries and Regions (SA) |
| SARDI | South Australian Research and Development Institute |
| SEP | Stakeholder Engagement Plan |
| SHB | Split Hopper Barge |
| SHD | Suction Hopper Dredge |

| Abbreviation | |
|---|---|
| SMP | Seagrass Monitoring Plan |
| SPA | Sand Placement Area |
| SPS | Sand Pumping System |
| TSHD | Trailing Suction Hopper Dredge |
| WB | West Beach |
| WQ | Water Quality |
| WQMP | Water Quality Monitoring Plan |
| ZoI | Zone of Influence |
| ZoMI | Zone of Moderate Impact |
| ZoHI | Zone of High Impact |

# 1 Introduction

## 1.1 Background

In 2022, the Adelaide Beach Management Review was established to fulfil an election commitment made in response to local community concerns over sand management practices on Adelaide's beaches. To support this, an Independent Advisory Panel (the Panel) was appointed by the Government to oversee a review for the identification of a sustainable approach to managing Adelaide's beaches.

The Adelaide Beach Management Review culminated in two recommendations to maintain sand within the Northern Management Area (i.e. North Haven to West Beach):

- Restore: One-off restoration of West Beach with an external sand source.
- Recycle: Long-term recycling of sand between northern beaches and West Beach.

A series of detailed investigations conducted since the commencement of the Adelaide Beach Management Review, including the successful delivery of the Adelaide Beach Management Review Implementation (ABMRI) Dredge Trial in 2024, further informed the preferred approach to deliver the Restore and Recycle objectives above.

As announced in January 2026, the South Australian Government has developed plans for a new long-term replenishment program to manage erosion and sand build-up along the Adelaide coast from West Beach to North Haven. Subject to regulatory approvals, the program includes a one-off replenishment to restore West Beach with 400,000 cubic metres of sand collected from north of the Outer Harbor channel breakwater. Following this, a routine replenishment program will be established with sand dredged from nearshore areas where it has built-up and placed where it is needed.

This Dredge Management Plan outlines the proposed dredging program to extend the ABMRI Dredge Trial in 2026, to support refinement of dredging operations while recycling excess sand accumulating at the northern beaches to maintain Adelaide's central beaches for coastal protection purposes.

## 1.2 Project overview

ABMRI Phase II is an EPA-regulated dredging trial that will deliver sand replenishment in 2026 while testing and refining dredging methods, operational controls and environmental monitoring arrangements to inform future programs.

The campaign would involve the collection of up to 90,000 $m^3$ from North Haven nearshore borrow area (NBA3) for placement in the nearshore at West Beach (WB) or Henley Beach South (HBS) **(**Figure 1**)**.

Dredging operations are proposed to be completed within the dredge window, by 30 September 2026 and if necessary DEW will apply to the EPA for approval of an extension.

The proposed equipment and methodology are detailed in **Appendix B**.

- A backhoe dredge would be used to collect sand from NBA3, and two split hopper barges would transport this sand for direct seabed placement in the nearshore at WB or HBS.
- Split Hopper Barges may also place sand in a designated 'rehandling area' for collection by a cutter suction dredge and placement in the intertidal area to actively nourish shallower areas using a pipeline diffuser.

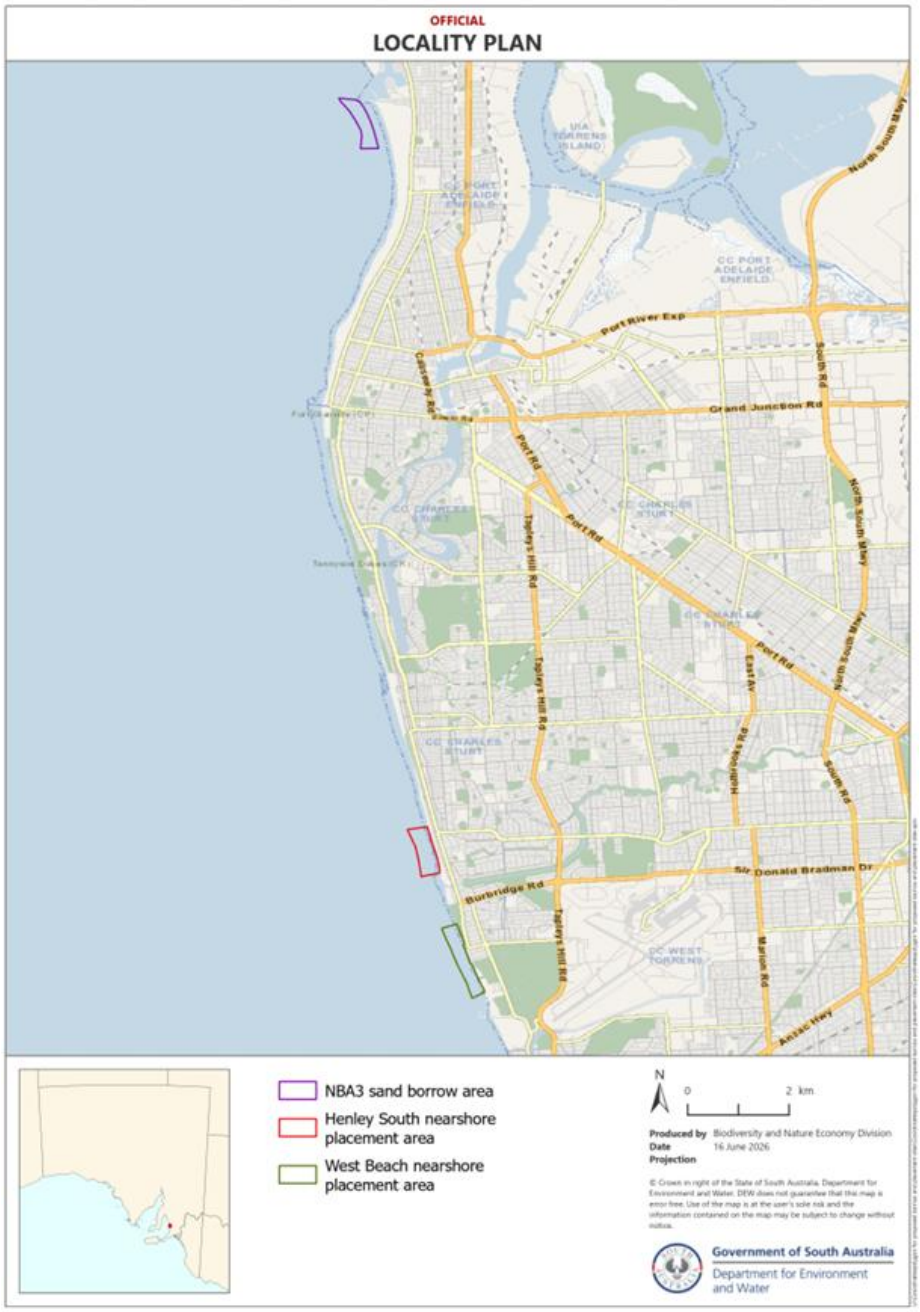



*Figure 1: ABMRI Project Phase II Locality Plan including sand borrow area and sand placement areas*

Extensive studies and physical investigations on sediment characteristics and contamination, benthic habitat, hindcast plume modelling, and bathymetry and sand volume analysis have informed selection of the proposed borrow and placement areas.

The aim of ABMRI Phase II is to continue to assess the effectiveness of dredging methodologies for sand management and coast protection purposes.

## 1.3 DMP purpose

The purpose of this Dredge Management Plan is to set out how dredging and sand placement will be undertaken, and how environmental and community risks will be managed, monitored and reported, so that the dredging campaign is implemented with all reasonable and practicable measures to avoid or minimise environmental harm.

The DMP covers the following:

1. Scope of Work, including intended methodologies and equipment to be used, location of sand borrow and placement areas.
2. Existing environmental conditions and values.
3. Environmental requirements.
4. Environmental risk assessment.
5. Reporting.

The DMP includes drawings and environmental management sub-plans which aim to identify, as far as reasonably practicable, environmental risks associated with the dredging and placement processes and outline procedures to prevent, minimise and manage such risks:

- Sand borrow and placement area drawings (**Appendix A**)
- Dredge vessel specification (**Appendix B**)
- Water Quality Monitoring Plan (**Appendix C**)
- Seagrass Monitoring Plan (**Appendix D**)
- Noise Management Plan (**Appendix E**)
- Stakeholder Engagement Plan (**Appendix F**).
- 2025 NBA3 Sediment Sampling Data (**Appendix G**)2026 NBA3, Henley Beach South & West Beach Sediment Sampling Data (**Appendix H**)

The DMP and environmental management plans seek to:

- Identify potential environmental risks associated with the dredging program;
- Minimise environmental impacts that may be caused by dredging and placement activities; and
- Ensure potential impacts on the community and the marine environment near the borrow and placement areas are minimal, local, and temporary.

## 1.4 Approvals

As outlined in the EPA approval process flowchart, DEW as the proponent is seeking a new EPA license and approval of this DMP for continuation of the ABMRI dredge trial (Phase II).

Phase I of the ABMRI dredge trial was previously undertaken under EPA dredging licence 42842 and approved Dredge Management Plan.

## 1.5 Legislative framework

State and Commonwealth legislation and guidelines applicable to this dredge management plan scope of works are provided below.

## 1.6 Commonwealth legislation and guidelines

***Environment Protection and Biodiversity Conservation Act 1999***

- Requires developments to be referred where there is the potential for a 'significant impact' on a matter of national environmental significance (MNES).

***Biosecurity Act 2015***

- Details how biosecurity threats to plant, animal and human health are managed in Australia. The risks of marine pest incursions from international shipping are managed by Department of Agriculture, Fisheries and Forestry (DAFF) under this Act.

***Protection of the Sea (Prevention of Pollution from Ships) Act 1983***

- Several instruments relate to maritime safety and pollution, including *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, the Protection of the Sea (Prevention of Pollution from Ships) Regulations, and various Marine Orders made under the Act and Regulation (e.g. Marine Orders 91, 93, 94, 95, 96, 97).
- This legislation is reflected in State level instruments (e.g. *Pollution of Marine Waters (Prevention of Pollution from Ships) Act 1987*).

**National Assessment Guidelines for Dredging 2009**

- Guideline for assessing contamination in marine sediments intended to be placed at sea.

## 1.7 State government legislation and guidelines

***Environment Protection Act 1993***

- Provides the legislative framework to protect South Australia's environment including land, air and water. The Act outlines the obligations of businesses and individuals to protect the environment, as well as enforcement processes and penalties for non-compliance.

Environment Protection (Water Quality) Policy 2015

- Provides the regulatory framework requiring proponents to demonstrate that activities will not cause unacceptable water quality impacts to sensitive environmental receptors, including seagrass habitats.

EPA SA Dredge Guideline

- Supports dredging proponents and licensees meet their general environmental duty under Section 25 of the *Environment Protection Act 1993.*

EPA Code of Practice for Vessel and Facility Management (Marine and Inland Waters)

- Established for the prevention of pollution from the construction, use, and maintenance of vessels and related facilities. It provides guidance for all types of vessels and vessel owners.

***Coast Protection Act 1972***

- Provides for the protection of the coast of South Australia and establishes the Coast Protection Board.

***Native Vegetation Act 1991***

- Provides incentives and assistance to landowners in relation to the preservation and enhancement of native vegetation, and controls the clearance of native vegetation.
- Clearance of native vegetation requires approval, unless an exemption is applicable, and a 'Significant Environmental Benefit' (SEB) offset would be required.

***Fisheries Management Act 2007***

- Primary responsibility for the control of noxious and pest marine species is vested in the Department for Primary Industries and Regions South Australia (PIRSA).
- PIRSA has developed a range of controls and guidance measures intended to limit the risk of the introduction, or translocation, of marine pest species in SA waters.

# 2 Roles and responsibilities

Roles and responsibilities pertaining to environmental management and implementation of this DMP are detailed in Table 1 below.

*Table 1: Roles and responsibilities throughout the dredging operations.*

| Organisation | Position | Responsibility |
|---|---|---|
| DEW | Program Manager | Responsible for project management including Contractor performance and compliance with DMP. |
| DEW | Project Director | Project oversight and commercial management. |
| Dredging Contractor | EPA Licence Holder | Responsible for compliance against all aspects of the project and DMP, including water quality, impacts to seagrass and noise management. |
| Dredging Contractor | Project Manager | Manage day-to-day dredging operations. Provide daily, weekly progress reports. Ensure compliance with DMP. |
| Dredging Contractor | Site/Marine Representative | Manage onsite dredging and placement activities. Onsite contact. |
| Dredging Contractor | HSE Representative | Manage safety and environmental aspects of dredging activities including compliance with DMP. |
| Dredging Contractor | Surveyor | Undertake pre-, during and post-dredging surveys, volume calculations and reports. |
| Bluecoast | Coastal Engineer | Design dredging program, technical specifications and sand placement strategy. |
| Swash | Dredging Program Delivery and Regulatory Monitoring Lead | Prepare and implement DMP. Oversight of dredging activities and environmental activities to ensure DMP compliance. Provide water quality monitoring reports and notifications if alarm/hold trigger values exceeded. |
| Aquatic Assessments | Seagrass monitoring consultant | Prepare and implement seagrass monitoring plan. |
| Sonus | Noise management consultant | Prepare and implement noise management plan. |

# 3 Dredging operations

The proposed beach nourishment (via dredging) activities are described in the sections below to address the minimum information required in Section 5.3.1 of EPA's Dredge Guideline.

## 3.1 Description of operations

The purpose of dredging is to deliver sand replenishment in 2026 while testing and refining dredging methods, operational controls and environmental monitoring arrangements to inform future programs.

We propose to collect clean sand from a northern nearshore borrow area (NBA3) at North Haven (Figure 2) and transport sand, by split hopper barges (SHB) to sand placement areas at West Beach and Henley Beach South (Figure 3). If conditions are suitable, some of the sand placed in the nearshore boxes at West Beach will be rehandled by cutter dredger and placed in the bar areas.

## 3.2 Sand borrow area

The sand borrow area is located south of the North Haven Marina breakwater within the active (littoral) zone, within the same envelope of suitable sand identified in the planning and design of ABMRI Phase I. Details on the ABMRI Phase II sand borrow area extent and tolerances are provided in Figure 2 (also in **Appendix A)**. The target area for sand collection in ABMRI Phase II is adjacent to the area dredged in October 2024 during ABMRI Phase I.

Since early 2024, DEW has undertaken multiple sediment sampling and testing campaigns across the borrow and placement areas (Figure 20), providing a robust and contemporary dataset to characterise the sediment resource outlined in Table 5.

A review of the 2024 borrow area was undertaken in October 2025. The 2025 Sediment Sampling and Analysis Report is provided in **Appendix G**.

This investigation included sediment core samples and video transects to further understand the rate of infilling and characteristics of the infill material. This investigation concluded that the previous area was generally bare sand with no significant build-up of wrack and chemical parameters were either below laboratory reporting limits or present at very low concentrations.

- Total organic carbon (TOC) content was low across all samples, consistent with the coarse sandy nature of the seabed in the survey area.
- Assessment of reduced inorganic sulfur showed very low AVS (<0.5–5.8 µmol/g) and low CRS (0.03–0.08% S) across all sites which fell below national guidelines and are unlikely to generate $H_2S$.
- An analysis of the infill rate of the borrow area identified that a rate of 34% of the dredged volume per year occurred over the 12-month period with material from around the immediate surrounds of the dredge cut (e.g. clean sand).

This investigation confirmed that the sediments in the borrow area remain chemically inert, low-organic marine sands with minimal accumulation of contaminants (Bluecoast 2025).

## 3.3 Placement area

The Placement Area applied for in the licence runs from West Beach Boat Harbour to Henley Beach South. Within that, two high priority sand nourishment areas located at West Beach and Henley Beach South have been identified. Figure 3 depicts the proposed nearshore nourishment design as per the tender specification, with final placement design to be informed by a pre-dredge MBES bathymetric survey.

Placement will only occur within the area defined in the dredge licence application by the methods outlined in this Dredge Management Plan. Placement will be within Bar boxes (0m AHD) and Nearshore boxes (-5m AHD) only.

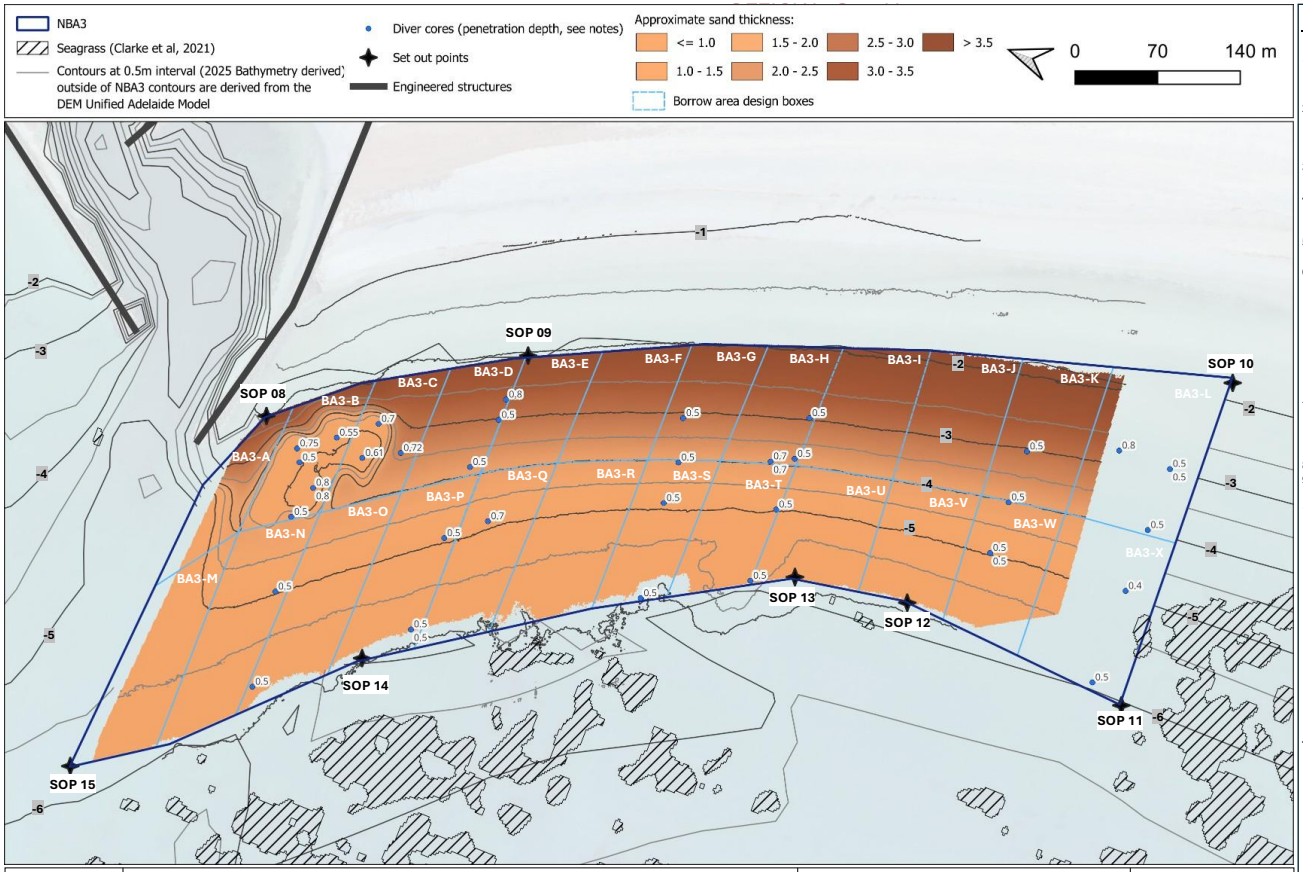
A number of exclusion zones have been confirmed within the placement area outlined in the dredge licence application. No sand will be placed in these areas:

1. West Beach boat harbour maintenance dredging spoil ground

- West Beach boat harbour is routinely dredged year-round to remove sand and wrack to maintain navigability for recreational and emergency service use.
- Material dredged from the boat harbour is pumped via pipeline to a ‘Restriction Zone’.
- Maintenance dredging at West Beach boat harbour will not occur during the Phase II Dredge Trial Program.

2. Identified areas of rocky reef habitat

- The hatched area depicted in Figure 3 refers to seagrass identified by remote sensing (Clarke et al. 2021).
- Due to the methodological constraints of hyperspectral imagery in accurately identifying seagrass as opposed to rocks or wrack, the proposed placement area at Henley Beach South was surveyed by divers to verify the presence or absence of seagrass.
- The dive survey confirmed the presence of rocky reef habitat as opposed to a seagrass meadow.
- Accordingly, a small area of rocky reef habitat located within the proposed placement area at the most seaward edge has been excluded from the detailed placement area design.




DRAWN: JM
REVIEWED: TF
APPROVED: EW

**NEARSHORE BORROW AREA NBA3 (NORTH HAVEN)**
ISSUED FOR TENDER (01.04.2026)

Prepared by: bluecoast CONSULTING ENGINEERS
Prepared for: Government of South Australia, Department for Environment and Water

DWG No.: P24462_02
SHEET: 2 OF 5

NOTES:

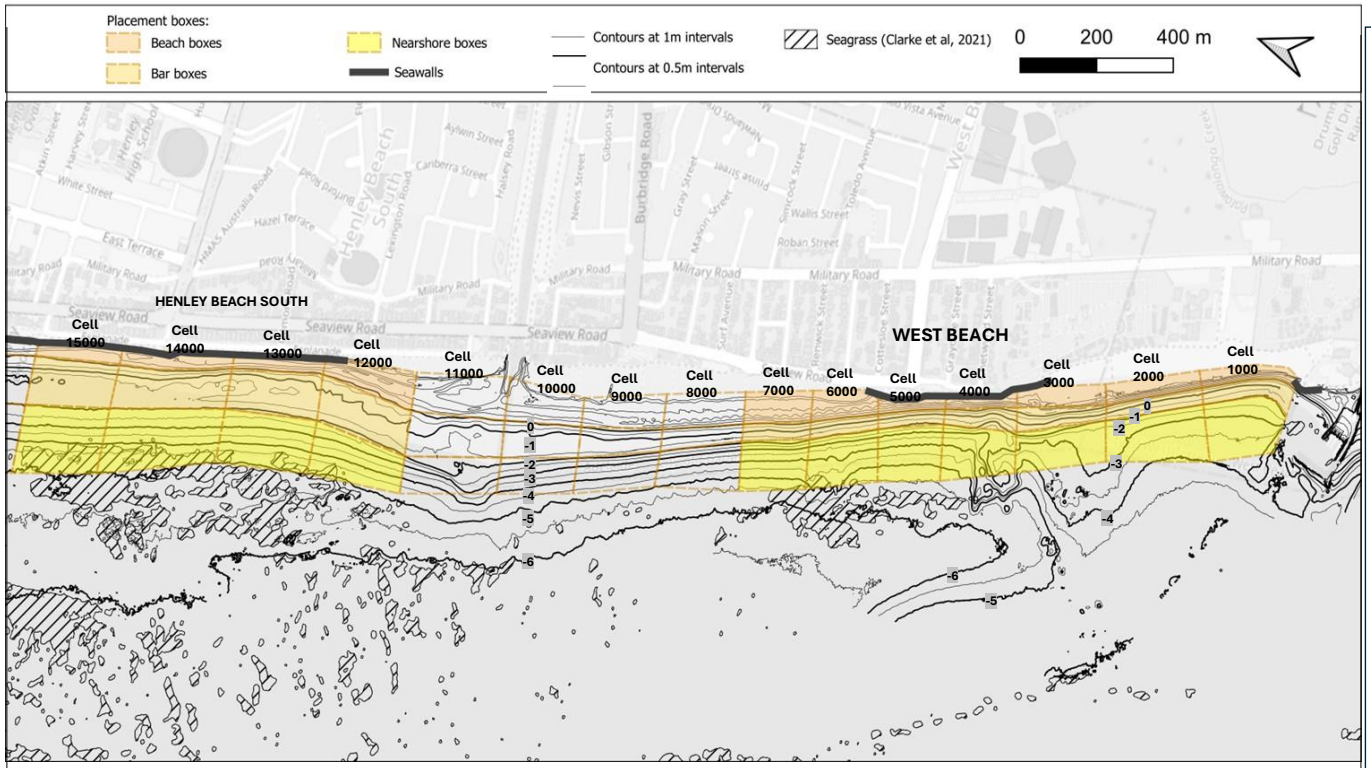
1. MULTIBEAM HYDROGRAPHIC SURVEY WITHIN THE BORROW AREA WAS CAPTURED IN JANUARY 2025 BY MARITIME CONSTRUCTION.
2. 1m CONTOURS SHOWN OUTSIDE THE BORROW AREA ARE DERIVED FROM THE DEM UNIFIED ADELAIDE MODEL (COMPLEATION OF VARIOUS SOURCES). APPROXIMATE ONLY.
3. ALL LEVELS AND CONTOURS SHOWN REFLECT SITE CONDITIONS AT THE TIME OF THE SURVEY.
4. SETOUT POINTS (SOPS) DEFINE THE BOUNDARY OF THE NEARSHORE BORROW AREA AND ARE PROVIDED IN THE TABLE BELOW.
5. BATTER SLOPES OUTSIDE THE BORROW AREA ARE PERMITTED.
6. AN APPROXIMATE SEDIMENT THICKNESS HAS BEEN INTERPRETED AS THE ABSOLUTE DIFFERENCE BETWEEN THE SURVEYED LEVELS AND AN ASSUMED BOTTOM OF SAND INTERFACE (TAKEN AS A DEPTH CONTOUR OF-4.9 M AHD). THE INTERFACE LEVEL WAS APPROXIMATED FROM THE PHYSICAL TESTING RESULTS (PHASE 1 DREDGE ZONE AND DIVER CORE IT HAS BEEN ASSUMED THAT THIS INTERFACE LEVEL IS UNIFORM ACROSS ALL THE BORROW AREA.
7. THE DIVER CORES "PENETRATION DEPTH" IS A VALUE REFLECTING THE SEDIMENT DEPTH (m) RECOVERED DURING THE MOST RECENT PHYSICAL TESTING AT EACH LOCATION.
8. MAX ALLOWABLE DREDGING DEPTH TO LEVEL-4.9 m AHD.
9. PERMISSIBLE DREDGING TOLERENCES ARE MAXIMUM OF -0.3m WITH A MEAN OVER THE AREAS DREDGED OF-0.2m.
10. THE AVERAGE MATERIAL PROPERTIES WITHIN NB3 ARE:
    - D50 = 0.11mm
    - Cu = 1.3,
    - Fines content = 8.5%
    - Gravel content = 0.6%.

    FOR MORE DETAIL REFER TO SECTION 4.3 OF THE NOURISHMENT FEASIBILITY ASSESSMENT REPORT (BLUECOAST, 2025)

LIST OF SOPS:

| ID | Latitude (WGS 84) | Longitude (WGS 84) |
|---|---|---|
| SOP 08 | -34.7961659 | 138.4820983 |
| SOP 09 | -34.7982531 | 138.4834524 |
| S0P 10 | -34.8044736 | 138.4854479 |
| SOP 11 | -34.8045246 | 138.4822918 |
| SOP 12 | -34.8023356 | 138.4825056 |
| SOP 13 | -34.8012768 | 138.4823732 |
| SOP 14 | -34.7977644 | 138.4802963 |
| SOP 15 | -34.7955653 | 138.4784331 |

*Figure 2: Nearshore Borrow Area NBA3*




| | | | |
|---|---|---|---|
| DRAWN: JM<br>REVIEWED: TF<br>APPROVED: EW | **NOURISHMENT SITE DESIGN (WEST BEACH AND HENLEY BEACH SOUTH)**<br>ISSUED FOR TENDER (01.04.2026) | Prepared by: bluecoast CONSULTING ENGINEERS<br>Prepared for: Government of South Australia Department for Environment and Water | DWG No.: P24462_04<br>SHEET: 4 OF 5 |

NOTES:

1. MULTIBEAM HYDROGRAPHIC SURVEY WITHIN THE SAND PLACEMENT AREA WAS COMPLETED BY HATCH IN APRIL 2025
2. ALL LEVELS AND CONTOURS SHOWN REFLECT SITE CONDITIONS AT THE TIME OF THE SURVEY ONLY.
3. CELL AND BOX LOCATIONS WILL BE PROVIDED TO CONTRACTOR
4. THE TERM CELL REFERS TO ALONGSHORE 'ZONES', EACH ZONE IS SEPERATED INTO THREE CROSS SHORE BOXES DENOTED AS BEACH, BAR AND NEARSHORE. THE NAMING CONVENTION SHOWN IN FIGURE 1 BELOW:

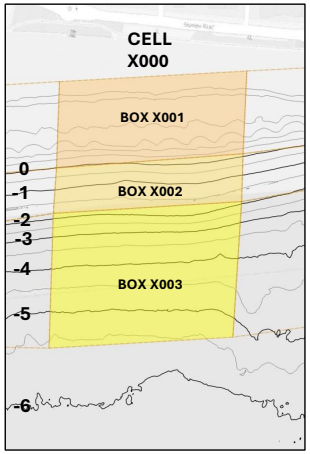



FIGURE 1: EXAMPLE OF CROSS SHORE BOX NAMING CONVENTION WHERE 'X' DENOTES ALONGSHORE CELL (i.e. Cell 1000)

*Figure 3: Sand Placement Area - Henley Beach South and West Beach.*

## 3.4 Volumes

A maximum volume of 90,000 $m^3$ is proposed to be relocated from NBA3 to the placement area at West Beach and Henley Beach South.

Final placed volumes will be confirmed through pre-dredging, progress and post-dredging surveys of borrow and placement areas. Estimated volumes will be recorded based on Split Hopper Barge loads for comparison and analysis throughout operations for tracking purposes.

## 3.5 Timing and duration

Dredging operations in Phase I of the ABMRI trial were undertaken between 3 October and 30 November 2024.

Phase II dredging operations are proposed to commence the week beginning 7 September and conclude by 30 September 2026. An extension to operate until 10 October 2026 may be sought, and will be subject to EPA review and assessment.

Dredging and placement activities will be undertaken on a 24/7 basis.

## 3.6 Dredging methodology

The project involves the collection, transport and placement of clean sand using dredging plant and equipment for the purpose of beach nourishment and coastal protection at West Beach and Henley Beach South.

### 3.6.1 Backhoe dredge and split hopper barge

For the ABMRI Phase II, a Backhoe Dredge (Figure 4) will be used to dredge NBA3 and load sand into split hopper barges. Backhoe dredging is a form of mechanical dredging, where sand is excavated from the seabed. The sand will be placed directly into adjacent split hopper barges (SHB). There are no pipeline requirements and no hopper overflow during loading or in transit to placement areas.

At the completion of loading the SHB, a tug vessel will be used to push/pull the SHB to the designated placement area. Once there, the SHB will split open, and sand will be placed directly on the seabed beneath the hull.

Two 760 $m^3$ SHBs will be used to maximise dredging volumes within the operational window - sand collection via dredging in one SHB will continue while the other SHB transits to and from the designated placement area at either West Beach or Henley Beach South.

Transit times are estimated to be between 4 to 5 hours. Each cycle consists of loading the SHB (~1 hour); transiting to sand placement area (1.5-2 hours); placing sand (<10 minutes); transiting back to the sand borrow area (1.5-2 hours).

Examples of SHB transit tracks from ABMRI Phase I are shown in Figure 5 and Figure 6 respectively.

The maximum number of trips to the placement areas within a 24 hour day is estimated to be six trips, equating to a maximum production rate of 3,500 $m^3$ to 4,400 $m^3$ per day, subject to weather and regulatory requirements.

Downtime associated with weather conditions, maintenance or other operational constraints is expected.

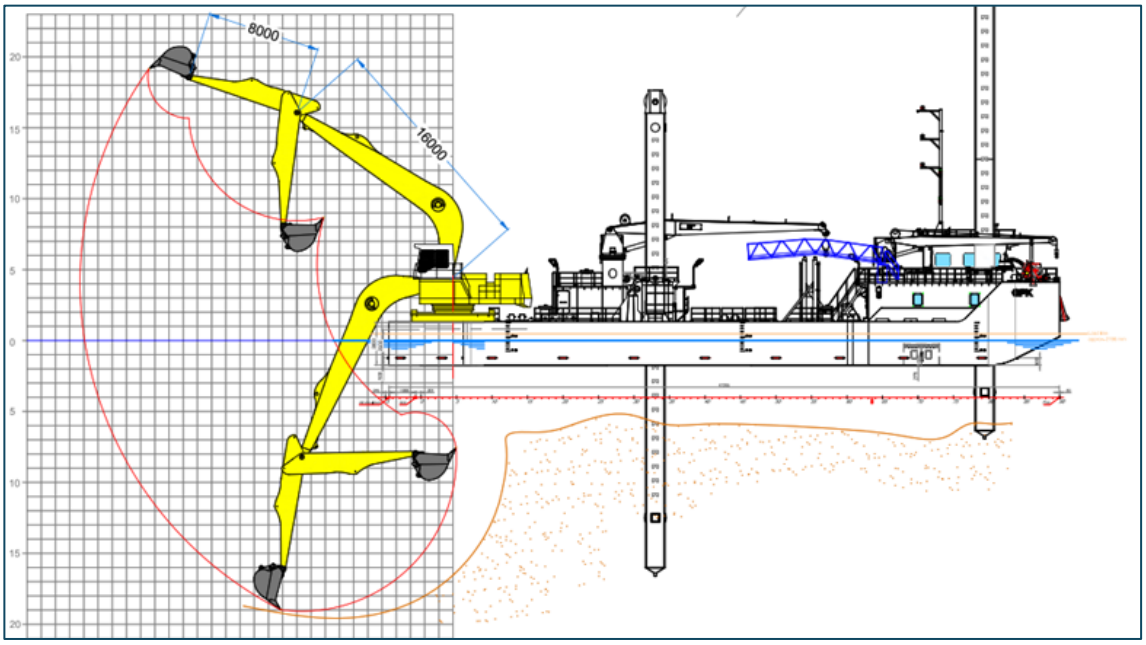



*Figure 4: General layout of backhoe dredge GPK*

*Figure 5: Split hopper barge transit routes - sand placement at West Beach (3–21 October 2024)*

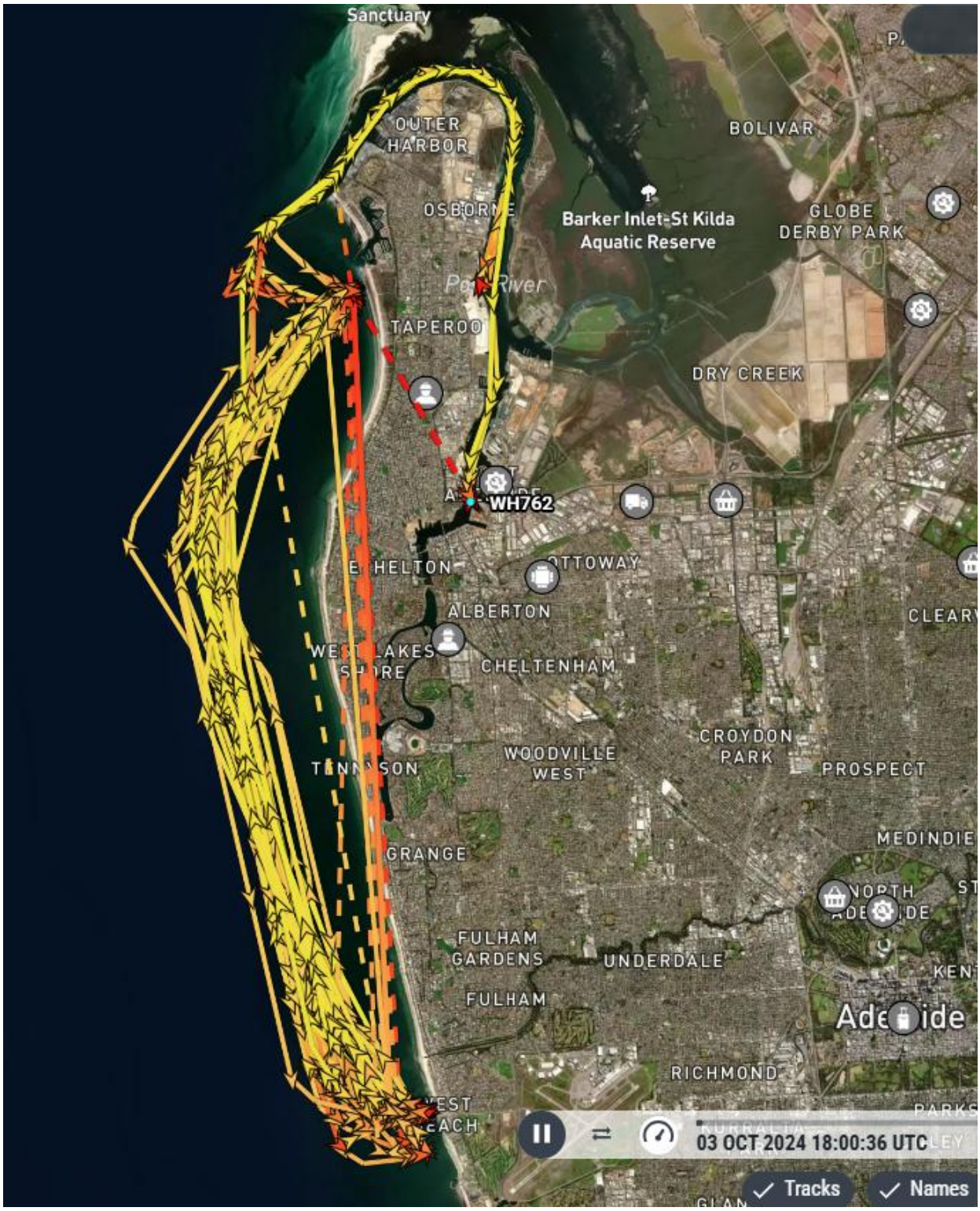



*Figure 6: Split hopper barge transit routes - North Haven (NBA3) to West Beach (3–21 October 2024)*

### 3.6.2 Cutter suction dredge and pipeline diffuser

The methodology includes provision for cutter suction dredge (CSD) rehandling of sand placed by direct seabed placement if weather permits.

CSD rehandling is proposed to be used when it is beneficial to distribute sand nourishment closer inshore than the SHB allows. Direct seabed placement using an SHB provides an efficient means of delivering bulk volumes of sand to West Beach and Henley Beach South, while CSD rehandling allows nourishment material to be moved into targeted placement zones with the diffuser for coast protection purposes.

Sand placed using both methods will be monitored to assess how placement depth, elevation and method influence sediment mobility, water quality parameters and beach response. Results will help inform design of future dredge programs.

CSD activity can occur concurrently with backhoe dredging at NBA3. The CSD would be located at either West Beach or Henley Beach South sand placement areas.

Once sufficient sand has been placed by SHBs into the nearshore boxes of allocated cells (Figure 3 / **Appendix A**), the CSD can collect this sand and pump into shallow subtidal areas closer to the beach via a short pipeline (either floating or located on seabed) and diffuser barge. This will include placement in the shallow Bar boxes (0 to -2m AHD) and only the seaward side of Beach boxes on high tides where Highest Astronomical tide is +1.44m AHD. The method of placing sand directly into shallow water using a pipeline and diffuser barge was successfully implemented during ABMRI Phase I. Sand was dredged from the West Beach Boat Harbour sand trap and pumped directly to the shallow West Beach placement areas via pipeline and diffuser barge, demonstrating the effectiveness of this placement methodology.

There will be no pipeline, civil plant or equipment on the beach during dredging operations. Temporary occupation of the beach may be required during mobilisation phases, to join pipeline lengths before transporting it to the water and connecting to the cutter suction dredge.

## 3.7 Dredge and marine plant

The proposed dredge and marine plant are summarized in Table 2 and illustrated in Figure 7.

Specification sheets for the main dredge and marine plant are provided in **Appendix B**.

*Table 2: Dredge and Marine Plant to be used during operations.*

| Name | Vessel Type | Dimensions / Specifications |
|---|---|---|
| GPK | Backhoe dredge | Length – 45.0m<br>Beam – 15.0m |
| WH761 | Split Hopper Barge | Length – 59.4m<br>Beam – 11.04m<br>Hopper Capacity – 760m$^3$ |
| WH762 | Split Hopper Barge | Length – 59.4m<br>Beam – 11.04m<br>Hopper Capacity – 760m$^3$ |
| Kythira | Tug vessel | Length – 26.0m<br>Beam – 8.0m |
| Lucinda | Tug vessel | Length – 23.8m<br>Beam – 7.5m |
| Ironheart | Cutter suction dredge | Length – 17.1m<br>Beam – 5.6m |
| Contour | Survey vessel | Length – 6.2m<br>Beam – 2.3m |
| Rapid | Survey vessel | Length – 6.2m<br>Beam – 2.4m |
| Kenny | Anchor Barge | Length – 9m<br>Beam – 3.8m |
| Lloyd | Workboat | Length – 7.61m<br>Beam – 2.3m |

*Figure 7: Images of dredge and marine plant*
*Left to right, top to bottom: BHD GPK, split hopper barges WH761 and WH762, Lucinda and Kythira tugs, CSD Ironheart, anchor barge Kenny, Contour and Rapid survey vessels*

# 3.8 Backhoe dredge

## 3.8.1 GPK

BHD GPK (Figure 4) is a De Donge built, mechanical dredger with a heavy-duty hydraulic Liebherr 9150 excavator mounted on a pontoon, best suited for dredging in shallow areas with little opportunity for maneuvering. The GPK can be fitted with multiple combinations of buckets, sticks and booms depending on the material to be excavated and the depth of the design. The pontoon features two spuds in a fixed position and one travel spud on a carriage used to reposition the pontoon.

The BHD is equipped with onboard ablution facilities. Sewage generated onboard is treated via an approved onboard sewage treatment plant that complies with MARPOL Annex IV requirements. The vessel holds a valid Statement of Compliance for Sewage Pollution Prevention until 9 October 2027. No untreated sewage will be discharged to the marine environment.

## 3.8.2 Environmental controls

The dredging equipment proposed for the project utilises several measures to firstly prevent hydrocarbons and / or other environmentally hazardous substances from entering the water or impacting on the marine environment.

The prevention measures include but are not limited to:

- Periodic documented preventative maintenance program.
- Replacement of high-risk hydraulic hoses after a predetermined time (machine hours), not after they have failed.
- A hydraulic hose register that records the details of every hose e.g., manufacturer, date of manufacture, date of installation, type, size, length, etc.
- Boom and dipper cylinders fitted with anti-burst valves which prevent loss of oil from the hydraulic ram should a hose fail.
- Use of Panolin HLP Synth 46 biodegradable hydraulic oil in GPK and hopper barge hydraulic systems.

All vessels used in the delivery of the project will have onboard a comprehensive stock of spill response items.

## 3.8.3 Sea state

Weather and sea state dictate the ability of a BHD to safely operate. Generally, this can be limited by a combination of wave height, swell direction and current. The combination of the BHD and barge can operate in sea conditions of between significant wave height (Hs) < 1.0-1.5m. Without a barge alongside the BHD, these parameters may increase if the bow of the dredge can safely be positioned into the prevailing swell and wind direction.

If the BHD pontoon has reached its limitations, the Superintendent or delegate will decide when the dredging will be terminated as per the De Donge operational manual requirements.

Daily sea-state information and forecasts will be made available to each of the project vessels, so the Masters can make their decisions, in consultation with the shore management team, relevant to the conditions.

### 3.8.4 Working principles

BHDs generally work backwards as this generates less spillage from the dredging operation than working forwards and is preferable in terms of productivity and efficiency (Figure 8). In some instances, if the existing water depth is less than the draft of the pontoon or when dredging is required alongside or near to a structure then forward dredging lets the BHD create its own channel. This will be required for shallow depth dredging at NBA3.

Dredging is carried out by removing all the material within reach of the excavator in a radius from the centre of the excavator. Cut depths and radius depend on material types to be dredged and the configuration of the excavator.

During excavation of material a split hopper barge (SHB) will be moored alongside the BHD. The excavator will load the material into barges until the required draft is attained. The 760m$^3$ hopper barges will then transport the material to the WB or HBS sand placement areas. Once a profile/cut has been completed the dredge will move to the next cut.

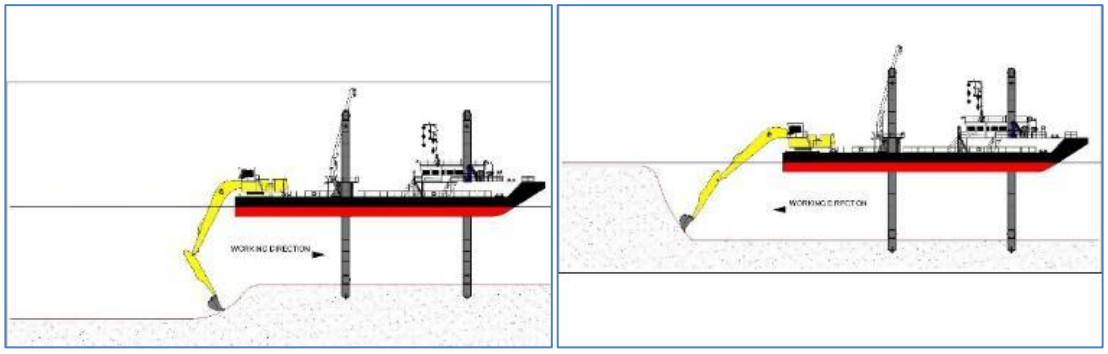



*Figure 8: Working Principles*

### 3.8.5 Repositioning the backhoe dredge

Backhoe dredges are held in positioned by three “spud” legs. The two aft (toward the rear or stern) spuds are fixed and operate up and down. The third forward spud travels backwards and forwards in a spud carriage, with a stroke of approximately 6m enabling the GPK to maneuver while it is dredging without assistance from tugs, anchors, cables or winches. The spuds are lowered to the seabed and hold the dredge in position for the dredging operation; they are controlled from the operator cab. Their movement is seen in real-time on the DipMate screens by the operator.

The maneuvering of the dredge with the spud legs is done only whilst dredging; for movements of further distances a tug is employed to relocate the dredge.

**Relocating BHD Non-Assisted**

The process for non-assisted repositioning (stepping) involves centring the excavator on the pontoon, lowering the bucket to the seabed, and placing the hydraulic controls in float mode. The forward spud is then lifted and traveled back to the start position and lowered. Once this has been done the two main spuds are lifted, the forward spud now pulls the dredge back approximately 6 m. The dredge is then centered, and the two main spuds are lowered. For normal dredging operations the two main spuds are raised first, the forward spud is then retracted in increments that suit the dredging sequence. The main spuds are then lowered, and dredging continues.

**Relocating BHD Assisted**

When the assisted relocation of the BHD is required, a tug will assist. The Tug Master and Superintendent will communicate the best arrangement for the towing and barge combination depending on relocation distance. The tug may hip-up or be connected via a tow line. The SHB may or may not be attached to the BHD during this process.

### 3.8.6 Configuration

The configuration of the excavators can be changed to suit different conditions and production requirements. It is not envisaged that the stick or boom will be changed for the project.

A change of configuration will only be undertaken when the increased productivity justifies the downtime required to make the change. All configuration changes will be carried out as per Heron's SOP–HSE-020 – Configuration Change.

### 3.8.7 Deck area

The dredges have a significant amount of deck space available to store spare buckets. The GPK is fitted with two service cranes, the largest has a capacity of 9T @ 15m, having this capacity allows the crew to change sticks and buckets without the assistance of land-based cranes.

### 3.8.8 Barge loading

The dredged material will be loaded in the SHBs moored alongside the BHD. The loading is controlled by the operator of the BHD who will communicate directly with the Master of the tug that has control of the SHB if required. These communications usually direct the shifting of the barge, the checking of draft marks, and letting go once it is full and are carried out via radio.

Once the SHB has been fully loaded, the mooring ropes will be released, and the tug will maneuver the barge out and will sail to the target SPA.

The barges operate under established safety procedures, including crew training, load management controls to prevent overloading, maintaining vessel stability, and measures to prevent material loss to the environment.

### 3.8.9 Barge changes

The coordination of SHBs and tugs will be at the discretion of the dredge operator. Barges returning from the WB and HBS sand placement areas will slow or hold off until contacted by the dredge. Once permission has been given the tug will push the barge over to the dredge. Approach will be controlled to enable deck crew to transfer lines and secure the barge. Positive radio communication is always maintained between the dredge, tug, and deck.

When the barge has been positioned and securely fastened, the BHD will start loading. Once a barge is confirmed loaded the dredge will wash down any spillage off the sides of the barge in the dredge area. The dredge operator will communicate with the tugs and instruct the crew to drop the lines and sail to the target SPA.

## 3.9 Split hopper barges

The project will use two non-propelled Split Hopper barges (SHBs), capable of carrying 760 $m^3$ of sand which will be unloaded at the WB or HBS SPAs. The barge is set up to be remotely started and stopped for the operation of the thrusters by the crew on the tugs. The Barges are fitted with Automatic Identification System (AIS), differential GPS and data loggers. These systems generate track plots for the barges and continuously record the time and position of vessels across the fleet.

*Figure 9: Split Hopper Barge*

### 3.9.1 Sea state

Tugs with a hipped-up barge can operate in sea conditions that are up to Hs < 1.0m. When the SHB is connected to a tug, the Tug Master is deemed responsible. Prior to commencing any voyage, the Tug

Master needs to adequately consider the conditions for sailing to and from the SPA prior to committing to the voyage. Checks to be completed may include but not be limited to:

- Assess sea state conditions through MetOcean and/or VTS weather reports. Check weather; swell, wave height and are conditions worsening or improving?
- Is there restricted visibility due to fog, rain or smog?
- Communicate the above information with the Superintendent and proposed action.
- Communicate with the incoming tug as to sea state in the SPA.
- Sea state is to be reassessed on approach to SPA.
- The Master is to log the communication process.

If the Tug Master considers that conditions are not suitable to safely move a barge to the SPA, he is to communicate with the Dredge Superintendent immediately. Under no circumstance is he to sail if there is doubt that the vessel can safely transit to the SPA and place the load.

### 3.9.2 Barge movements

Barges will be towed to and from the sand placement areas by tug. The preferred approach when manoeuvring alongside the dredge is for the tug to be "hipped up" to the bow of the barge and push it into position. This arrangement allows the tug to always remain connected to the barge, maintaining effective control during positioning and transfer operations.

All tugs will be fitted with heavy-duty towing winches to enable barges to be retrieved quickly and safely.

When a tug is hipped up to a barge, pre-set lines can be retrieved without the need for a crew member to board the split hopper barge (SHB) in most circumstances. This allows the SHB to be secured to the tug before personnel are required to board.

In the event of a broken line, mechanical failure, or other circumstance requiring a crew member to board an SHB, the relevant Standard Operating Procedure (SOP) will be followed at all times.

*Figure 10: Hipped up Configuration*

### 3.9.3 Split hopper barge bottom placement

Discharging sand in the sand placement areas will usually be done with the barges remaining hipped up (Figure 11). The tug will, prior to discharging the hopper barge, reduce speed, maintain Marine Mammal Observations and place the hopper load of sand in the required cell and box. The tug master will generally hold the barge into the weather and once positioned correctly will discharge the load, barge positional accuracy of +/-2m is achievable.

If material remains in the SHB after it has been discharged, the barge will be closed prior to leaving the area and returned to the dredge site. Depending on the size of the remaining material build-up, the excavator may be used to dislodge it within the hopper or the SHB simply reloaded, and the additional material used to drag the build-up out during the next discharge.

All barges will be fitted with low pressure flashing strobe lights to alert dredge operators if the barge is not properly closed.

*Figure 11: Nearshore sand placement by SHB at West Beach during 2024 Phase I dredge trial*

### 3.9.4 Barge tracking

The dredge, tugs and barges continuously record position in an x, y format. Tug and barge activities are monitored, and track plots are recorded during their transition to and from the SPAs.

Real time telemetry logging of the SHB's is undertaken, showing location and times of the barge of movements. In addition, barges are fitted with differential GPS and data logger systems, this provides track plots for the hopper barges and records the position, elevation, and time that the hopper barge opened and closed. This system is backed up to the cloud. Tugs and the dredge are equipped with AIS.

Print screens of the barge opening and placing its load are recorded prior to opening and once they have been closed, they also show the position of all previous placed loads. Figure 12 below shows the information provided on each screen print.

**Technical Information**

- **Disposal Software**: Reson PDS2000 Dumping Module Disposal Hardware:
  - Advantech ARK-2150L-S7A1E Computer
  - SNM940 Modem
  - Long Range WIFI
- **Positioning**: Trimble SPS855 GNSS RTK Receiver, with SPS555H Heading Receiver.

Using PDS 2000 software on board the tug, the master will be able to remotely see the actual position of the hopper barge to within an accuracy of 1m. When the master has the hopper barge in position, the open button on the Hopper Barge remote control will be activated. This will automatically prompt the PDS 2000 software to change its state to Open, and the digital terrain model (DTM) of the placement box will start updating to reflect the material being placed. Once the barge is fully closed the updating will stop. The position and the state of the barge (open/closed) will be logged, and time stamped in PDS 2000. Below in Figure 12 is a screen shot of a load being placed using PDS 2000.

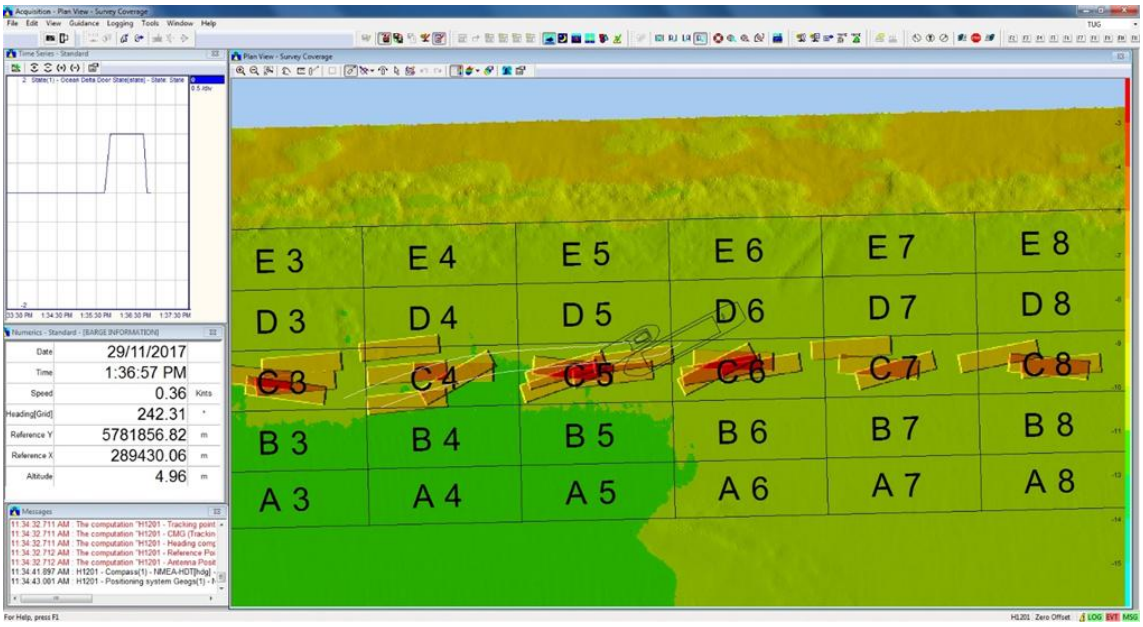



*Figure 12: Barge Print Screen*

## 3.9.5 Barge transit track plots

The split hopper barges will be fitted with Differential GPS and data logger systems, this provides track plots for the barges as it transits between the North Haven NBA3 and West Beach and Henley Beach South sand placement areas. Information is continuously logged and recorded on a web-based receiver. In addition to tracking the transit, the system also records and tracks the period that the barge is open, elevation and position.

Barges track plots are produced to show the exact movements as they transit between the nearshore borrow area and sand placement area as indicated in Figure 13. Each barge has a different colour track.

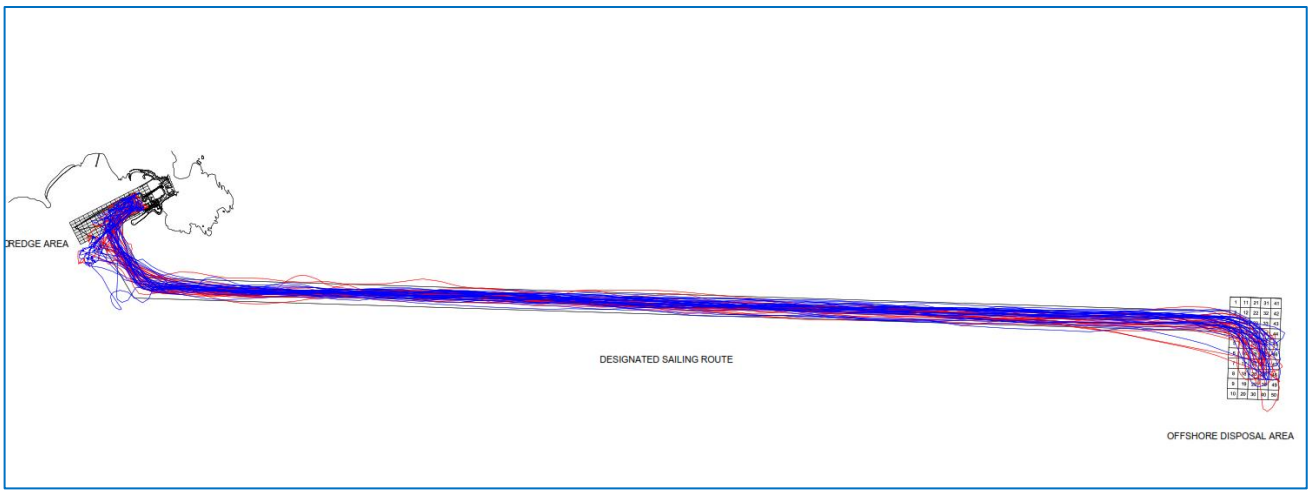



*Figure 13: Track Plots*

When the barge is open it also produces a track that show where it has been while open as shown in Figure 14.

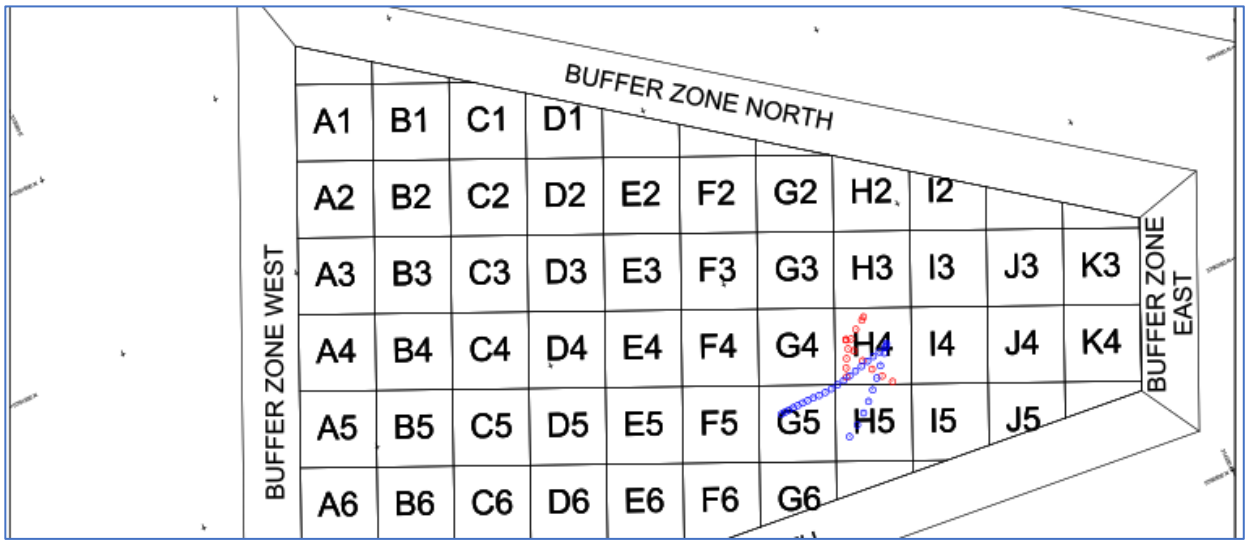



*Figure 14: Grid system and barge Open Tracks.*

# 3.10 Survey

The objective of the planned survey works is to provide accurate, high-resolution survey datasets that meets the standards required for dredge planning, execution, and post-dredge verification. All raw and processed data will be provided to DEW post-capture.

## 3.10.1 Nearshore borrow area (NBA3)

Survey works for the dredging sites are to follow the proposed frequency:

- Pre-Dredge Survey: within two (2) weeks prior to works starting;
- Progress surveys: every two-weeks;
- Post-Dredge Surveys: within two (2) days following completion of all dredging works.

Surveys are to encompass the entire extent of the nominated nearshore borrow area (NBA3) and extend 200m (where practical) beyond the site boundaries. The survey data will be used to derive volume statistics to verify quantities of nourishment material.

## 3.10.2 Sand placement areas

Pre- and post-dredging and sand placement surveys will be undertaken. The Contractor may also undertake progress surveys to gauge operational efficiencies and ensure operational safety.

## 3.10.3 Methodology

A Multibeam Echosounder (MBES) system fitted to shallow draft survey vessels will be used at NBA3 and to capture bathymetry at the 'Nearshore' and 'Bar' boxes in the placement areas at both West Beach and Henley Beach South. Optimal high tides will be used to capture this data. Terrestrial survey using RTK GNSS techniques will be required on corresponding low tides to cover the remainder of the 'Bar' and 'Beach' boxes not accessible by vessel (refer Figure 15).

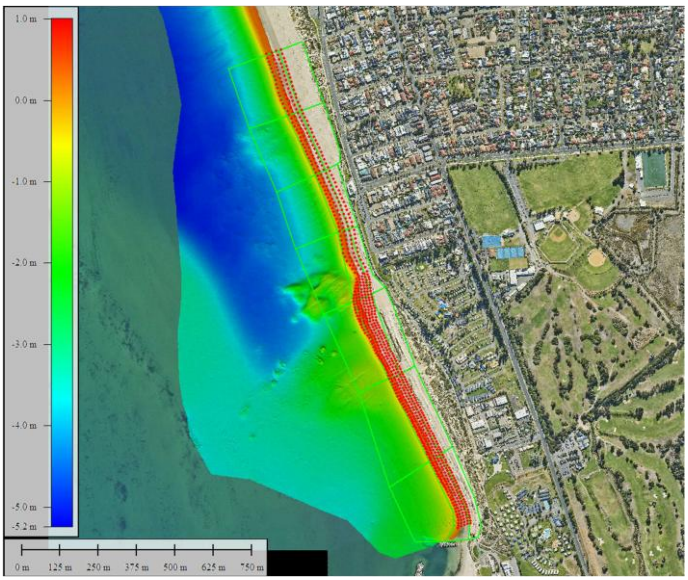



*Figure 15: West Beach survey methodology – MBES and RTK GNSS (red points)*

# 4 Existing environment

## 4.1 Environmental values

### 4.1.1 Benthic habitat and seagrass

Seagrass ecosystems of Gulf St Vincent and the Adelaide metropolitan coastline are dominated by long-lived genera such as *Posidonia* and *Amphibolis*, which form extensive, persistent beds across soft-sediments, supporting high biodiversity and ecosystem function (Clarke *et al.,* 2021, Environment SA, 2023). Across South Australia, seagrasses cover approximately 9,600 km² and include 11 species with 6 main species dominating the Adelaide metropolitan coastline, providing critical habitat for many species (Environment SA, 2023, Department for Environment and Water, 2023).

Historically, extensive seagrass meadows are believed to have occupied much of the shallow subtidal zone of the Adelaide metropolitan coastline. Naturally occurring unvegetated sandy corridors exist in 'active' areas where the sediment is perpetually mobilised by wave action, currents and tides, limiting establishment of persistent seagrass meadows (Figure 16: Seagrass mapping based on coarse-scale hyperspectral imagery.

Extensive field investigations have occurred along the Adelaide Metropolitan coast to support Adelaide Beach Management since 2024. In June 2026, additional sediment cores and benthic observations were undertaken across the borrow area (NBA3) and placement sites (Henley Beach South and West Beach).

Following these investigations, a separate dive survey was undertaken at Henley Beach South and confirmed the target placement areas comprise largely unconsolidated bare sand, with a small section of outcrop reef located in the proposed Henley Beach South placement area (Bluecoast 2026, Swash 2026). This area has been excluded from the placement design.

Further detail on seagrass habitats are provided in **Appendix D – Seagrass Monitoring Plan.**

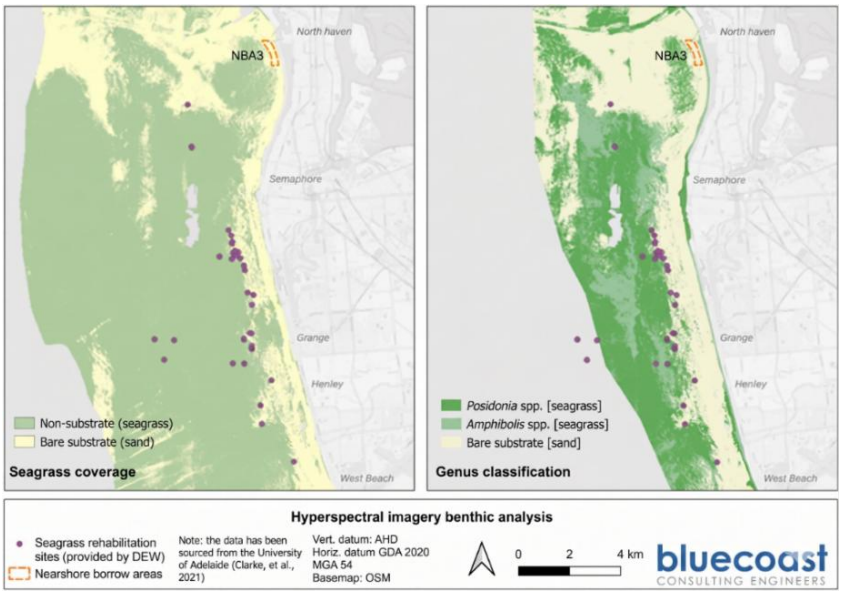


*Figure 16: Seagrass mapping based on coarse-scale hyperspectral imagery.*

## 4.2 Marine fauna

The Project Area is within a mapped distribution of threatened and migratory marine species, however there are few records of these species in close proximity. The NBA is not considered to provide significant habitat for marine fauna, however key species may traverse the Project Area.

The Australian sea lion, Long-nosed fur seals and Indo-pacific bottlenose dolphins are considered frequent visitors and will likely be present in close proximity to the Project Area.

The Great White Shark frequents areas in and around Pinniped colonies (e.g. Fur Seal and Sea Lions at the Neptune Islands), areas of the Great Australian Bight, and regions with high prey densities. The Australian Sea Lion may visit the Project Area, however, more suitable habitat for this species can be found to the north of the Project Area. A haul-out site for this species exists at the Outer Harbour breakwater in Port River, approximately 2 km north of the Project Area. This aggregation is not considered to be large enough to attract resident Great White Sharks.

The Green Turtle rarely visits southern Australia and there is no known critical habitat or breeding grounds within the region. Similarly, the Leatherback Turtle is more commonly found in the northern half of Australia. There are no records of the Leatherback Turtle nesting in SA.

The Southern Right Whale is seasonally present along the Australian coast between late April and early November. There are no known current or historical aggregation areas within Gulf St Vincent and it is not part of the species' migration path. Visitation to Gulf St Vincent and the vicinity of the Project Area by an individual whale or whale pairs (i.e. mother/calf) is possible.

Syngnathids (including seadragons, seahorses and pipefish) are protected as Listed Marine Species under the EPBC Act and are commonly associated with seagrass habitats in Gulf St Vincent. Persistent syngnathid populations are unlikely to occur within the NBA, which is predominantly characterised by unvegetated sandy habitat. However, individual syngnathids may occasionally occur within the area, including in association with drifting seagrass wrack, macroalgae or other floating debris.

Marine parks are established under the *Marine Parks Act 2007* and aquatic reserves are declared under the *Fisheries Management Act 2007*. The Project Area does not intersect with any marine parks, aquatic reserves or other protected areas.

The Adelaide Dolphin Sanctuary (ADS) is the nearest marine protected area adjacent to the Project Area (Error! Reference source not found.). The ADS occupies the eastern shoreline of Gulf St Vincent and e xtends across the Port River estuary, Port Adelaide and northwards to St Kilda. Established in 2005, the sanctuary was created to protect a resident population of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) and the habitat on which they depend.

The Adelaide Dolphin Sanctuary supports significant conservation, educational and recreational values and is a focus for wildlife observation and tourism activities. Dolphins within the sanctuary are protected under both the *National Parks and Wildlife Act 1972* and the *Adelaide Dolphin Sanctuary Act 2005*.

*Figure 17: Adelaide Dolphin Sanctuary*

## 4.3 Cultural heritage

All shipwrecks older than 75 years are protected in South Australia. Recorded shipwrecks in the Project Area between North Haven and Semaphore South are listed in Table 3. Shipwreck locations will be noted and avoided during operational activities.

*Table 3: Recorded shipwrecks in proximity to the operational areas.*

| Shipwreck | Year Lost | Area | Latitude | Longitude |
|---|---|---|---|---|
| Lottie | 1932 | North Haven | -34.8003 | 138.486 |
| Young Foster | 1919 | Taperoo | -34.807 | 138.4847 |
| Buck | 1920 | Taperoo | -34.8076 | 138.4852 |
| Little Orient | 1883 | Largs North | -34.8153 | 138.4875 |
| Amy | 1890 | Largs North | -34.8195 | 138.4847 |
| Jane Flaxman | 1850 | Semaphore | -34.8387 | 138.478 |
| Elizabeth | 1871 | Semaphore South | -34.8487 | 138.468 |
| Trucanini | 1923 | Semaphore South | -34.8552 | 138.4755 |

## 4.4 Social and recreational values

The Project Area is located adjacent to metropolitan Adelaide, with sensitive receivers such as residential homes, education facilities and caravan parks nearby. The Noise Management Plan (**Appendix E**) outlines noise nuisance associated with the safe delivery of works. Management actions are provided in Table 12.

The Adelaide metropolitan coastline offers significant recreational value to beach users and recreational fishing and boating communities. There are numerous local surf life-saving and sailing clubs that frequently use this coastline. As the sand borrow and placement areas are in the nearshore marine environment, the presence of recreational swimmers, fishers and boaters is likely during project activities.

The comprehensive Stakeholder Engagement Plan (SEP) outlines the communication of program activities to affected stakeholders (**Appendix F**).

## 4.5 Coastal processes

### 4.5.1 Waves

The Project Area is located within the relatively low-energy environment of Gulf St Vincent, where wave conditions are dominated by locally generated south-westerly sea waves and attenuated ocean swell due to the sheltering effect of Kangaroo Island (Bluecoast, 2025).

Nearshore wave roses for total, swell (swell waves, Tp >8s) and sea (local sea, Tp <8s) are provided in Figure 18.

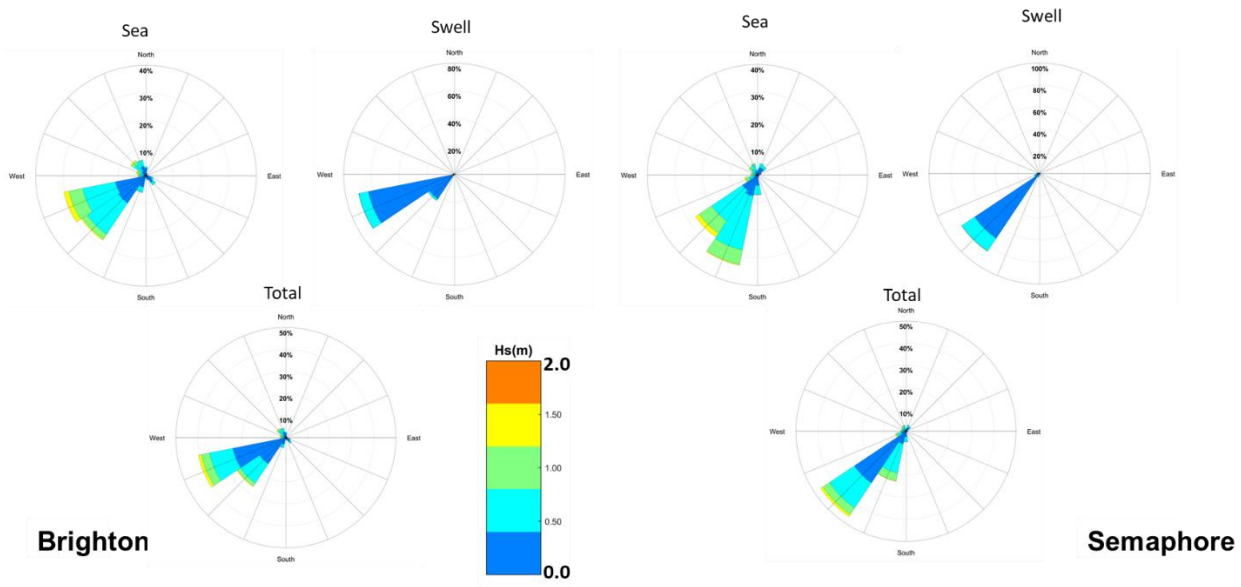



*Figure 18: Total, swell and sea wave height and direction roses at Brighton (left) and Semaphore (right) (Bluecoast, 2025)*

## 4.5.2 Wind and currents

The predominant winds along the Adelaide coastline are southerly, although there are occasional strong north-westerly winds. The direction of wind-driven waves and coastal processes vary from year to year, but the dominant southerly winds lead to a net drift of sand in a northerly direction along the metropolitan coast. The waves generated by these winds are low to medium energy waves. These waves strike the metropolitan coast at an oblique angle and induce a coastal process known as littoral transport.

The Adelaide metropolitan coastline experiences relatively low tidal currents, which reverse direction with the flood and ebb tides in Gulf St Vincent. Moderate tidal currents occur within the Outer Harbour entrance and Port River due to constricted flow conditions.

## 4.5.3 Tides

Tides within Gulf St Vincent are semi-diurnal with two high and two low tides per 24 hour period, but not always at equal levels (BOM 2024). A few times per year the water level is almost constant for several days, known as a ‘dodge’ tide.

Tidal ranges go from 0 to 3m depending on diurnal pattern and regional conditions.

| | Heights above Chart Datum | | | Chart Datum | | High Water Full & Change |
|---|---|---|---|---|---|---|
| | LAT | ISLW | Predict. Datum | Local Datum | AHD | |
| Ports | m | m | m | m | m | H : m |
| OUTER HARBOR | 0.08 | -0.05 | 0.0 | 30.995 | -1.45 | 04 : 48 |

*Figure 19: South Australian standard and secondary ports (DPTI 2020 Tide Tables, pg. 133)*

## 4.6 Sediment

In accordance with the South Australian EPA's dredging assessment framework and the *National Assessment Guidelines for Dredging* (NAGD), sediment suitability testing has been undertaken to characterise the physical and chemical properties of material within the proposed borrow area. Investigations have focused on confirming the suitability of the sediment for beach renourishment through analysis of grain size distribution, sediment composition and contaminant concentrations.

While the NAGD generally considers sediment quality data collected within the previous five years to be suitable for assessment purposes where environmental conditions and contaminant sources remain unchanged, the proposed borrow area has been subject to a substantially more extensive investigation program. Since early 2024, DEW has undertaken multiple sediment sampling and testing campaigns across the borrow area (Figure 20), providing a robust and contemporary dataset to characterise the sediment resource outlined in Table 5.

In addition to the sampling event complete in October 2025, additional baseline sediment sampling and laboratory analysis was undertaken across North Haven, West Beach and Henley Beach South in June 2026. The 2026 NBA3, Henley Beach South and West Beach Sediment Sampling Data is provided in **Appendix H**.

The sampling and analysis program included sediment chemistry screening consistent with the National Assessment Guidelines for Dredging (NAGD), physical sediment characterisation, benthic observations, and additional laboratory analyses relevant to acid sulfate soils, reduced sulfur species and potential hydrogen sulfide ($H_2S$) generation.

The additional baseline sampling and analysis confirmed that:

- the sampled sediments are generally sandy marine sediments
- physical characteristics vary between North Haven, West Beach and Henley South sample locations
- conventional contaminants were low or non-detectable
- results are generally consistent with previous baseline sediment characterization
- Assessment of reduced inorganic sulfur showed generally low AVS and CRS concentrations across the sampled sites. AVS ranged from <0.5 to 2µmol/g dry weight, and CRS ranged from <0.005 to 0.08%S demonstrating that the sampled sediments are generally alkaline (Bluecoast 2026).

The results provide the basis for assessing potential environmental risks associated with dredging and subsequent sand placement, while demonstrating compliance with relevant state and national dredging guidelines and providing a high level of confidence in the suitability of the material for beach renourishment. The findings build upon the extensive investigations documented in the report, *Sand Management Using Dredgers – Sand Sourcing and Other Feasibility Assessments Report – ABMRI* which assessed the suitability of the proposed borrow area as a sand source for metropolitan beach nourishment (Bluecoast, May 2025).

The investigations confirmed that there is sufficient sand of suitable quality to support Adelaide Beach Management program requirements. A summary of sand source investigations undertaken to date is presented in Table 4.

*Table 4: Summary of sediment sampling since 2024 to support the Adelaide Beach Management Review and Implementation.*

| Date | Type | Outcome |
|---|---|---|
| **Mar-Aug 2024** | Diver coring, sediment sampling and laboratory analysis (JBS&G) | Identified potential long-term sand sources offshore of Largs Bay and between North Haven and Point Malcolm. Provided sediment characteristics to support the 2024 dredge trial and future investigations. |
| **Oct-Nov 2024** | Grab sampling (Bluecoast) | Undertook an initial screening of potential sand source areas from Point Malcolm to Henley Beach and offshore of Largs Bay. Identified areas suitable for more detailed investigation. |
| **Jan 2025** | Benthic habitat observations (DEW) | Confirmed seabed habitat characteristics, including seagrass species and coverage. Supported assessment of habitat suitability and viability of potential sand harvest areas. |
| **Jan-Feb 2025** | MBES, backscatter and sub-bottom profiling surveys (Revelare & Flinders Ports) | Collected high-resolution bathymetry and sediment thickness data within investigation areas to improve understanding of potential sand resources. |
| **Feb 2025** | Vibrocoring, diver coring and sediment analysis (Bluecoast, Seas Offshore, Maritime Constructions & East West Dive & Salvage) | Confirmed sand thicknesses and sediment properties at extraction depths. Identified suitable sand borrow areas for beach nourishment and refined investigation areas where suitable sand was not initially found. |
| **October 2025** | Sediment data and benthic observations at the North Haven borrow area (SBA1 from 2024) and the West Beach placement areas (Bluecoast, East West Dive and Salvage). | Confirmed natural infilling and suitable sediment conditions. This includes sediment physical and chemical analysis, inorganic sulfur (AVS and CRS) levels from core samples and visual assessment of seagrass wrack. |
| **June 2026** | Sediment sampling at North Haven, West Beach and Henley Beach South (Bluecoast and East West Dive and Salvage). | Confirmed areas of interest remain generally consistent with previous baseline sediment characterisation. This includes sediment physical and chemical analysis, inorganic sulfur (AVS and CRS) levels from core samples and visual assessment of benthic environment. |

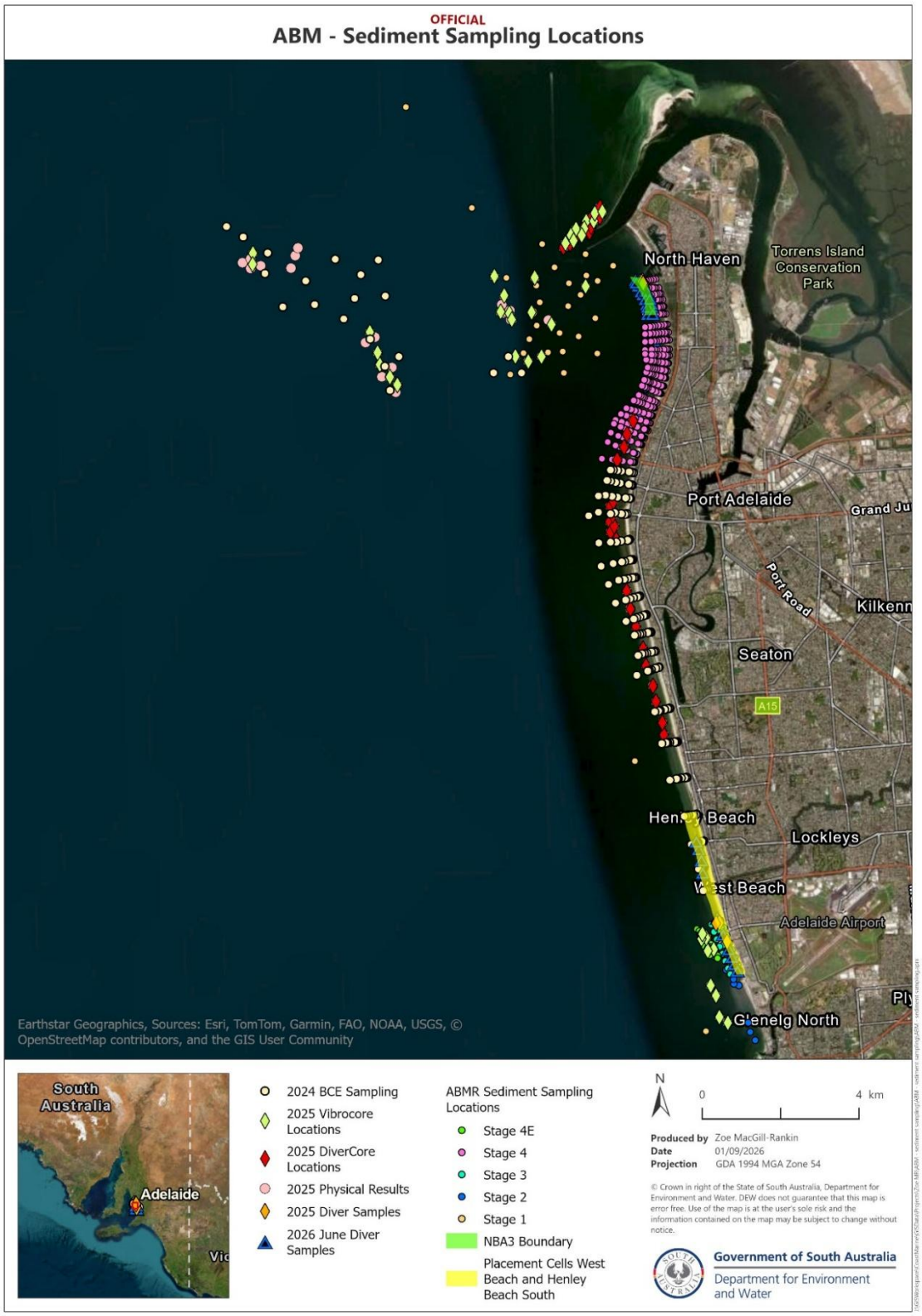



*Figure 20: Map of sediment sampling locations to support Adelaide Beach Management since 2024.*

*Table 5: Quality of sand in borrow and placement areas.*

| Type | Parameter | NBA3 |
|---|---|---|
| **Quantity*** | Average sand thickness: | >2.5m |
| | Size of borrow area: | 245,000m$^2$ |
| | Available sand volume: | >650,000m$^3$ |
| **Quality (physical)**** | No. of samples:<br>D50:<br>Cu (uniform coefficient)<br>Fines:<br>Gravels: | 16<br>0.10 mm<br>1.9<br>11%<br><1% |
| **Quality (geo-chemical)**** | Metals and metalloids:<br>(Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Vanadium, Zinc) | ✓ (Pass) |
| | BTEXN & TRH<br>(Benzene, Toluene, Ethylbenzene, Xylene (total) and C6-C10) | ✓ (Pass) |
| | Organochlorine, PCBs, PAH, Organotin<br>(4,4-DDE, gamma - BHC, Dieldrin, Cis-chlordane, Trans-chlordane, 4,4-DDT, 4,4-DDD, Endrin, Heptachlor epoxide, Total PCBs, Tributyltin as Sn and Benzo(a)pyrene) | ✓ (Pass) |
| | Reduced inorganic sulfur: Acid Volatile Sulfide (AVS) and Chromium Reducible Sulfur (CRS) | ✓ (Pass) |
| | **Sand is clean and uncontaminated as confirmed by testing in accordance with NAGD guidelines.** | |

*Source: Bluecoast 2025* and 2026**.*

## 4.7 Environmental risks and management

The key environmental risks associated with this dredge program relate to impacts to marine water quality and marine ecology. The potential nuisance caused through noise are also considered in this section.

Potential impacts to the marine environment could be a result of:

- Prolonged and significantly increased turbidity during dredging or placement operations.
- Interactions of wildlife with marine equipment.
- Result of accidents such as collisions and oil spills.
- Introduction of marine pests.
- Direct removal of seagrass through mooring and anchoring.

This could lead to a:

- Loss of habitat (e.g. seagrass habitats)
- Impact on marine biodiversity (covered under various legislation including to Matters of National Environmental Significance (MNES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within and surrounding the Project Area).

Other potential impacts related to the dredging operations relate to social impacts such as:

- Nuisance noise from dredging negatively impacting amenity.
- Reduced visual amenity with presence of dredge and barge equipment.
- Reduced visual amenity from potential temporary water quality impacts.
- Reduced recreational values such as swimming opportunities.

South Australia has experienced several significant Harmful Algal Bloom (HAB) events recently, affecting the Spencer Gulf, Gulf St Vincent, Kangaroo Island and parts of the state's south-east coastline. HAB taxa of concern include (but are not limited to) the genera *Karenia, Chattonella, Alexandrium, Dinophysis, Pseudo-nitzschia, Gymnodinium, Prorocentrum, Karlodinium, Akashiwo, Trichodesmium* and *Vicicitus*.

Blooms of one or more of these can result in widespread impacts to marine ecosystems. The South Australian government continues to implement a monitoring comprising 166 routine sampling sites across seven regions in South Australia. The aim of the program is to deliver early detection, situational awareness, post-bloom vigilance, and risk-proportionate response across South Australia. This risk is also considered in the water quality monitoring program.

## 4.8 Water quality

Impact analysis and risk management related to water quality parameters are outlines in the following tables.

*Table 6: Water quality - Turbidity impact analysis and risk management*

| **Water quality - Turbidity** | |
|---|---|
| Applicability | Activities that could potentially result in elevated turbidity or plumes include:<br>• Removal of sediment at the Nearshore Borrow Area (NBA) at North Haven (NBA3).<br>• Overflow of water containing fine sediment when filling the barge or loss during transit from NBA3 to the placement areas (PAs).<br>• Placement activities using the Split Hopper Barge (SHB) or Cutter Suction Dredge (CSD) diffuser in the nearshore.<br>• Resuspension of fine materials that have been placed during stormy weather. |
| Potential impacts | Potential impacts include:<br>• Smothering of benthic habitat by settling of suspended sediment.<br>• Reduced light availability for seagrass habitats if plumes persist.<br>• Seagrass loss associated with smothering and reduced light.<br>• Loss of visual amenity.<br>• Loss of recreational values.<br>• Impacts to South Australian Research and Development Institute's (SARDI) operations and any associated facilities. |
| Desired outcomes | The main environmental outcome includes:<br>• Dredging operations are undertaken in a manner that avoid or minimise impacts to the marine environment and to the community.<br>The performance measures which demonstrate that this outcome has been achieved include:<br>• Turbidity measurements at NBA3 and West Beach and Henley Beach South placement areas are consistent with established baseline conditions.<br>• Community complaints are addressed and managed in a timely manner.<br>• South Australian Research and Development Institute's (SARDI) operations and any associated facilities are not negatively impacted. |
| Risk analysis | Potential risks include:<br>• Smothering of benthic habitats and seagrass in close proximity to borrow and placement area due to suspended sediment, or direct placement of sand on sensitive benthic habitats.<br>• Placement area is used recreationally.<br>• Impacts to South Australian Research and Development Institute's (SARDI) and associated facilities.<br>Risk profile based on EPA risk category guidance is assessed as High. |

| **Water quality - Turbidity** | |
|---|---|
| Controls | The following controls will be implemented to minimise the risk of environmental impact:<br>• Hindcast plume modelling will inform dredge program design to ensure sensitive seagrass meadows in the proximity of sand borrow and placement areas will not be affected by turbidity.<br>• Sensitive benthic habitats such as reefs will be excluded from placement area design.<br>• A suitably qualified, experienced and licenced contractor will deliver the works in accordance with the approved Dredge Management Plan (DMP).<br>• Comprehensive environmental monitoring plans for seagrass and water quality will be developed and implemented to mitigate risk and detect impacts.<br>• ALARM and HOLD triggers for water quality parameters exceeding baseline levels will be enforced. |
| Monitoring | Turbidity will be monitored at 8 surface monitoring sites throughout the dredge program located in proximity to seagrass, nearshore borrow areas and sand placement areas, along with background sites.<br>Turbidity is measured by optical scatter via a nephelometer producing readings in Nephelometric Turbidity Units (NTU). Turbidity at the surface monitoring sites will be measured using twin turbidity sensors for quality control purposes. Turbidity measures represent suspended sediments within the water column.<br>An adaptive management program using varying turbidity trigger levels will be implemented during the dredge trial as follows:<br>• ALARM Level (implement adaptive management measures):<br>  ○ 3.2 NTU based on a 15 day rolling median<br>  ○ 6.2 NTU based on a 6 day rolling median<br>• HOLD trigger (result in a stop work order until turbidity levels return to background or approval to recommence is received from EPA:<br>  ○ 6.2 NTU based on a 15 day rolling median<br>  ○ 16.2 NTU based on a 6 day median rolling median<br>In addition to live turbidity data from water quality monitoring buoys, high resolution and low-resolution satellite imagery will be captured and analysed on every fly over (likely 2 – 3 days) to provide satellite inferred turbidity imagery. |
| Management actions | Monitoring of turbidity levels via a real-time water quality monitoring dashboard will occur throughout the dredge program. Access will be provided to the EPA and any other relevant stakeholders upon commencement of the program.<br>If ALARM triggers are reached, the dredge operator will modify activities. If the trigger is reached at the North Haven dredge site, then management measures will focus on altering dredging activities. Conversely, if the trigger is reached at the placement site, then management measures will focus on altering placement activities. Management measures will be dependent on the situation and may involve the following:<br>• Slowing or pausing activities. |

| Water quality - Turbidity | |
|---|---|
| | • Moving to the other placement area (e.g. West Beach or Henley Beach) depending on which water quality buoy has been triggered.<br>• Dredge only during incoming tides.<br>• Proactive maintenance downtime.<br>If HOLD triggers are exceeded:<br>• Dredging activities will cease as soon as practicable if exceedance is at the dredging site, or placement activities as soon as practicable if the trigger is at placement site.<br>• An assessment will be undertaken in consultation with the EPA to determine whether background turbidity is a significant influence on turbidity exceedances.<br>• If the HOLD trigger is reached at the North Haven dredge site only, then placement activities can continue at West Beach/Henley Beach. Conversely, if the HOLD trigger is reached at the placement site only, then dredging activities can continue at North Haven.<br>• Dredging or placement after any Alarm or Hold warnings will only recommence after clearance is provided by the EPA during business hours Monday to Friday. Outside of these times, the contractor will work to the WQMP and when triggers have decreased to an acceptable level will recommence works.<br>• Detailed planning and design of dredging operations will consider SARDI's operational requirement and those of any associated facilities. To minimise potential impacts, sand placement operations will commence at Henley Beach South, with ongoing review of placement locations and operational timing based on water quality monitoring results and consultation with SARDI. |
| Reporting | Reporting will comprise the following:<br>• 'Alarm' and 'Hold' trigger alerts will be reported immediately to the dredge contractor, DEW and EPA via automatic Eagle.io alerts.<br>Swash will follow up with DEW and contractor staff on any alerts to make sure they were received.<br>• Weekly summary reports of dredging activities provided to DEW.<br>• For satellite image analysis, a weekly technical note will be prepared covering the previous seven-day period. This will include details of the processed satellite imagery, dredging and sand placement activities at the times satellite images were captured and the metocean conditions. Including a discussion of any plumes identified. All suitable and available satellite imagery will be assessed and included in weekly interpretation. The technical note will also include a validation metric comparing satellite-inferred turbidity with data collected at the water quality monitoring stations. |

| **Water quality - Turbidity** | |
|---|---|
| | • Weekly technical note is to include a summary of dredge activity timing, volumes collected and placed for the week prior. The technical note will be submitted to the EPA by close of business on Monday the following week.<br>• A final water quality monitoring report will be provided to DEW and EPA following cessation of the dredging operations and monitoring period. This report will be provided 4 weeks post program and include raw data, summary of data, any exceedances (causes and adaptive management action if required) and general discussion on water quality impacts with respect to the dredging and sand placement activities undertaken. |

*Table 7: Water quality - DO, pH and contaminants impact analysis and risk management.*

| **Water quality - DO, pH and contaminants** | |
|---|---|
| Applicability | Activities that could potentially result in changes in water quality (DO, pH or contaminants) include:<br>• Removal of sediment at the borrow area at North Haven (NBA3).<br>• Overflow of water containing fine sediment when filling the barge or loss during transit from NBA3 to the PAs.<br>• Placement activities using the Split Hopper Barge (SHB) or Cutter Suction Dredge (CSD) diffuser in the nearshore.<br>• Resuspension of fine materials that have been placed during stormy weather. |
| Potential impacts | Potential impacts include:<br>• A decline in water quality associated with reduced oxygen, acidity and/or increased contaminants.<br>• Stress or mortality of aquatic flora and fauna<br>• Impacts to recreational and commercial fishing.<br>• Impacts to recreational and amenity values.<br>• Impacts to human health.<br>• Impacts to South Australian Research and Development Institute's (SARDI) operations or any associated facilities. |
| Desired outcomes | The main environmental outcome includes:<br>• Dredging operations are undertaken in a manner that avoid or minimise impacts to the marine environment and to the community.<br>The performance measures which demonstrate that this outcome has been achieved include:<br>• Water quality measurements and grab samples at NBA3 and West Beach and Henley Beach South placement areas are consistent with established baseline.<br>• Community complaints are addressed and managed in a timely manner.<br>• SARDI's operations or any associated facilities are not negatively impacted. |

| **Water quality - DO, pH and contaminants** | |
|---|---|
| Risk analysis | Potential risks include:<br>• Material to be dredged is classified as fine to coarse sand.<br>• Seagrass meadows are located in close proximity to borrow and placement areas.<br>• Target maximum volume of sand to be dredged from NBA3 and placed in the PAs is 90,000 $m^3$.<br>• Nearshore ocean disposal.<br>• Activity area has frequent recreational use.<br>Risk profile based on EPA risk category guidance is assessed as High. |
| Controls | The following operational controls will be implemented to minimise the risk of environmental impact:<br>• A suitably qualified and experienced contractor will deliver the works in accordance with the approved DMP.<br>• Environmental Monitoring Plans are developed and implemented to mitigate risks and detect impacts.<br>• ALARM and HOLD triggers for water quality parameters exceeding baseline levels will be enforced.<br>• Detailed planning and design of dredging operations will consider SARDI's operational requirement and those of any associated facilities. To minimise potential impacts, sand placement operations will commence at Henley Beach South, with ongoing review of placement locations and operational timing based on water quality monitoring results and consultation with SARDI. |
| Monitoring | Dissolved oxygen (DO) and pH (along with electrical conductivity and temperature) will be monitored at three sites - one dredge plume monitoring site (NH), one placement site (WB2) and one background site (B4). These parameters are anticipated to remain consistent spatially and temporally in the marine environment.<br>An adaptive management program will be implemented during the dredge trial as follows:<br>• pH:<br>  ○ Alarm: change of greater than 0.5 pH unit.<br>  ○ Hold: pH values less than 6.5.<br>• DO:<br>  ○ Alarm: DO less than 65% saturation.<br>  ○ Hold: DO less than 55% saturation.<br>In addition, fortnightly grab samples will be collected at each site and tested for total suspended solids (TSS), turbidity, total and dissolved metals (Al, As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg), total sulfide (to assess $H_2S$) and ammonia. |

| **Water quality - DO, pH and contaminants** | |
|---|---|
| Management actions | Monitoring of DO and pH levels via a real-time water quality monitoring dashboard will occur throughout the dredge program. In the event that ALARM triggers are reached, the dredge operator will modify activities as follows:<br>• If the trigger is reached, additional targeted water quality field testing (pH and DO) will be undertaken as soon as practical (weather dependent) in the vicinity of the triggered buoy to assess the source of low pH or DO.<br>• If the trigger is reached at North Haven (site NH), testing of pH of material in hopper loads will be undertaken to assess if source of low pH or DO is from dredge material. If pH of material is less than pH of 5, or there is significant organic material in the hopper, dredging and placement works are to cease until material can be adequately treated or disposed of accordingly.<br>In the event that HOLD triggers are exceeded:<br>• Dredging will cease as soon as practicable if exceedance is at dredging site (NH). If trigger is at any of the placement sites, no placement of sand will occur at the location where the exceedance was reached.<br>• An assessment will be undertaken in consultation with the EPA to determine whether background pH and/or DO is a significant influence.<br>• Dredging will recommence only after clearance is provided by the EPA during business hours, Monday to Friday. Outside of these times, the contractor will work to the WQMP and when triggers have decreased to an acceptable level will recommence works. |
| Reporting | Reporting will comprise the following:<br>• 'Alarm' and 'Hold' trigger alerts will be reported immediately to the dredge contractor, DEW, SARDI and EPA via automatic Eagle.io alerts.<br>Swash will follow up with DEW and contractor staff on any alerts to make sure they were received.<br>• Weekly technical note is to include a summary of dredge activity timing, volumes collected and placed for the week prior. The technical note will be submitted to the EPA by close of business on Monday the following week.<br>• A final water quality monitoring report will be provided to DEW and EPA following cessation of the dredging operations and monitoring period. This report will be provided 4 weeks post program and include raw data, summary of data, any exceedances (causes and if adaptive management required) and general discussion on water quality impacts with respect to the dredging and sand placement activities undertaken. |

*Table 8: Water quality - Hydrogen Sulfide ($H_2S$) impact analysis and risk management.*

| **Water quality - Hydrogen Sulfide ($H_2S$)** | |
|---|---|
| Applicability | Activities that could potentially result in changes in levels of hydrogen sulfide ($H_2S$) include:<br>• Removal of sediment at the borrow area at North Haven (NBA3) containing high organic load.<br>• Placement of sediment with high organic load by Split Hopper Barge (SHB) or Cutter Suction Dredge (CSD) in the nearshore. |
| Potential impacts | Potential impacts include:<br>• A decline in water quality associated with acidification and release of $H_2S$.<br>• Stress or mortality of aquatic flora and fauna.<br>• Adverse impacts to marine habitats and ecological communities.<br>• Impacts to recreational and commercial fishing and nearby aquaculture.<br>• Impacts to amenity values.<br>• Impacts to human health associated with increased exposure to hydrogen sulfide ($H_2S$).<br>• Impacts to operations in South Australian Research and Development Institute (SARDI) and associated facilities. |
| Desired outcomes | The main environmental outcome includes:<br>• Dredging operations are undertaken in a manner that avoid or minimise impacts to the marine environment and to the community.<br>The performance measures which demonstrate that this outcome has been achieved include:<br>• Water quality and sediment monitoring at the sand borrow and placement areas for parameters associated with total organic content and hydrogen sulfide ($H_2S$) are within acceptable limits based on the NAGD Guidelines, EPA regulations and/or the normal range established by baseline monitoring.<br>• Community complaints are addressed and managed in a timely manner.<br>• Operations at SARDI and associated facilities are not negatively impacted. |
| Risk analysis | Potential risks include:<br>• Presence of organic-rich sediments.<br>• Presence of sulfidic sediments.<br>• Proximity of sensitive receptors, including seagrass and other benthic ecology, fish populations, recreational users and fishers.<br>Sediment in the sand borrow area (NBA3) has been extensively sampled and comprises low levels of organic matter and no sulfidic elements.<br>In June 2026, sediment sampling and analysis indicated sediments were generally alkaline across the sites (AVS ranged from <0.5 to 2µmol/g dry weight and CCS ranged from <0.005 to 0.08% (Bluecoast, 2026 – See Appendix G & H). |

| **Water quality - Hydrogen Sulfide ($H_2S$)** | |
|---|---|
| | The risk of undetected $H_2S$ impacts is considered low due to the aeration of sediments during dredging, transfer, transport and placement, together with dilution and dispersion prior to any interaction with the SARDI seawater intake. Water monitoring provides a more direct means of detecting changes in receiving water conditions.<br>Given the activity area has a very high commercial consequences, the risk profile is assessed as Medium. |
| Controls | The following operational controls will be implemented to minimise the risk of environmental impact:<br>• Sediment and water quality investigations have been undertaken to characterise sediment composition and assess the potential for acidification and/or hydrogen sulfide ($H_2S$) generation.<br>• Environmental Monitoring Plans will be implemented to monitor water quality and detect any changes in relevant indicators during dredging and placement activities.<br>• Detailed planning and design of dredging operations and monitoring parameters will be agreed with SARDI.<br>• Dredging and placement activities will be undertaken in accordance with the DMP.<br>• Management actions will be implemented in response to detection of H2S. |
| Monitoring | An adaptive management program will be implemented during the dredging as follows:<br>- Hydrogen sulphide ($H_2S$) sediment monitoring will be undertaken using a representative sample collected from each barge prior to transport and placement.<br>• Dredge contractor staff will be trained in the collection and testing of samples for $H_2S$ presence.<br>• Samples are to be collected within the last 10 buckets into each load.<br>• If $H_2S$ is detected, placement will not occur at West Beach. This sediment may be placed at Henley Beach South.<br>- Water samples will be collected at the eight monitoring sites established as part of the WQMP. In addition, water samples will be collected at the four SARDI seawater intake pipes. Samples are to be collected using a Van Dorn sampler.<br>• Water samples will be collected and tested for total suspended solids (TSS), turbidity, total and dissolved metals (Al, As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg), total sulfide (to assess $H_2S$) and ammonia.<br>• Samples will be submitted to the laboratory (Envirolab) for analysis of total sulphide in marine water.<br>• Laboratory sulphide results will be converted to hydrogen sulfide ($H_2S$) concentrations using water quality conditions measured by the |

| Water quality - Hydrogen Sulfide ($H_2S$) | |
|---|---|
| | corresponding water quality monitoring buoy (pH, temperature and salinity). The calculations will be undertaken in accordance with ANZG (2018). |
| Management actions | Sediment Sampling:<br>• If a positive test is received from the barge sediment sampling (lead acetate strips) the barge will place that sediment load only at Henley Beach South.<br>Water grab samples:<br>• If calculated $H_2S$ concentrations start increasing at the buoys adjacent the placement areas, the frequency of sampling will be determined based on discussions with the EPA. |
| Reporting | Reporting will comprise the following:<br>• Swash will follow up with DEW and contractor staff on any positive laboratory results.<br>• Contractor to notify DEW and Swash following any positive test results.<br>• Weekly summary reports including sampling frequency and results, chain of custody forms are to be maintained and provided to DEW and EPA.<br>• All laboratory result reports to be provided to DEW upon delivery.<br>• Weekly technical note is to include a summary of sampling completed, results, dredge activity timing, volumes collected and placed for the week prior. The technical note will be submitted to the EPA by close of business on Monday the following week.<br>• A final water quality monitoring report will be provided to DEW and EPA following cessation of the dredging operations and monitoring period. This report will be provided 4 weeks post program and include raw data, summary of data, any exceedances (causes and if adaptive management required) and general discussion on water quality impacts with respect to the dredging and sand placement activities undertaken. |

*Table 9: Water quality - Algal Cell impact analysis and risk management.*

| **Water quality - Algal Cells** | |
|---|---|
| Applicability | Activities that could potentially result in changes in water quality, specifically elevated levels of algal cells in the water column include:<br>• Removal of sediment at the borrow area at North Haven (NBA3) containing high algal cell counts.<br>• Placement activities using the Split Hopper Barge (SHB) or Cutter Suction Dredge (CSD) diffuser in the nearshore resulting in a translocation of live cells. |
| Potential impacts | Potential impacts include:<br>• A decline in water quality associated with increased algal cells and potential bloom conditions.<br>• Stress or mortality of aquatic flora and fauna.<br>• Adverse impacts to marine habitats and ecological communities.<br>• Impacts to recreational and commercial fishing.<br>• Impacts to recreational and amenity values.<br>• Impacts to human health associated with exposure to algal toxins.<br>• SARDI's or any associated facilities operations are negatively impacted. |
| Desired outcomes | The main environmental outcome includes:<br>• Dredging operations are undertaken in a manner that avoid or minimise impacts to the marine environment and to the community.<br>The performance measures which demonstrate that this outcome has been achieved include:<br>• Water quality measurements and grab samples at NBA3 and West Beach and Henley Beach South placement areas are consistent with established baseline conditions.<br>• Community complaints are addressed and managed in a timely manner.<br>• No change attributable to dredging in HAB cell counts at the dredging or placement areas. |
| Risk analysis | Potential risks include:<br>• Recent harmful algal bloom events in South Australian coastal waters could result in an increased presence of algal cysts in the sediment.<br>• Disturbance of sediments may result in the localised release of algal cysts to the water column.<br>• Localised changes to water quality associated with dredging and placement activities may influence algal growth.<br>• Proximity of sensitive ecological, recreational and commercial receptors.<br>• The activity area has high recreational and commercial use.<br>Recent harmful algal bloom events have occurred in South Australian coastal waters, with the *Karenia* bloom affecting metropolitan Adelaide beaches between 2025 and early 2026. Ongoing monitoring continues and baseline testing shows algal cell counts |

| **Water quality - Algal Cells** | |
|---|---|
| | remain zero to very low across Metropolitan Adelaide. Therefore, the likelihood of dredging activities contributing to harmful algal bloom development is considered low. However, given recent events and the sensitivity of the receiving environment, the risk profile is assessed as Medium. |
| Controls | The following operational controls will be implemented to minimise the risk of environmental impact:<br>• Baseline water quality testing across metropolitan Adelaide continues.<br>• Environmental Monitoring Plans will be implemented to monitor water quality and detect any changes in relevant indicators during dredging and placement activities.<br>• Dredging and placement activities will be undertaken in accordance with approved DMP.<br>• Trigger levels and management actions will be implemented in response to exceedances. |
| Monitoring | An adaptive management program will be implemented during the dredge trial as follows:<br>• General algal sensors installed at B1, B2, B3, HEN and WB1 with live total algal data managed and presented through Eagle.io.<br>• Ongoing statewide water quality testing results will continue to be monitored.<br>• Twice weekly (weather permitting) water grab samples will be taken at all 8 monitoring sites and tested for concentration of harmful algal species (*Karenia spp.)*. Samples are to be sent to SARDI for analysis.<br>• Fortnightly water samples are to be collected from all 8 sites and submitted to Micro-Algal Services Victoria for analysis of total cell counts. |
| Management actions | Algal sensors will provide an early indication tool of elevated levels of total algae (chlorophyll) in the water column. In addition, monitoring of algal cell counts will be undertaken by water grab samples taken twice weekly (if weather permits) at three of the water quality monitoring sites outlined in the WQMP. Triggers and management actions will be in accordance with current statewide monitoring programs.<br>• If elevated levels of harmful algae are detected at any site (>10,000 cells/L) an investigation will be undertaken in consultation with the EPA to determine the source, extent and significance of the result and identify any required management actions.<br>• Dredging and placement activities will be subject to EPA direction. |
| Reporting | Reporting will comprise the following:<br>• Swash will follow up with DEW and contractor staff on any positive laboratory results. |

| Water quality - Algal Cells | |
|---|---|
| | • Contractor to notify DEW and Swash following any visible changes in water quality.<br>• Weekly summary reports including timing of dredging activities and volumes collected and placed to be maintained and provided to DEW.<br>• All laboratory result reports and chain of custody forms to be provided to DEW upon delivery.<br>• A final water quality monitoring report will be provided to DEW and EPA following cessation of the dredging operations and monitoring period. This report will be provided 4 weeks post program and include raw data, summary of data, any exceedances (causes and if adaptive management required) and general discussion on water quality impacts with respect to the dredging and sand placement activities undertaken. |

The Water Quality Monitoring Plan is provided in **Appendix C**.

## 4.9 Seagrass

Impact analysis and risk management related to seagrass is outlined in Table 10.

*Table 10: Seagrass impact analysis and risk management*

| **Seagrass** | |
|---|---|
| Applicability | Dredging at Nearshore Borrow Areas and relocation to sand Placement Areas will occur close to sensitive seagrass environmental receptors. |
| Potential impacts | Potential impacts from dredging and sand placement activities include:<br>• Direct removal of seagrass habitats.<br>• Impacts to water quality (turbidity).<br>• Reduction in available light to seagrass for extended periods.<br>• Mobilisation of fine sediments and organic matter, impacting on water quality.<br>• Sedimentation and smothering of seagrass. |
| Desired outcomes | Dredging and placement are undertaken so that impacts to adjacent seagrass meadows are avoided or minimised through reasonable and practicable measures. |
| Risk analysis | Potential risks to seagrass habitats includes:<br>• Direct disturbance or loss of seagrass habitat within or adjacent to the dredging and sediment placement areas.<br>• Increased turbidity and suspended sediments generated by dredging and placement activities may reduce light availability required for seagrass growth and survival.<br>• Sediment deposition on seagrass leaves may smother vegetation, reduce photosynthetic capacity and inhibit growth.<br>• Changes to seabed levels and sediment characteristics may affect the suitability of habitat for seagrass establishment, recovery and persistence.<br>• Localised changes to water quality associated with dredging and placement activities may adversely affect seagrass health and resilience.<br>• Cumulative impacts from repeated disturbance events may affect the recovery capacity of seagrass meadows in the broader area.<br>Results from the 2024 dredging trial seagrass monitoring program identified no measurable impacts attributable to dredging activities. In addition, dredging and placement are undertaken in areas where seagrass does not naturally occur as established meadows, further reducing the likelihood of direct impacts. Consequently, the likelihood of dredging activities contributing to a decline in seagrass habitats is considered Low. However, recognising the recent large-scale environmental disturbance associated with the Gulf St Vincent algal bloom and the resulting uncertainty regarding ecosystem resilience and recovery, the overall risk rating is conservatively assessed as Medium. |

| **Seagrass** | |
|---|---|
| Controls | Real-time monitoring of water quality (turbidity) to ensure Alarm/Hold trigger values are outlined above in Table 6 and Table 7. If they are triggered, then appropriate adaptive dredge management measures as described below. |
| Monitoring | Seagrass will be monitored used asymmetric Beyond-BACI design (Before-After-Control-Impact with multiple control locations).<br>Towed underwater video (primary method) will be used along georeferenced transects and include image-based quantitative analysis.<br>• 5 x areas of interest (AOIs) comprising two Impact AOIs and three Control AOIs will be surveyed pre- and post dredging.<br>• Additionally, a comprehensive five-year seagrass monitoring program which will include all AOIs will be established to ensure any long-term changes in seagrass extent and condition are detected and assessed. The results will inform the Government's commitment to a five-year dredging review, helping to ensure that dredging activities do not adversely affect seagrass over time. Regular interim reports (e.g. annually or as designed) will be provided to update regulators on the findings of the monitoring program and will be made publicly available.Seagrass condition, cover and community composition will be assessed and compared across AOIs and survey periods.<br>• Statistical analyses (PERMANOVA) will be used to determine whether observed changes at impact sites differ from natural temporal and spatial variability at control sites.<br>• Indicators of potential impact include reductions in seagrass cover, increases in bare sand or macroalgae, and changes in species composition.<br>• Results will be interpreted in the context of natural variability, including seasons, and other regional stressors. |
| Management actions | Seagrass surveys will be undertaken beforeand with two months of the completion of dredging.<br>The purpose of the monitoring program is to measure any short-term changes in seagrass condition that may be attributable to the dredging works across the five Areas of Interest.<br>The pre-dredging survey will establish the baseline condition of seagrass habitats against which post-dredging survey results will be compared. Monitoring outcomes will inform future Adelaide Beach Management monitoring requirements and operational design. |
| Reporting | Results will be interpreted as a baseline characterisation of seagrass extent, composition, and condition across Areas of Interest (AOIs), with explicit reference to predicted dredging impact pathways (light reduction, sedimentation, burial) as outlined in the National Assessment Guidelines for Dredging.<br>Emphasis will be placed on: |

| Seagrass | |
|---|---|
| | • Establishing baseline percent cover (primary indicator of potential dredging-related change in condition).<br>• Documenting species composition and habitat structure.<br>• Quantifying natural spatial variability within and between AOIs.<br>• Positioning each AOI within the modelled exposure gradient to identify areas of higher inherent risk.<br>A seagrass report will be submitted to the EPA, 6 weeks after the completion of the post-dredge survey. Further ongoing reports will be completed as part of the comprehensive five-year seagrass monitoring program. |

The **Seagrass Monitoring Plan** is provided in **Appendix D**.

## 4.10 MNES and marine fauna

Impact analysis and risk management related to matters of national environmental significance (MNES) and marine fauna is outlined in Table 11.

*Table 11: MNES and marine fauna impact analysis and risk management*

| MNES and marine fauna | |
|---|---|
| Applicability | Activities that could potentially result in negative impacts to marine fauna including MNES are:<br>• Dredging activities in the NBAs.<br>Placement activities using the SHBs or CSD diffuser. The key marine fauna and MNES that may be at risk from the activities include:<br>• Pipefish and other Syngnathidae species.<br>• Australian sea lion.<br>• Long-nosed fur seals.<br>• Indo-pacific bottlenose dolphins.<br>• Southern Right Whale.<br>• Great White Shark.<br>The above list will be the main species that will be monitored for during dredging operations. |
| Potential impacts | An EPBC self-assessment, which included a Protected Matters Search of the project area with 5 km buffer, was completed previously for the 2024 Phase I dredge trial. The report assessed whether any action associated with the trial is likely to have a significant impact on any Matters of National Environmental Significance (MNES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within and surrounding the Project Area.<br>An updated Protected Matters Search of the project area with 5 km buffer was undertaken in May 2026. Compared to the 2024 findings, apart from some minor listing changes for threatened species, there has been no change in MNES species including |

| MNES and marine fauna | |
|---|---|
| | 2 threatened ecological communities, 67 threatened species, and 64 migratory species.<br><br>Potential impacts from the Project include, but are not limited to:<br>• Loss of habitat.<br>• Underwater noise and vibration impacting physiology of marine fauna.<br>• Introduction of diseases into the marine environment.<br>• Physical disturbance.<br><br>The assessment concluded that the trial is not likely to have a significant impact on listed threatened species.<br><br>The project area is near high marine traffic areas, with vessel traffic accessing the nearby commercial port and recreational vessels navigating metropolitan waters and entering the North Haven and West Beach Harbours. A recent study that investigated the impacts of dredging activity on the long-term occurrence of Indo-Pacific bottlenose dolphins and long-nosed fur seals in the Port River estuary concluded that animals in this area are habituated to high noise levels and were not disturbed by dredging operations (Bossley *et al* 2022). Likewise, although vessel strikes are reported for marine mammals, studies have shown that the risk of collision is low given that active dredgers are generally stationary and move at slow speeds. Collision risk can be actively managed by avoiding critical habitats, areas where calves or juveniles are present, and known migration routes (Todd *et al* 2015).<br><br>Piling works are considered to pose a higher risk to marine mammals than dredging, with dredging often providing opportunistic feeding situations for highly mobile species. The underwater noise assessment completed for the trial was undertaken in accordance with the DIT Underwater Piling and Dredging Noise Guidelines. The assessment sets significant safety zones for specific species which have been considered by the project team and based on discussions with the EPA, have been modified to reasonable and practicable distances based on the level of risk that the specific operations pose to marine mammals and MNES. |
| Desired outcomes | The main environmental outcome includes:<br>• Dredging is undertaken in a manner that avoids or minimises impacts to marine fauna and MNES.<br>The performance measures which demonstrate that this outcome has been achieved includes:<br>• Negative interactions with marine fauna and MNES are minimised. |
| Risk analysis | Potential risks include:<br>• Underwater noise impacts to marine mammals and MNES.<br>• Physical interactions with marine mammals and MNES.<br>• Duration of dredging.<br>• Offshore activity being 24/7 |

| **MNES and marine fauna** | |
|---|---|
| | Risk profile has been assessed as medium. |
| Controls | Management strategies for offshore activities include:<br>• Specific crew members will be suitably qualified as Marine Fauna / Mammal Observer (MFO/MMO) and will always be present on the dredge.<br>• Trained crew members will keep watch for marine fauna and notify the dredge operator immediately by radio. Standard operating procedures will be followed which include:<br>  ○ Marine fauna observation will take place 30 mins prior to works commencing. If no marine mammals are observed during this time, works can commence.<br>  ○ Marine faunal observations will continue throughout operations.<br>  ○ Trigger distances for management responses are aligned to the minimum approach distances in the *NPWS* regulations, being 50 m for dolphins and seals, 100 m for whales, 150 m for dolphins accompanied by calves, and 300 m for whales accompanied by calves.<br>  ○ Operations will be modified until the individual is a safe distance away; >50 m for dolphins and seals, >100 m for whales, >150 m for dolphins accompanied by calves, and >300 m for whales accompanied by calves. |
| Monitoring | The following parameters will be measured throughout the dredge program:<br>• Number of times marine fauna and MNES were sighted.<br>• Description of species sighted.<br>• Description of behaviour when sighted.<br>• Number of times operations needed to be modified because of marine fauna presence.<br>• Number of hours of modified operations or stand down time required until marine mammal was identified to be a suitable distance away. |
| Management actions | If required, the following management actions will be implemented:<br>• Dredging or placement operations will be modified, including slowing or pausing activities.<br>• Operations will be slowed if marine fauna are spotted.<br>• Operations will be paused if dolphins or seals are within 50 m of the dredge, 100 m for whales, 150 m for dolphins accompanied by calves, and 300 m for whales accompanied by calves.<br>• Operations will only resume once marine fauna have been observed moving away from the dredge area and located at least 50 m from the dredging operation for dolphins and seals, >100 m for whales, >150 m for dolphins accompanied by calves, and >300 m for whales accompanied by calves.. |
| Reporting | Reporting will comprise the following: |

| MNES and marine fauna | |
|---|---|
| | • Contractor will notify Swash and DEW of any marine fauna interactions within 12 hours including any management actions taken.<br>• Marine fauna sightings and interactions will be included in daily data and weekly summary reports provided to DEW.<br>• Submission of marine fauna and MNES register that was maintained throughout the trial which is to include:<br>  ○ Type of fauna identified (species name).<br>  ○ Number of MNES identified in each interaction (number of individuals).<br>  ○ Description of interaction (behaviour identified).<br>  ○ Management action taken if required.<br>  ○ Details of who was notified of the interaction (date, time, contact name).<br>The register will be provided to DEW and EPA 4 weeks post-dredge program. |

## 4.11 Noise

The Noise Management Plan is provided in Appendix E.

Impact analysis and risk management related to noise is outlined in Table 12.

*Table 12: Noise impact analysis and risk management*

| Noise | |
|---|---|
| Applicability | The Contractor may work 24 hours a day, 7 days a week.<br>Noise management risk is an important consideration for North Haven and West Beach as residential areas. Noise travelling from the dredge location is expected to be masked somewhat by ambient wave noise.<br>Activities that could potentially result in elevated noise includes:<br>• Dredging activities in the NBAs – especially night-time operations.<br>• Placement activities using the CSD diffuser in the PAs. |
| Potential impacts | Residents who may be potentially impacted by noise have been identified through noise modelling (**Appendix E**). Potential impacts include:<br>• Elevated noise levels are deemed a nuisance to sensitive receivers.<br>• Noise impacts will be more prevalent during nighttime operations due to lower background noise levels. |
| Desired outcomes | The main desired outcomes are:<br>• Dredging operations are undertaken in a manner that avoids or minimises noise impacts to sensitive receivers.<br>The performance measures which demonstrate that this outcome has been achieved include:<br>• Noise levels do not exceed the limits identified in the Noise Management Plan (NMP) and relevant guidelines.<br>• Number of complaints received are regarded as minimal. |

| **Noise** | |
|---|---|
| Risk analysis | Potential risks include:<br>• Closest sensitive receiver is within 100 m of dredging activity.<br>• Noise reduction measures are not adequate to reduce immediate noise concerns.<br>• Operational hours of dredging being 24 hours 7 days a week.<br>Risk profile based on EPA risk category guidance for noise is assessed as High. |
| Controls | Communications and engagement:<br>• Residents will be notified via letterbox flyer.<br>• In-person engagement may be undertaken as needed, to ensure people are aware of noise-generating work, mitigation measures and the likely duration.<br>• All interactions including actions taken to address noise will be recorded in the central correspondence register and provided to the EPA as required.<br>All reasonable and practicable measures are to be taken to minimise noise at sensitive receivers. On-site noise management strategies include:<br>• Incorporating noise management items into safety/environment inductions and daily toolbox sessions.<br>• Identification of noise-sensitive receivers to site staff during inductions/ orientations.<br>• Instructing site supervisors to routinely check for unnecessary noise-generating activities and direct workers to manage the activity accordingly.<br>• Instructing site supervisors to respond to any noise complaints by investigating the cause of the complaint and determine if alternative work methods can be implemented to remove or minimise noise.<br>• Instructing workers to use radios to communicate and to avoid shouting, whistling and use of horns or alarms for communication.<br>• Instructing plant operators to use the minimum power of equipment to complete the task, and throttle down to the minimum setting when not in use if it is not possible to shut plant down.<br>• Placing petrol or diesel powered lighting towers away from residential locations.<br>• Ensuring that dredge heads and cutters are maintained in optimal condition. |
| Monitoring | The following parameters will be measured throughout the dredge program:<br>• Noise monitoring at NBAs and PAs will be undertaken periodically during the dredging operations to measure noise levels for a sufficient period of time to capture representative noise data for the operations.<br>• Measurements will be representative of worst case scenarios for each type of operation.<br>• Noise data collected may be utilised to respond to noise complaints and inform if further measurements and management actions are required.<br>• Monitoring locations will reflect the closest receivers to any dredging activity. |

| **Noise** | |
|---|---|
| Management actions | • Where measured noise levels are less than the targets, works are considered 'Level 1' and 'basic noise mitigation' is required.<br>• Where 'Level 1' targets are exceeded, the works are deemed 'Level 2'. Level 2 works are required to implement 'advanced noise mitigation' strategies in line with the Department for Infrastructure and Transport's (DIT) *Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities* (DIT CM Guideline).<br>• For any works occurring outside of standard operating hours, noise level targets based on the duration of works will be implemented (**Appendix E**). |
| Reporting | Reporting will comprise of the following:<br>• Summary of the results obtained during the monitoring program.<br>• Submission of a complaints register that was maintained throughout the trial which is to include:<br>  ○ Contact details of complainant.<br>  ○ Time and date of noise issue.<br>  ○ Nature of noise issue and any noise sources/activities of concern.<br>  ○ Actions taken to address the noise concerns.<br>The report will be provided to the EPA 4 weeks post-dredge program. |

## 4.12 Biosecurity

Management of biosecurity risks are under the jurisdiction of PIRSA. However, as per the EPA SA Code of practice for vessel and facility management (marine and inland waters), vessels and equipment associated with the marine activities will be managed to minimize risks of introducing new marine pests and diseases from biofouling.

Biofouling management plans will be developed and submitted to Biosecurity SA (PIRSA) for each vessel involved in operations. The management plan shall consider inspection and cleaning prior to movement of the vessels to new regions using the following resources:

- National Biofouling Management Guidelines for Non-Trading Vessels:

*http://www.marinepests.gov.au/marine_pests/publications/Documents/Biofouling_guidance__NTV.pdf*

- National Biofouling Management Guidelines for Commercial Vessels:

*http://www.marinepests.gov.au/marine_pests/publications/Documents/Biofouling_guidelines_commercial_vessels.pdf*

- IMO guidelines:

*http://www.imo.org/en/OurWork/Environment/Biofouling/Documents/RESOLUTION%20MEPC.207%5b62%5d.pdf*

Records of hull inspections, application of antifouling and vessel cleaning will also be maintained and made available to EPA upon request.

# 4.13 Air quality

Air quality and dust management are low risk for this dredging activity. Most of the sand will be discharged in water and therefore is not a dust or air-quality risk.

Odour management is of moderate risk for this dredging activity. The activity area is located directly adjacent to residential areas and dredge sediments may comprise of some decomposing organic matter, but is unlikely to generate a persistent offensive odour.

# 4.14 Waste and hazardous subtances

## 4.14.1 Waste

Waste and recycling bins will be provided at the site compound, along with bunded waste oil storage locations. All waste oil, rags and other hydrocarbon impacted materials must be contained in watertight dry containers and disposed of appropriately.

A waste bin will be available on each dredge barge and support vessel, appropriately secured to prevent loss of waste overboard. Any item that enters the water must be retrieved immediately using a support vessel, provided it's safe to do so.

## 4.14.2 Hazardous substances

Vessels, tugs and barges will be working in close vicinity where an accidental collision may occur. Recreational vessels that interact with the operation increase the risk of collision.

To minimise this risk,

- A Notice to Mariners will be submitted to DIT.
- Local clubs will be provided with notification of upcoming works.
- All crew will be trained coxswains with appropriate qualifications and experience in manoeuvring vessels and barges.
- All crew are trained in emergency spill response - records of training to be kept and available upon request.
- Appropriate spill kits are kept on vessels and are always accessible and used in the event of a spill.
- All plant must be maintained and undergo pre-start checks before operation as part of standard protocol to reduce the risk of plant malfunction and/or loss hazardous materials, leaks etc.
- In the event of a spill emergency, the Signal Tower and EPA must be notified immediately for spill response guidance.

All contractor representatives using any Dangerous Goods or Hazardous Materials or carrying out any bunkering of plant, equipment or machinery must ensure storage and use of such materials is in accordance with EPA requirements for the immediate environment. All contractors and visitors involved in such activities will be trained in emergency spill response with records of training to be kept and available upon request.

All bunkering activities will be in accordance with port requirements. Fueling procedures and checklists will be implemented to ensure spill risk is minimised.

# 5 Reporting

## 5.1 Record keeping and auditing requirements

During dredging activities, the dredging contractor will keep records which detail:

- Qualifications of crew.
- Records of pre-start and tool box meetings.
- Records of contractor hazard identification site inspections.
- The times and dates of when each material placement run is commenced and finished.
- The position (by GPS) of the vessel at the beginning and end of each placement run with the inclusion of the path of each dredge material relocation run.
- The volume of dredge material (in cubic metres) placed for the specific operational period. These records will be retained for audit purposes.
- Details of any spill of oil, fuel or other potential contaminant, details of remedial action and monitoring instigated as result.
- Details of any marine fauna observations during dredging activities.
- Time and duration of any alterations to the program, including stop work actions, as a result of any environmental mitigation measure.
- DEW will undertake internal audits during each dredging program.

Post the dredging program, DEW and/or the dredging contractor will:

- Undertake a bathymetric survey of the NBAs and PAs used within one month of the completion the project.
- Continue post-dredging monitoring of NBAs and PAs 12 months post campaign.

## 5.2 Monitoring of environmental performance

Environmental performance will be monitored through real-time measurements, observations and surveys. Results of monitoring (water quality, seagrass, noise) will feed into ongoing performance reviews of environmental management, including future beach management programs.

## 5.3 Complaints and incidents

### 5.3.1 Complaints

All complaints will be logged in a complaints register and reviewed by the Contractor and DEW.

### 5.3.2 Incidents

Significant environmental incidents will be logged in writing, with all relevant details recorded, after corrective action has been completed.

- Should an environmental incident occur during dredging or placement, DEW and the Dredging Contractor will take measures to mitigate the risk or impact.
- The Dredging Contractor will report to the EPA within 24 hours of a known significant environmental incident and provide a follow-up investigation report within 5 business days.

# References

*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 from: https://www.waterquality.gov.au/anz-guidelines.

Bluecoast Consulting Engineers, 2025. *Sand management using dredgers – sand sourcing and other feasibility assessments.* https://data.environment.sa.gov.au/Content/Publications/Bluecoast_2025_ABMRI_%E2%80%8B%E2%80%8BSandManagementUsingDredgers_SandSourcingAndOtherFeasibilityAssessments_FINAL%E2%80%8B.pdf. For Government of South Australia – Department for Environment and Water.

Bluecoast Consulting Engineers, 2025. *Analysis of sediment in ABMRI borrow and placement areas*. For Government of South Australia – Department for Environment and Water.

Bluecoast Consulting Engineers, 2026. *Baseline sediment analysis for ABMRI trial nourishment extension*. For Government of South Australia – Department for Environment and Water.

Bossley, M.I., Steiner, A., Parra, G.J., Saltre, F., Peters, K.J. 2022. Dredging activity in a highly urbanised estuary did not affect long-term occurrence of Indo-Pacific bottlenose dolphins and long-nosed fur seals. Marine Pollution Bulletin. Vol 184: https://doi.org/10.1016/j.marpolbul.2022.114183.

Department for Environment and Water, Government of South Australia, 2026. *Adelaide Beach Management Review Implementation (ABMRI) Outcomes Summary Report.* https://data.environment.sa.gov.au/Content/Publications/DEW_2026_ABMRI_Summary.pdf

Environment Protection Authority, South Australia, 2020. *Dredge guideline.* https://www.epa.sa.gov.au/files/14712_dredge_guideline_2020.pdf

Swash Project Delivery, 2025. ABMRI Dredge Trial - *Report on Operational and Environmental Feasibility of Dredging*. For Government of South Australia – Department for Environment and Water.

https://data.environment.sa.gov.au/Content/Publications/SWASH_2025_ABMRI_DredgeTrial_ReportOnEnvironmentalAndOperationalFeasibility_FINAL.pdf

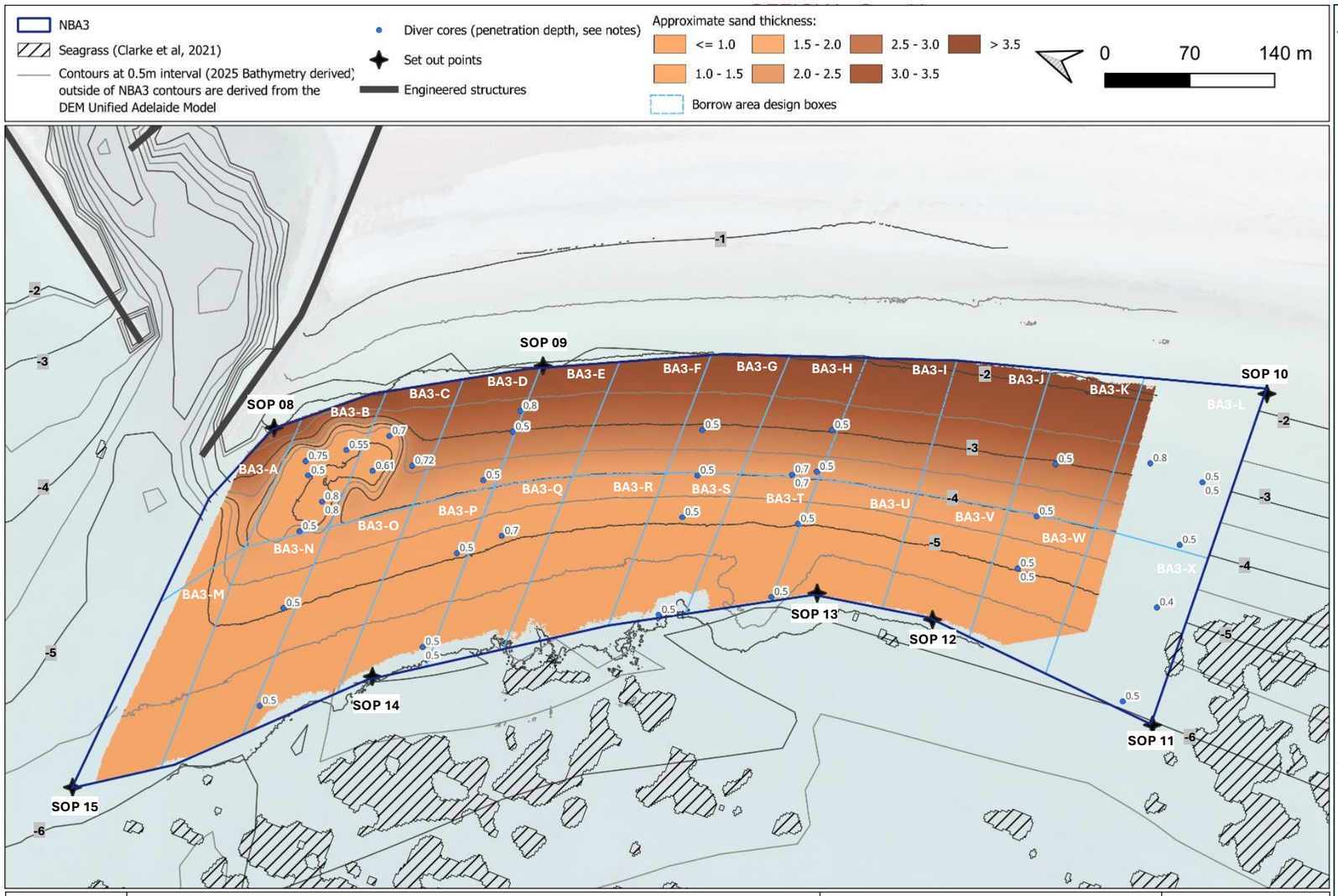
Swash Project Delivery, 2026. Dive Survey of *Henley Beach Placement Area* – Draft Report. For Government of South Australia – Department for Environment and Water.

Todd, V.L.G., Todd, I.B., Gardiner, J.C., Morrin, E.C.N., MacPherson, N.A., DiMarzio, N.A., Thomsen, F. 2015. A review of impacts of dredging activities on marine mammals. ICES Journal of Marine Science (2015), 72(2), 328–340. https://doi.org/10.1093/icesjms/fsu187

# 6 Appendices

## 6.1 Appendix A – Proposed Sand Borrow Area (NBA3) and Sand Placement Area

Nearshore Borrow Area NBA3 (south of North Haven Marina breakwater)




NOTES:

1. MULTIBEAM HYDROGRAPHIC SURVEY WITHIN THE BORROW AREA WAS CAPTURED IN JANUARY 2025 BY MARITIME CONSTRUCTION.
2. 1m CONTOURS SHOWN OUTSIDE THE BORROW AREA ARE DERIVED FROM THE DEM UNIFIED ADELAIDE MODEL (COMPLEATION OF VARIOUS SOURCES). APPROXIMATE ONLY.
3. ALL LEVELS AND CONTOURS SHOWN REFLECT SITE CONDITIONS AT THE TIME OF THE SURVEY.
4. SETOUT POINTS (SOPS) DEFINE THE BOUNDARY OF THE NEARSHORE BORROW AREA AND ARE PROVIDED IN THE TABLE BELOW.
5. BATTER SLOPES OUTSIDE THE BORROW AREA ARE PERMITTED.
6. AN APPROXIMATE SEDIMENT THICKNESS HAS BEEN INTERPRETED AS THE ABSOLUTE DIFFERENCE BETWEEN THE SURVEYED LEVELS AND AN ASSUMED BOTTOM OF SAND INTERFACE (TAKEN AS A DEPTH CONTOUR OF-4.9 M AHD). THE INTERFACE LEVEL WAS APPROXIMATED FROM THE PHYSICAL TESTING RESULTS (PHASE 1 DREDGE ZONE AND DIVER CORE IT HAS BEEN ASSUMED THAT THIS INTERFACE LEVEL IS UNIFORM ACROSS ALL THE BORROW AREA.
7. THE DIVER CORES "PENETRATION DEPTH" IS A VALUE REFLECTING THE SEDIMENT DEPTH (m) RECOVERED DURING THE MOST RECENT PHYSICAL TESTING AT EACH LOCATION.
8. MAX ALLOWABLE DREDGING DEPTH TO LEVEL-4.9 m AHD.
9. PERMISSIBLE DREDGING TOLERENCES ARE MAXIMUM OF -0.3m WITH A MEAN OVER THE AREAS DREDGED OF0.2m.
10. THE AVERAGE MATERIAL PROPERTIES WITHIN NB3 ARE:
    - D50 = 0.11mm
    - Cu = 1.3,
    - Fines content = 8.5%
    - Gravel content = 0.6%.

    FOR MORE DETAIL REFER TO SECTION 4.3 OF THE NOURISHMENT FEASIBILITY ASSESSMENT REPORT (BLUECOAST, 2025)

LIST OF SOPS:

| ID | Latitude (WGS 84) | Longitude (WGS 84) |
|---|---|---|
| SOP 08 | -34.7961659 | 138.4820983 |
| SOP 09 | -34.7982531 | 138.4834524 |
| S0P 10 | -34.8044736 | 138.4854479 |
| SOP 11 | -34.8045246 | 138.4822918 |
| SOP 12 | -34.8023356 | 138.4825056 |
| SOP 13 | -34.8012768 | 138.4823732 |
| SOP 14 | -34.7977644 | 138.4802963 |
| SOP 15 | -34.7955653 | 138.4784331 |

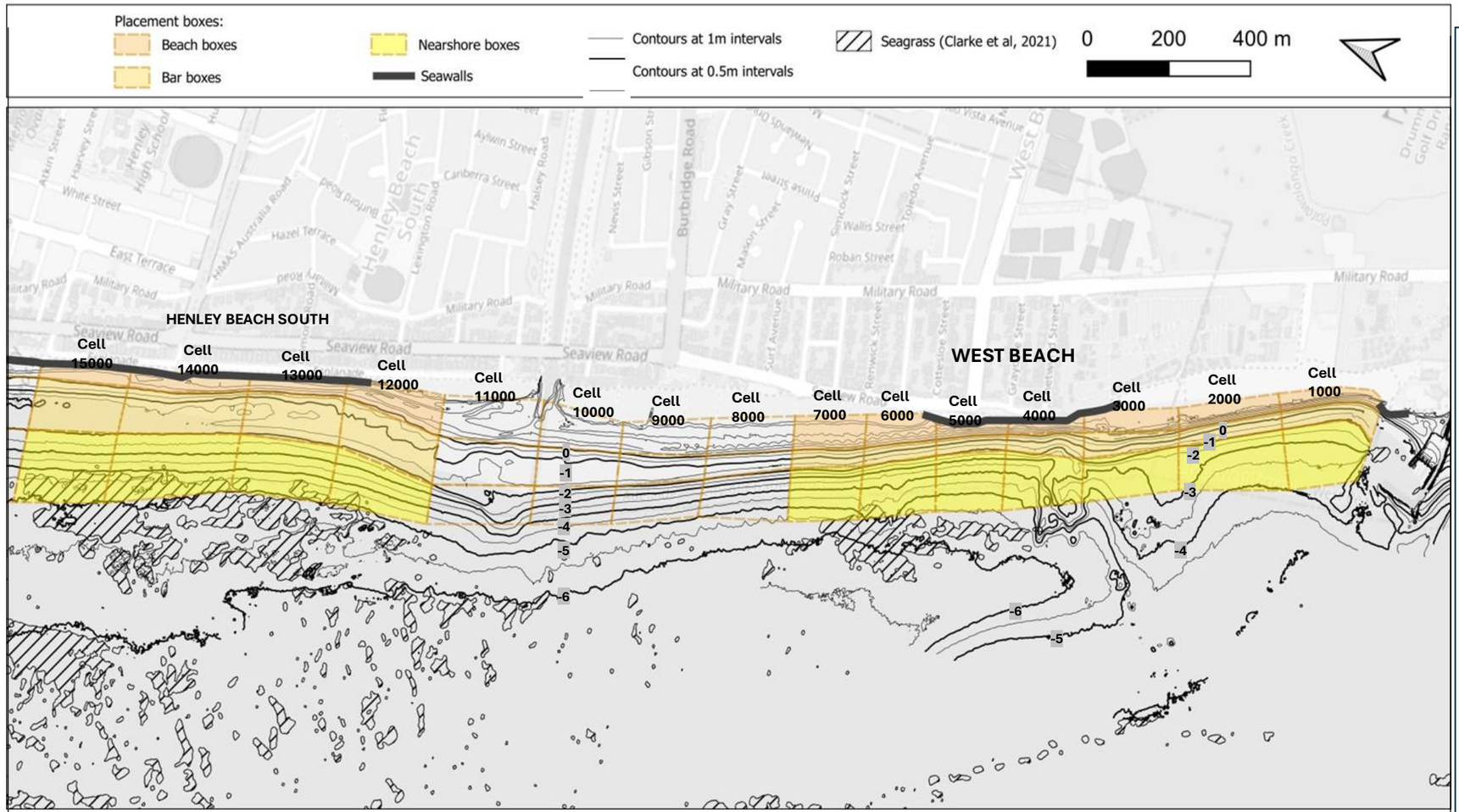
DRAWN: JM
REVIEWED: TF
APPROVED: EW

**NEARSHORE BORROW AREA NBA3 (NORTH HAVEN)**
ISSUED FOR TENDER (01.04.2026)

Prepared by: bluecoast CONSULTING ENGINEERS
Prepared for: Government of South Australia, Department for Environment and Water

DWG No.: P24462_02
SHEET: 2 OF 5

Sand Placement Area: Henley Beach South and West Beach




NOTES:

1. MULTIBEAM HYDROGRAPHIC SURVEY WITHIN THE SAND PLACEMENT AREA WAS COMPLETED BY HATCH IN APRIL 2025
2. ALL LEVELS AND CONTOURS SHOWN REFLECT SITE CONDITIONS AT THE TIME OF THE SURVEY ONLY.
3. CELL AND BOX LOCATIONS WILL BE PROVIDED TO CONTRACTOR
4. THE TERM CELL REFERS TO ALONGSHORE 'ZONES', EACH ZONE IS SEPERATED INTO THREE CROSS SHORE BOXES DENOTED AS BEACH, BAR AND NEARSHORE. THE NAMING CONVENTION SHOWN IN FIGURE 1 BELOW:

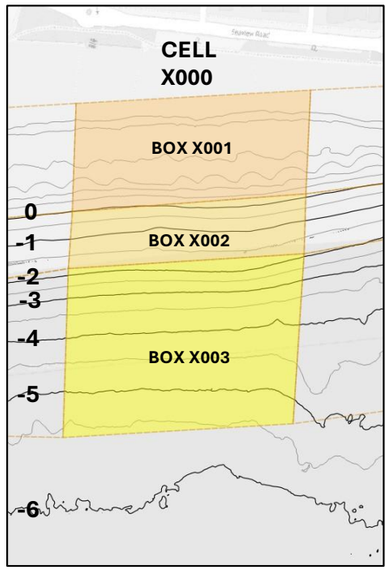



FIGURE 1: EXAMPLE OF CROSS SHORE BOX NAMING CONVENTION WHERE 'X' DENOTES ALONGSHORE CELL (i.e. Cell 1000)

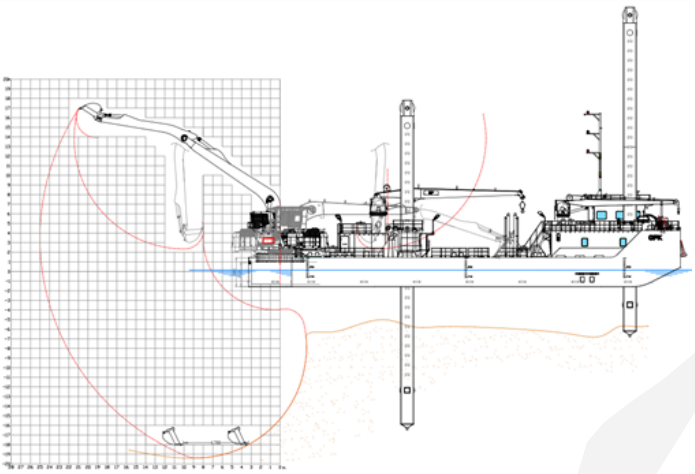
| | | | |
|---|---|---|---|
| DRAWN: JM<br>REVIEWED: TF<br>APPROVED: EW | **NOURISHMENT SITE DESIGN (WEST BEACH AND HENLEY BEACH SOUTH)**<br>ISSUED FOR TENDER (01.04.2026) | Prepared by: bluecoast CONSULTING ENGINEERS<br>Prepared for: Government of South Australia Department for Environment and Water | DWG No.: P24462_04<br>SHEET: 4 OF 5 |

## 6.2 Appendix B – Dredge and Marine Plant Specifications

# GPK

## Backhoe Dredger

| | |
|---|---|
| Name: | GPK |
| Type: | De Donge 'B' Type Backhoe Dredge |
| Operators: | Heron Construction Company Ltd |
| Port of registry: | Auckland, New Zealand |
| Class: | Lloyds Register |
| MNZ #: | 135875 |
| Official Number: | 876509 |
| Year launched: | 2016 |
| Gross tonnage: | 510 |
| Displacement: | 900 tonne |
| Length overall: | 44.95m |
| Breadth: | 15.0m |
| Excavator: | Liebherr P9150 |
| Max Dredge depth: | 19.0m |
| Monobloc (boom) length: | 14.0m |
| Stick (dipper) lengths: | 7.0m, 9.5m |
| Bucket sizes: | 3.5m$^3$, 3.0m$^3$ |
| Clamshell sizes: | 3.0 m$^3$ Environmental |
| Ripper: | XR60 Xcentric Ripper |
| Dredging control: | DipMate v3 by Seatools |
| Position and height control: | Trimble SPS855: GNSS Location 10/10, Trimble SPS555: Heading RTK DGPS |
| Aft spuds: | Two @ 1.4m x 1.4m x 32m long |
| Forward spuds: | One @ 1.4m x 1.4m x 32m long in carrier |
| Spud carrier stroke: | 6.5m |
| Jackup capacity: | 600 tonnes |

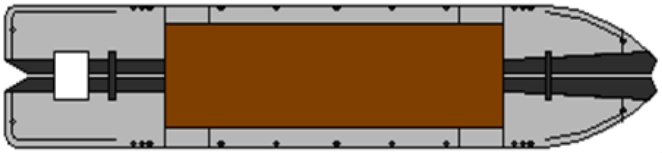


Heron Construction Co. Ltd.

# W.H. 761 and W.H. 762

## Non-propelled Split Hopper Barges

| | |
|---|---|
| Names: | WH 761 and WH762 |
| Type: | Non propelled, Split Hopper Barge |
| Maritime New Zealand Number: | WH 761: 124434, WH 762: 124435 |
| Class: | MNZ Barge Safety Certificate - Unlimited |
| Operators: | Heron Construction Company Ltd |
| Port of Registry: | Auckland, New Zealand |
| Gross tonnage: | 630 |
| Length between perpendiculars: | 55.8m |
| Length overall: | 59.4m |
| Breadth moulded: | 10.97m |
| Breadth max: | 11.04m |
| Draft loaded: | 3.5m |
| Draft lightships: | 1.3m |
| Displacement lightships: | 439 tonne |
| Load deadweight: | 1400 tonne |
| Hopper capacity: | 765 $m^3$ |
| Hopper dimensions at coaming: | 31.24m x 7.47m |
| Hopper bottom opening: | 2.4m (max.) |



Heron Construction Co. Ltd.

# LUCINDA

LUCINDA

**Principal Particulars**

| | |
|---|---|
| Call Sign | VJLU |
| Port of Registry | Port Lincoln |
| Builder | Index Slipway & Eng. Brisbane |
| Official Number | 191684 |
| Year Built | 1975 |
| Class | ABS |
| Survey Authority | South Australia |
| Length Overall | 23.77m |
| Length Waterline | 22.86m |
| Breadth Moulded | 7.52m |
| Depth Moulded | 3.01m |
| Designed Draft | 4.27m |
| Gross Tonnage | 250 |
| Fuel Capacity | 46.4 tons |
| Domestic FW Capacity | 9.2 tons |
| Ballast Capacity | 33.5 tons |
| Designed Bollard Pull | 26.4 tons |

**TWIN SCREW STEERING NOZZLES**

| | |
|---|---|
| Designed Speed | 10.4 KNOTS |
| **Navigational Aids** | |
| Radar | Furuno/1830 24n/miles |
| Echo Sounder | Furuno/FG-2000 MK111 |
| Auto Pilot | Robertson |
| GPS | Koden |
| **Machinery & Equipment** | |
| Main Engines | 2 x Detroit 12V149 800 BHP @ 1900 RPM |
| Clutch/Gearbox Type | TWIN Disc MG540 9.13:1 |
| Propellers | 2286mm x 2015mm |
| Alternators | 2 x Detroit 3.53 Series 37.5kw |

*All specifications listed in good faith, but without guarantee.*

**PORT LINCOLN TUGS PTY LTD**
Level 2, Suite 6/448 Pacific Highway, Artarmon NSW 2064
Tel + 61 2 9418 3711 / Fax + 61 2 9418 3722
Email info@stannard.com.au

Pacific Tug Group
Serving Australia since 1965

# VESSEL SPECIFICATION SHEET

## P.T. KYTHIRA

| PRINCIPAL PARTICULARS | |
|---|---|
| Vessel Type | **Twin Screw Tug** |
| Year Built | **2008** |
| Flag | **Australian** |
| Operational Area | **Unlimited** |
| Class | **NKK** |
| GRT / NRT | **192 / 58** |
| Speed (free run) | **11 knots** |
| Accommodation | **10 persons. All spaces air con** |
| Bollard Pull | **25 ton (est)** |
| Length OA | **26.0 m** |
| Breadth | **8.00 m** |
| Depth | **3.65 m** |
| Summer Draft | **3.00 m** |
| Summer Displacement | **362 ton** |
| Light Ship | **181 ton** |
| Fuel Capacity | **140,000 litres** |
| Fuel Consumption | **180 litres / hour** |
| F/water Capacity | **39,000 litres** |

| PROPULSION MACHINERY | |
|---|---|
| Main Engines | **2 x Yanmar 6AYM - ETE** |
| Power Rating | **2 x 610 kW (1636 HP)** |
| Gearboxes | **R/R Reintjes WAF 364L. ratio 6.417:1** |
| Propellers | **70" 4 blade Manganese Bronze. Kort Nozzles** |
| Steering Gear | **Twin Rudder high lift – Electro Hydraulic** |

| AUXILIARY EQUIPMENT | |
|---|---|
| Generator | **2 x Mitsubishi S4K-T** |
| Capacity | **54 kW 415/230 volts** |
| Fuel Transfer p/p | **2 x Ebara Valoute1 1/2" 20m$^3$ / hr each** |
| Hydraulic Power | **John Deere 6068TFM50** |

| DECK EQUIPMENT | |
|---|---|
| Towing Hook | **20t capacity free range, emergency release** |
| Towing Winch | **40t Line pull. 100t Brake holding capacity. 40 metres / min retrieval** |
| Drum Capacity | **40mm WRC x 600m** |
| Capstan | **Nil** |
| Stern Roller | **20t (est) capacity** |
| Anchor Handling Winch / Tugger | **10t line pull, 40t Brake holding capacity. 24mm wire** |

COMMENTS

Very capable coastal and International towing vessel. Unrestricted navigation area. Flexible sized vessel for manoeuvring barges in port as a dredging support vessel. High lift rudders add to her manoeuvrability.

Electronic chart system, AIS equipment.

Whilst every effort is made to ensure particulars are correct, Pacific Tug does not warrant the accuracy of the information given

8/119 Colburn Avenue, Victoria Point QLD 4165
PO Box 5245, Victoria Point, QLD 4165
P: +61 7 3383 6600
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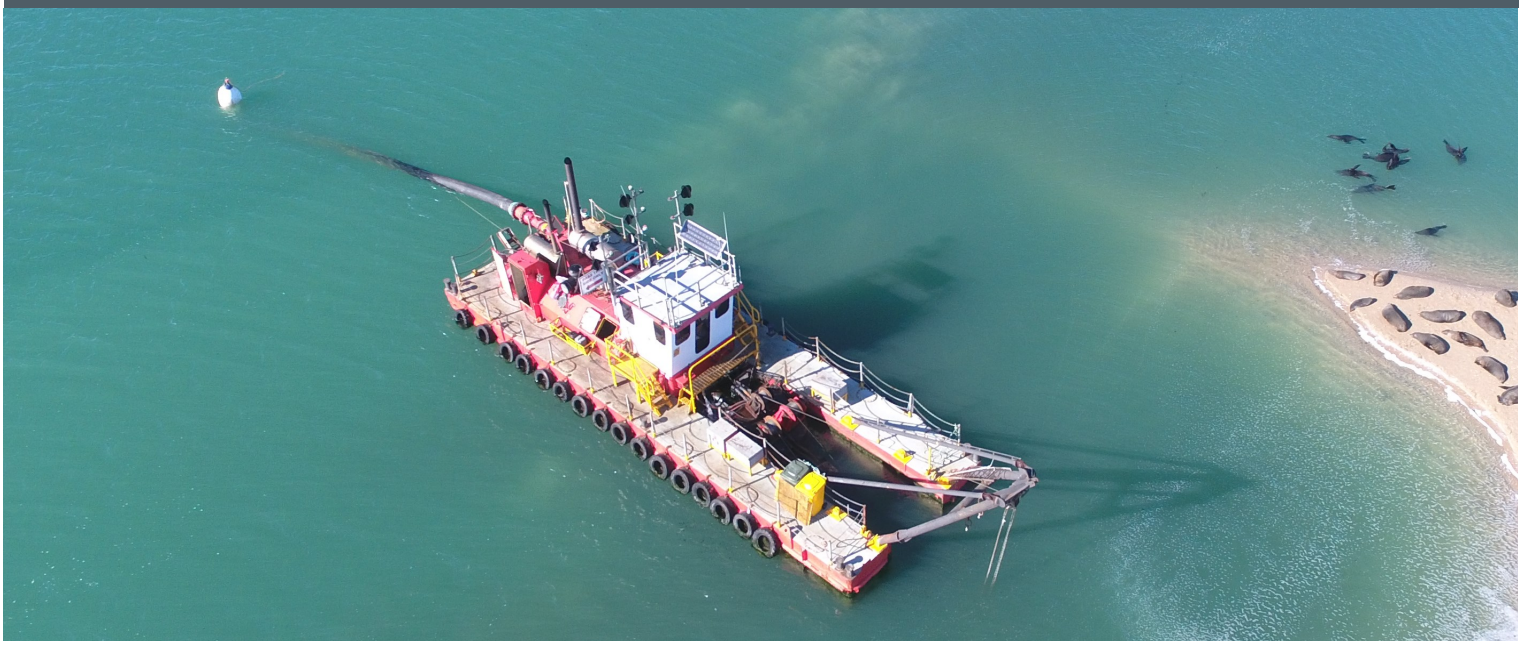
www.pacifictug.com

# Vessel Specification Sheet

## Cutter Suction Dredge

# *Ironheart*

MARITIME CONSTRUCTIONS



| Dimensions | |
|---|---|
| Length (m) | 17.1 |
| Beam (m) | 5.6 |
| Depth (m) | 1.5 |
| Draft (m) | 1.1 |

| Particulars | |
|---|---|
| Type | Cutter Suction Dredge |
| Builder | Maritime Constructions |
| Vessel ID | 453084 |
| Survey | 2D |

| Dredge and Engine Installation | |
|---|---|
| Dredge pump type | 10/12 LSA C/3ME |
| Discharge diameter | 400mm |
| Cutter type | Rosebud / Jaden |
| Cutter power | 45kW |
| Dredge pump engine | Cat C18 |
| Continuous Power rating | 605hp |

| Capacities | |
|---|---|
| Crew numbers | 4 |
| Passengers | N/A |
| DWT (t) | 70 |
| Fuel Oil (l) | 18,000l |
| Water (l) | N/A |
| Hydraulic Oil (l) | N/A |

| Dredging Features | | | |
|---|---|---|---|
| Max. dredging depth | -10m or -18m w/- exten. | Flow rate | 3200 $m^3/h$ |
| Swing Width | 60.0m | Spud/Winches | 3 point hydraulic winch |

Ironheart CSD can take both Rosebud and Jaden Cutterhead. Multiple booster stations.

Interchangeable hydraulically driven drives / attachments.

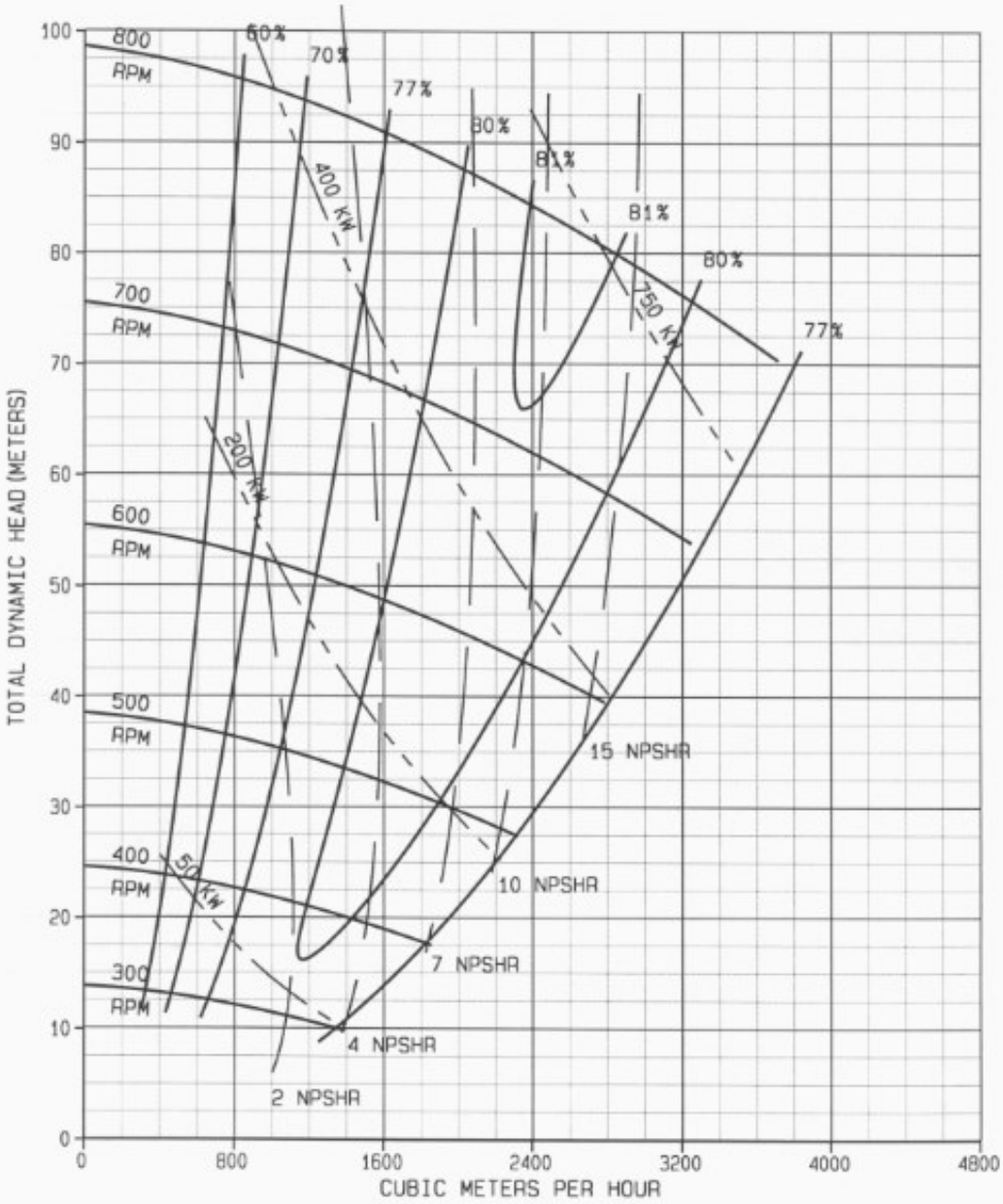


**E** info@mc-group.com.au www.maritimeconstructions.com.au **T** +61 8 8248 8700

# Vessel Specification Sheet

| Pump Type / Model | Vane Diameter | Free Passage | |
|---|---|---|---|
| LSA 10x12-36 C/3ME<br>S Series | 914 mm | 160x171mm | GIW Industries Inc.<br>A KSB Company · KSB |
| **Clear Water Performance**<br>The effects of specific gravity, viscosity and solids on performance with slurry must be accounted for. Alternate choice for frame size or seal type may also have some effects. | **Frame Size**<br>4-5G<br>**Seal Type**<br>K, F, M | **Curve Number**<br>E 5C-90<br>TP Basis<br>8290B-93 | |

Approx. 250 mm Disch, 300 mm Suct



## 6.3 Appendix C – Water Quality Monitoring Plan

SWASH
Dredging | Marine | Environment

# Water Quality Monitoring Plan (WQMP) – ABMRI Phase II

Department for Environment and Water

1 September 2026

# Document Control

| Version | Details | Authorised by | Date |
|---|---|---|---|
| 0 | Draft | Brad Grant | 27 April 2026 |
| 1 | Revised Draft | Brad Grant | 1 May 2026 |
| 2 | Revised Draft | Brad Grant | 6 May 2026 |
| 3 | Revised Draft | Brad Grant | 11 May 2026 |
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| 5 | Final | Brad Grant | 2 June 2026 |
| 6 | Revised Final | Brad Grant | 16 June 2026 |
| 7 | Revised Final | Brad Grant | 29 June 2026 |
| 8 | Revised Final | Brad Grant | 1 July 2026 |
| 9 | Revised Final | Brad Grant | 14 August 2026 |
| 10 | Revised Final | Brad Grant | 28 August 2026 |
| 11 | Revised Final | Brad Grant | 1 September 2026 |

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# 1 Introduction

Swash Project Delivery (Swash) was engaged by the Department for Environment and Water (DEW) to develop and implement a marine Water Quality Monitoring Plan (WQMP) for Phase II of the Adelaide Beach Management Review Implementation Dredge Trial (ABMRI Phase II). Implementation of this WQMP will manage risks to water quality arising from dredging operations during ABMRI Phase II.

## 1.1 Objective

The objective of this WQMP is to provide a framework for water quality monitoring during ABMRI Phase II of the dredging trial, including development of the monitoring methodology, water quality trigger limits and delegation of roles and responsibilities.

## 1.2 Monitoring Overview

Monitoring will comprise a combination of deployed instrumentation, site-specific investigations, and satellite image analysis, including:

- Monitoring buoys fitted with telemetry for real-time data feed, automatic processing of data and comparison to trigger levels, with alerts sent to notify of exceedances; sensors include turbidity and at select locations, dissolved oxygen, salinity, and temperature.
- Satellite imagery will be used to produce satellite-inferred turbidity maps to complement the measured real time data from monitoring buoys.
- Monitoring for harmful algal blooms (HAB) and hydrogen sulphide ($H_2S$).

## 1.3 Dredging Program Overview

Dredging operations are proposed for July to September 2026. Water quality will be monitored pre-, during, and immediately post-dredging operations.

The borrow area and placement areas include:

- Sand borrow area – south of the North Haven Marina breakwater.
- Sand placement areas – nearshore areas of West Beach and Henley Beach South.

## 1.4 Program Timeframe

The proposed monitoring program schedule is:

- Equipment deployment – 25 June 2026
- Baseline monitoring – June/July/August 2026 (~10 weeks)
- Dredging period – September 2026 (~4 weeks), with possibility to extend into October pending approval from EPA.
- Post-dredging monitoring – October 2026 (~4 weeks)

# 2 Dredge Plume Modelling

Hindcast dredge plume modelling was undertaken using data generated during the 2024 dredge trial and has been used to inform the location of monitoring sites for ABMRI Phase II, based on modelled plume direction.

Two scenarios were used in the hindcast modelling – an expected case (average conditions) and a worst case (upper bound). The scenarios took into account different spill rates and sediment size distribution. Due to the larger target volume for the 2026 campaign, the worst case scenario has been assumed.

Thresholds used to delineate the zones of impact were adopted from the Outer Harbour Channel Widening Project Environmental Modelling as presented in **Table 1**.

***Table 1. Zones of Impact Turbidity Thresholds***

| Impact zone (after EPA guidelines) | Turbidity (NTU) thresholds above background | | | |
|---|---|---|---|---|
| | 20th | Median | 80th | 95th |
| Zone of High Impact (ZoHI) | 3 | 5 | 15 | - |
| Zone of Moderate Impact (ZoMI) | 1 | 2 | 5 | - |
| Zone of Influence (ZoI) | - | 0.5 | 2 | 5 |

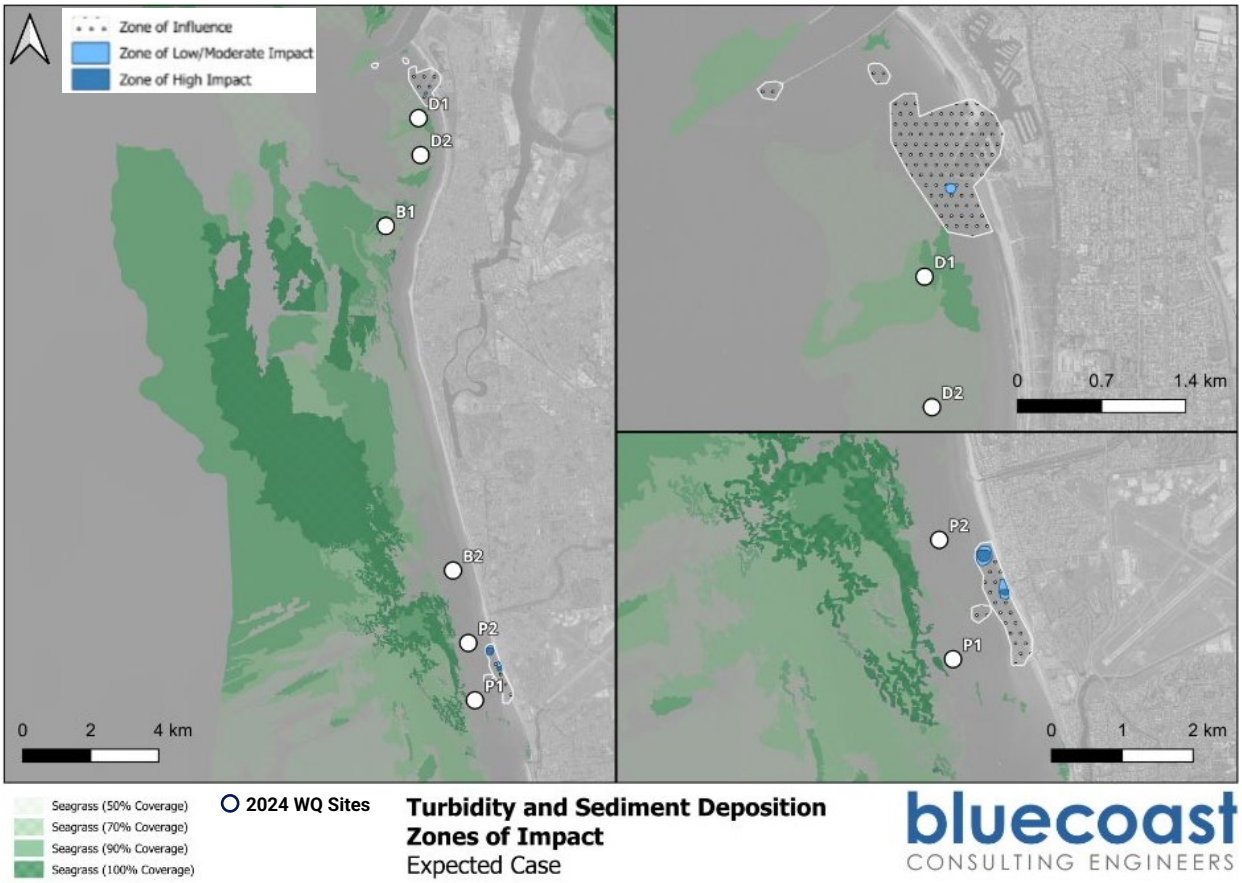
Model outputs were provided as 'zones of impact' figures (**Figure 1**) as follows:

- Zone of High Impact (ZoHI) – solid dark blue:
  - Irreversible impacts. This zone is usually present at locations directly involved or adjacent to dredging, disposal or nourishment.
- Zone of Moderate Impact (ZoMI) - solid light blue:
  - Impacts from dredging activities are predicted to recover within a defined timeframe.
- Zone of Influence (ZoI) - dotted area:
  - Extent of a detectable plume (above background), but no predicted ecological impacts.

To assist with placement of water quality instruments, the 95th percentile of dredge plumes (above background) was modelled to indicate the near-maximum extent of dredge plumes. This is shown in **Figure 2**. Note that the monitoring sites in **Figure 1** and **Figure 2** are from the 2024 dredge program.

The hindcast modelling concluded the following:

- While dredge plumes mobilise north and south with the tide, the plumes generally mobilise in a net northerly direction.
- No plumes of significance intersected with the monitoring sites.
- Some minor plumes occurred within a small extent around the dredging and placement activities.



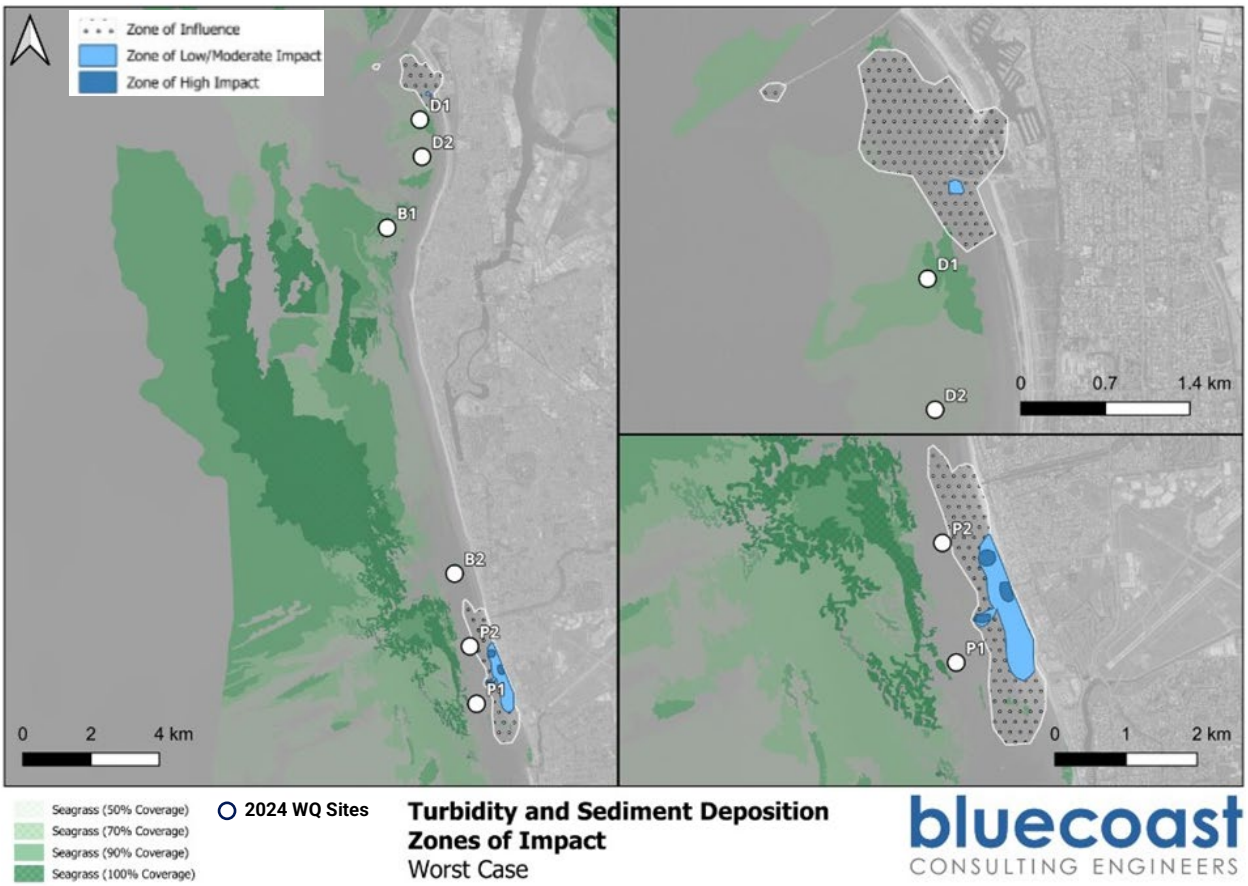




***Figure 1. Zones of Impact – Expected Case (Top) and Worst Case (Bottom)***

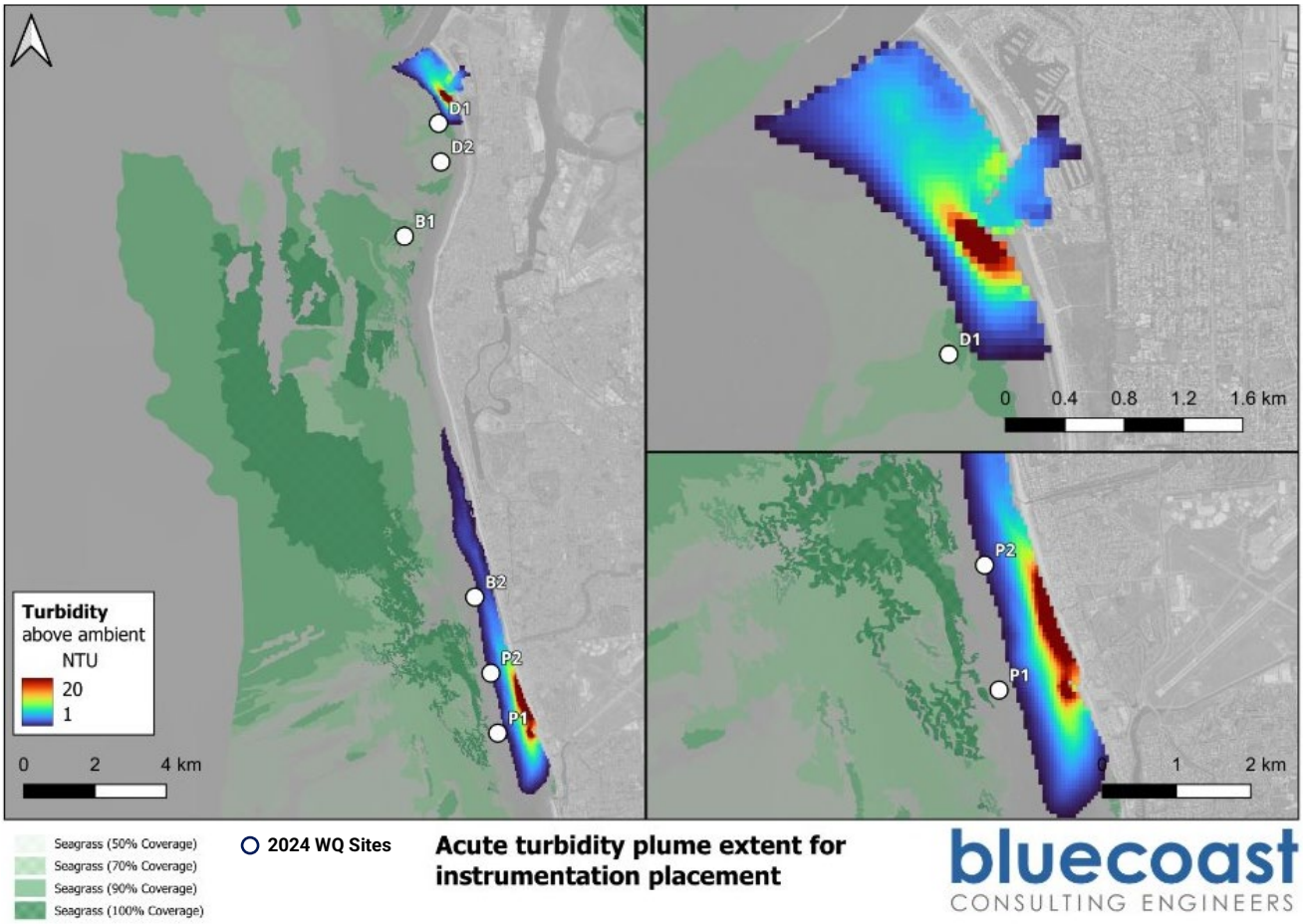



*Figure 2. 95th Percentile Turbidity*

# 3 Water Quality Monitoring Plan

This WQMP that has been developed for ABMRI Phase II dredging for sand management on Adelaide's metropolitan beaches.

## 3.1 Monitoring Sites

The location of water quality monitoring sites has been guided by the proposed dredge program (**Section 1.3**), historical monitoring programs and location of seagrass meadows (data sourced from SA Marine Benthic Habitats layer). These monitoring locations will also enable validation of the predicted extent of the dredge plume - the Zone of Influence (ZoI) calculated from hindcast modelling (**Section 2**).

Water quality monitoring equipment will be deployed at eight monitoring locations, as depicted in **Table 2**, **Figure 3** and **Figure 4**:

- Borrow area - one water quality monitoring site (NH) located adjacent the borrow area and sensitive receivers south of the North Haven Marina breakwater.
- Placement areas - three water quality monitoring sites located adjacent sand placement areas and sensitive receivers at West Beach (WB1 and WB2) and Henley Beach (HEN).
- Background - four 'background' water quality monitoring sites (B1, B2, B3 and B4).

Where possible, monitoring sites have been selected based on previous DEW monitoring (2021/22 and 2024) and the Outer Harbour Channel Widening (OHCW) project - BMT 2019).

The rationale for selection of monitoring sites includes the following:

- **NH -** near historical sites D1 (2024), D2 (2019) and M1 (2022). Located to the north of previous site (D1) due to northerly direction of modelled dredge plumes.
- **B1** - north of the Port River/Outer Harbour channel entrance, near to historical site D1 (2019).
- **B2** - near historical site B1 (2022 and 2024).
- **B3** - inshore from historical site B1 (2019).
- **HEN** - near historical site B2 (2022 and 2024).
- **WB1** - near historical site P2 (2024).
- **WB2** - near historical site P1 (2024) and SARDI seawater intake pipe.
- **B4** – background site near Tennyson.

The sites are located in similar water depths near the 5 m Lowest Astronomical Tide (LAT) depth contour to ensure data is comparable between sites. This depth is also typically associated with the edge of seagrass meadows in the active nearshore environment along the Adelaide metropolitan coast.

*Table 2. Monitoring Sites*

| Site ID | Description | Historical WQM Sites | Coordinates | |
|---|---|---|---|---|
| | | | Latitude | Longitude |
| **Northern Zone (Borrow Area)** | | | | |
| NH | Dredge monitoring site – North Haven borrow area | Site D1 (2024), M1 (2022) and D2 (2019) | 138.479315 | -34.798879 |
| B1 | Background monitoring site – north of Port River | Site D1 (2019) | 138.463824 | -34.77873 |
| B2 | Background monitoring site – Largs Bay | Site B1 (2022 and 2024) | 138.475417 | -34.828181 |
| B3 | Background monitoring site – Semaphore | Site B1 (2019) | 138.464058 | -34.857615 |
| **Southern Zone (Placement Areas)** | | | | |
| HEN | Placement monitoring site – Henley Beach placement area | Site B2 (2022 and 2024) | 138.486542 | -34.922834 |
| WB1 | Placement monitoring site – northern West Beach placement area | Site P2 (2024) | 138.490893 | -34.942442 |
| WB2 | Placement monitoring site – southern West Beach placement area, near SARDI seawater intake | Site P1 (2024) | 138.491360 | -34.956093 |
| B4 | Background monitoring site – Tennyson | Nil | 138.476614 | -34.892378 |

Title:

**Water Quality Monitoring Sites - North**

Figure: 3

Rev: A

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

0 600 1,200 m

SWASH
Dredging | Marine | Environment

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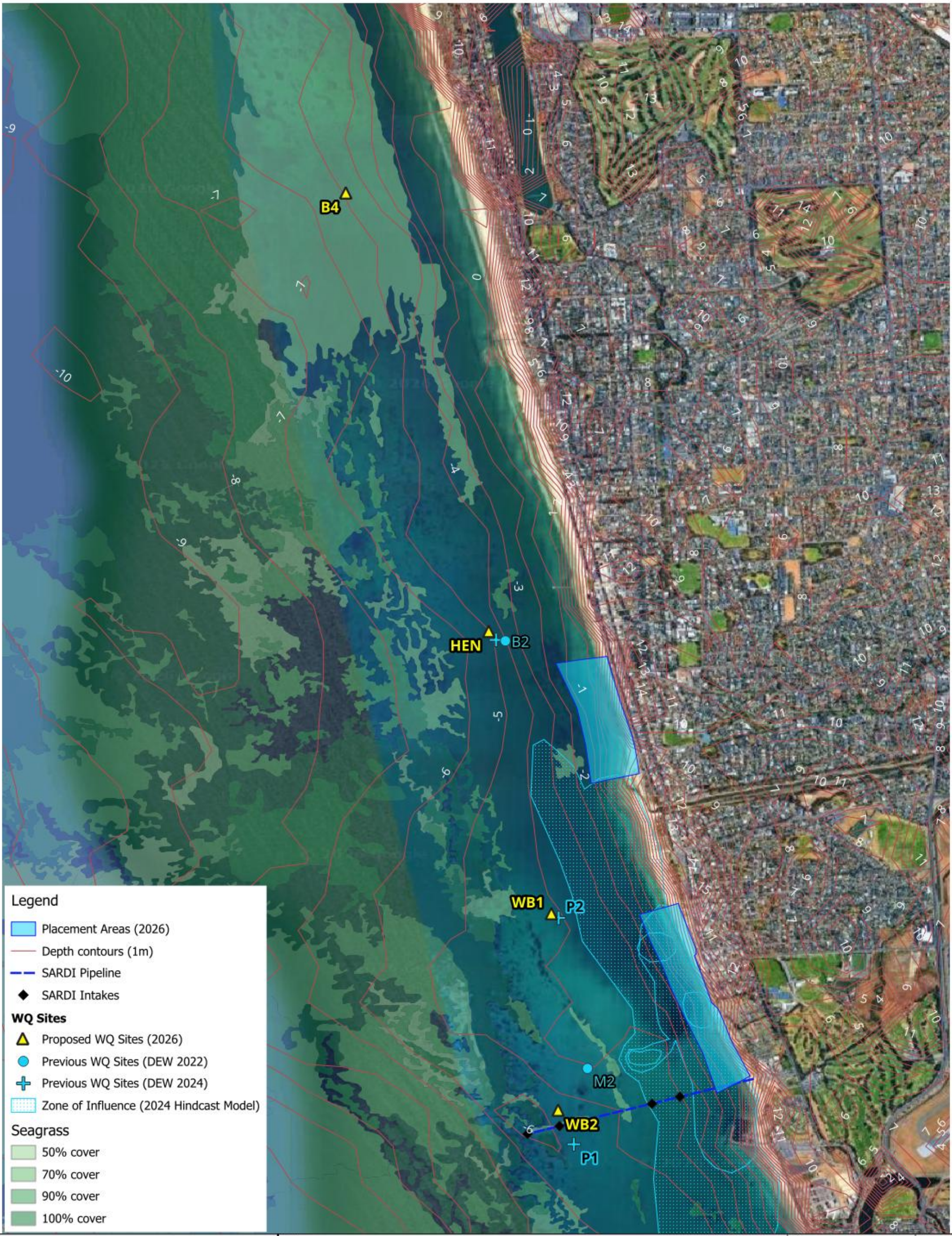


Title:

**Water Quality Monitoring Sites - South**

Figure: 4

Rev: A

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0 500 1,000 m

SWASH Dredging | Marine | Environment

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## 3.2 Water quality parameters

The following water quality parameters will be continuously measured (i.e. data logged every 15 minutes) throughout the monitoring program:

- Turbidity (proxy for suspended sediments within the water column):
  - Optical scatter via a nephelometer (readings in Nephelometric Turbidity Units - NTU).
  - All sites.
  - Twin turbidity sensors for quality control.
- Electrical conductivity (EC), pH and dissolved oxygen (DO - measured as % saturated):
  - Consistent spatially and temporally in the marine environment, therefore will only be monitored at three key sites - borrow area monitoring site (NH); placement area monitoring site adjacent the SARDI seawater intake pipe (WB2); background site at Tennyson (B3).
- Water temperature:
  - All sites.

***Table 3. Sites and Parameters***

| Area | Site | Type | Parameters |
|---|---|---|---|
| North | NH | Dredging | Twin turbidity, DO, pH, EC, temp |
| | B1 | Background | Twin turbidity, temp |
| | B2 | Background | Twin turbidity, temp |
| | B3 | Background | Twin turbidity, temp |
| South | HEN | Placement | Twin turbidity, temp |
| | WB1 | Placement | Twin turbidity, temp |
| | WB2 | Placement | Twin turbidity, DO, pH, EC, temp |
| | B4 | Background | Twin turbidity, DO, pH, EC, temp |

## 3.3 Monitoring Equipment

To collect real-time near-surface water quality measurements, water quality loggers will be mounted on purpose-built monitoring buoys (**Figure 5**). The monitoring equipment will be fitted with navigation lights and secured to the seabed using robust mooring lines and bruce anchors to minimize risk of theft and movement of equipment. Each monitoring buoy will be installed with a GPS tracking device which will send an alert if the buoy moves location.

The water quality logger (YSI EXO sonde) will be fitted with sensors designed to withstand long-term deployments in the marine environment. A copper anti-fouling guard, copper tape and sensor wiping apparatus prevent interference to sensors from marine growth.

The loggers are capable of continuous data logging, and will be programmed to log data once every 15 minutes. Real-time data from each buoy will be made available via telemetry using in-built Campbell Scientific data loggers, 4G modems, batteries and solar panels.

The sensors will measure turbidity and water temperature at all sites. Additional sensors measuring dissolved oxygen (% saturated), pH and electrical conductivity will be installed at three key monitoring sites NH, WB2 and B3. Each buoy will be fitted with a secondary turbidity sensor for QA/QC purposes and redundancy (in case a turbidity sensor malfunctions or becomes fouled).

With the loggers installed in each monitoring buoy, the sensors will be located at a depth of approximately 1m below the water surface.

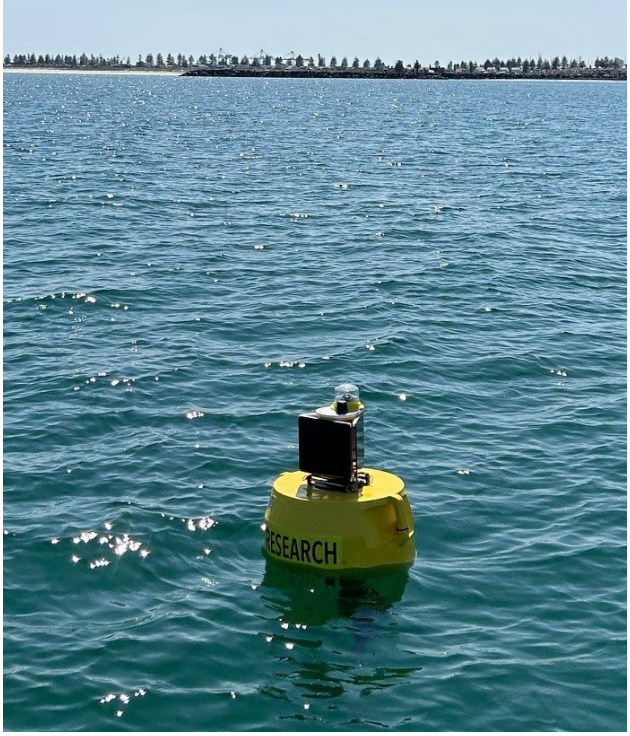


*Figure 5. DB600 Buoy*

## 3.4 Permits

Prior to deployment of monitoring equipment in the nearshore marine environment, advice for a 'Notice to Mariners' outlining the equipment used, deployment locations and deployment period will be submitted to the Department for Infrastructure and Transport (DIT). DIT has confirmed that a Licence Agreement for the water quality monitoring equipment is not required.

## 3.5 Calibration and Servicing

All monitoring equipment will be calibrated as per the manufacturer's specifications. Optical sensors (such as turbidity and DO) and EC sensors are robust and the manufacturer recommends calibration at least once every 6-12 months during use, while pH sensors are recommended to be calibrated every 2-4 months. All sensors will be calibrated prior to deployment.

The water quality monitoring equipment will be serviced every four weeks (subject to weather conditions). Servicing trips will involve cleaning and a calibration-check of all instrumentation, and any repairs or other maintenance required. Calibration will be checked as follows:

- A calibrated, hand-held water quality meter will take measurements from surface to bottom at each site during servicing trips to confirm the ongoing accuracy of the sensor readings. If a sensor is not reading correctly, it will be calibrated in the field or replaced with a spare, pre-calibrated sensor.
- Water quality grab samples (**Section 3.7**) will be collected adjacent to each monitoring buoy and analysed for turbidity.

Additional servicing trips will be undertaken should the monitoring data indicate any equipment malfunction or interference.

## 3.6 Equipment Failure

In the event of monitoring equipment failure during dredging operations, the following steps will be taken:

- A servicing trip - within 24 hours (weather dependent) if dredging is occurring; within 72 hours if dredging is not occurring.
- If the issue cannot be rectified onsite, replacement equipment will be deployed as soon as possible. Note – a spare YSI EXO sonde and sensors will be available in Adelaide for immediate replacement if necessary.
- If required, equipment from a background monitoring site can be relocated to the failed equipment site to maintain data logging while replacement equipment is sourced and deployed.

## 3.7 Grab Samples

At each water quality monitoring site, grab samples will be collected during deployment, servicing and retrieval trips. Water samples will be collected near the surface at each site.

The appropriate preservation protocols will be followed for sample collection, including the use of laboratory-supplied sample containers pre-filled with preservative (e.g. zinc acetate preservative for total sulfide) to ensure immediate preservation of the sample.

Samples will be placed in an ice-filled esky and submitted to a National Association of Testing Authorities (NATA) certified laboratory on the day of sampling.

Water samples will be analyses for the following:

- Total suspended solids (TSS).
- Turbidity (NTU).
- Ultra-trace metals (total and dissolved) – Al, As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg.
- Total sulfide.
- Ammonia.

Measurements of total sulfide from grab samples will be converted to hydrogen sulfide (H2S) concentrations using water temperature and salinity data taken from the in-situ instruments.

## 3.8 Data Analysis

Real-time telemetered data will be collected from each of the sites and compared to trigger values throughout the duration of the project.

Water quality data collected at monitoring buoys during dredging will be managed as follows:

- Data will be automatically downloaded on an hourly basis via a remote telemetry system. This raw data (not quality controlled) will be displayed on a monitoring portal (Eagle.io) developed for the project.
- Raw data will undergo an automatic QC checking process, followed by a manual QC checking process on a daily basis (refer to **Section 3.11**) and any potentially erroneous data will be quarantined from the data set.
- The QC-cleaned data will undergo automatic calculation of required metrics (e.g. 15-day and 6-day rolling medians) for comparison to trigger limits (**Section 3.9**). The calculated medians will be displayed on the monitoring portal as time series charts with trigger levels displayed. Alerts will be sent out to key project personnel if trigger limits are exceeded.

The monitoring data will be presented in a dashboard style monitoring portal.

## 3.9 Water Quality Trigger Limits

An adaptive management program involving turbidity, pH and dissolved oxygen (DO) trigger levels will be implemented during the dredge trial. Trigger levels have been set based on the EPA dredge guideline (EPA, 2020), previous Phase 1 dredge trial monitoring data (Epic Environmental, 2024) and the 2019 Outer Harbour Channel Widening (OHCW) project (BMT, 2019). The turbidity trigger levels take into account natural background turbidity and zones of impact thresholds for seagrass.

The 'Alarm' and 'Hold' trigger limits for the 2019 OHCW project used a baseline turbidity of 0.8 NTU (in deeper waters around 8 m LAT) with zone of impact threshold values added to this baseline value – 50$^{th}$ percentile for 15-day median and 80$^{th}$ percentile for 6-day median. The zone of impact thresholds are included in **Table 4.**

***Table 4. Zones of Impact Turbidity Thresholds***

| Impact zone (after EPA guidelines) | Turbidity (NTU) thresholds above background | | | |
|---|---|---|---|---|
| | 20$^{th}$ | Median | 80$^{th}$ | 95$^{th}$ |
| Zone of High Impact (ZoHI) | 3 | 5 | 15 | - |
| Zone of Moderate Impact (ZoMI) | 1 | 2 | 5 | - |
| Zone of Influence (ZoI) | - | 0.5 | 2 | 5 |

To set appropriate trigger values for this project (with sites located in slightly shallower waters compared to the 2019 OHCW project), the pre-dredge monitoring data from Phase 1 of the dredge trial (2024) was analysed. The Phase 1 pre-dredge data was collected during a similar time of year (July to Sep), using similar equipment and locations as proposed in this WQMP. The pre-dredge data was collected between 27 July and 30 September 2024, and summary statistics of this data are presented in **Table 5**.

***Table 5. Summary of Phase 1 Data (2024) – non-dredging periods***

| Summary Statistic | Phase 1 Monitoring Sites | | | | | | Average |
|---|---|---|---|---|---|---|---|
| | D1 | D2 | B1 | P1 | P2 | B2 | |
| Minimum | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.3 | 0.2 |
| 20th percentile | 0.4 | 0.4 | 0.5 | 0.6 | 0.7 | 0.9 | 0.6 |
| Median (50th percentile) | 0.8 | 0.8 | 1 | 1.4 | 1.5 | 1.7 | 1.2 |
| 80th percentile | 2.2 | 2 | 2.4 | 3.3 | 3.5 | 3.8 | 2.9 |
| Maximum | 12.9 | 13.3 | 12.4 | 25.9 | 25.5 | 19 | 18.2 |

Based on the results of the analysis in **Table 5**, a baseline turbidity value of 1.2 NTU (average median value of all sites) has been used to set trigger values for Phase 2 of the dredge trial. When the zone of impact threshold values (2 NTU and 5 NTU for Alarm, and 5 NTU and 15 NTU for Hold) are added to this baseline value, the revised trigger levels that will be applied to this project are as follows:

- **Alarm** level (associated with boundary of the zone of low to moderate impact):
  - 3.2 NTU based on a 15 day rolling median
  - 6.2 NTU based on a 6 day rolling median
- **Hold** level (associated with boundary of the zone of high impact):
  - 6.2 NTU based on a 15 day rolling median
  - 16.2 NTU based on a 6 day median rolling median

In accordance with the EPA dredge guideline (EPA, 2020), trigger values are also required for pH and DO. The EPA guidelines specify the following:

- **pH**:
  - Alarm: change of greater than 0.5 pH unit

  - Hold: pH values less than 6.5
- **DO**:
  - Alarm: DO less than 65% saturation
  - Hold: DO less than 55% saturation

The 15-day and 6-day rolling median turbidity values, along with pH and DO values, will be compared to the 'Alarm' and 'Hold' criteria in Eagle.io and alerts sent out to key project personnel if they are exceeded. The adaptive management strategy to exceedance of trigger limits is described as follows and shown in **Figure 6** for turbidity and **Figure 7** for pH and DO.

**Level 1: Business as Usual**

Turbidity levels remain below Alarm thresholds (pH and DO levels remain above Alarm levels), dredging continues as planned with ongoing monitoring at all times.

**Level 2: Alarm**

Turbidity levels exceed either of the following thresholds requiring the implementation of management actions by the Dredge Contractor to reduce levels:

- 3.2 NTU based on a 15 day rolling median, or
- 6.2 NTU based on a 6 day rolling median.

Upon reaching the Alarm trigger level, the dredge contractor will assess the source of increased turbidity, slow dredging, and/or implement management measures to reduce turbidity levels to return readings below Level 1 (Business as Usual). If the trigger is reached at the North Haven dredge site, then management measures will focus on altering dredging activities. Conversely, if the trigger is reached at the placement site, then management measures will focus on altering placement activities. Specific actions are detailed in the DMP.

Note: if the rolling median at one or more of the background sites also reaches the trigger values (or is within 20%), then dredging can continue as per Level 1: Business as Usual.

If DO decreases below 65% saturation, or pH values change by more than 0.5 pH unit at site WB2 (placement site) or site NH (dredge site), then adaptive management measures to be implemented as follows:

- If the trigger is reached, additional targeted water quality field testing (pH and DO) will be undertaken as soon as practical (weather dependent) in the vicinity of the triggered buoy to assess the source of low pH or DO.
- If the trigger is reached at North Haven (site NH), testing of pH of material in hopper loads will be undertaken to assess if source of low pH or DO is from dredge material. If pH of material is less than pH of 5, or there is significant organic material in the hopper, dredging and placement works are to cease until material can be adequately treated or disposed of accordingly.

**Level 3: Hold**

Turbidity levels exceed either of the following thresholds:

- 6.2 NTU based on a 15 day rolling median, or
- 16.2 NTU based on a 6 day median rolling median.

Upon reaching the Hold trigger level, the dredge contractor will cease dredging as soon as practicable (if exceedance is at dredging site) and placement activities as soon as practicable (if trigger is at placement site). If the Hold trigger is reached at the North Haven dredge site only, then placement activities can continue at West Beach/Henley Beach. Conversely, if the Hold trigger is reached at the placement site only, then dredging activities can continue at North Haven.

An assessment will be undertaken in consultation with the EPA to determine whether background turbidity is a significant influence and if so, then dredging and placement can recommence. Level 2 Alarm management measures are to be implemented for a period upon commencement until turbidity levels return below Level 2 (Alarm).

If DO decreases below 55% saturation, or pH values decrease below pH 6.5, then the following will occur:

- Dredging will cease as soon as practicable if exceedance is at dredging site (NH). If trigger is at any of the placement sites, no placement of sand will occur at the location where the exceedance was reached.
- An assessment will be undertaken in consultation with the EPA to determine whether background pH and/or DO is a significant influence.
- Dredging will recommence only after clearance is provided by the EPA during business hours, Monday to Friday. Outside of these times, when triggers have decreased to an acceptable level works will recommence.

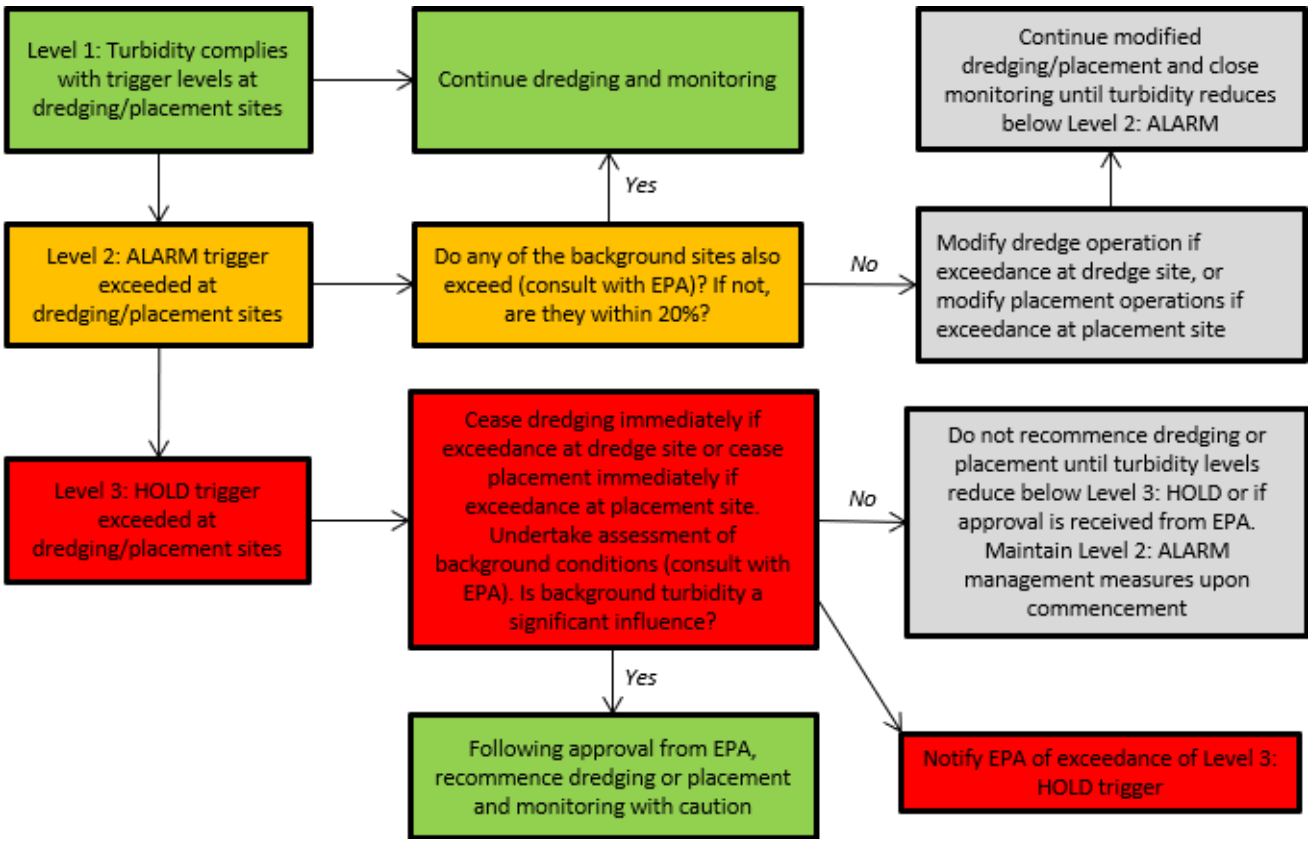


***Figure 6. Adaptive Management Strategy – Turbidity***

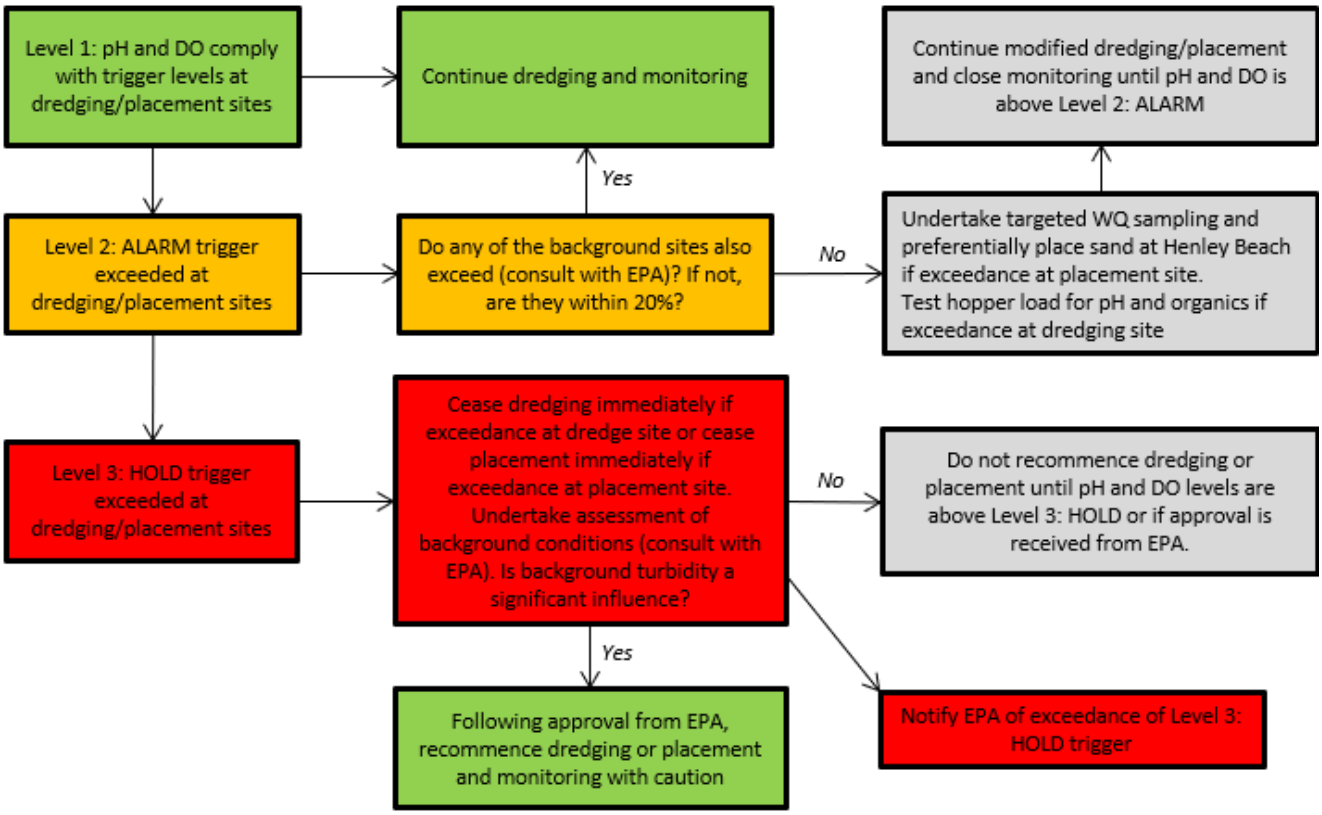


*Figure 7. Adaptive Management Strategy – pH and DO*

## 3.10 Assessment of Turbidity Data

Should the rolling median turbidity at dredging/placement sites reach the trigger limits, the rolling median turbidity (i.e. 6 day or 15 day) at the background sites is to be assessed to determine if ambient turbidity is elevated and is accounting for increased turbidity at dredging/placement sites.

If the Alarm trigger is reached at the North Haven dredge site and none of the background sites have reached the Alarm trigger, then management measures will focus on altering dredging activities. The exception to this would be if the background site/s are within 20% of the site that has exceeded, then dredging may continue, as this accounts for rolling median values either side of the trigger level. Conversely, if the Alarm trigger is reached at the placement site and none of the background sites have reached the Alarm trigger, then management measures will focus on altering placement activities.

Otherwise, if the Alarm trigger is reached at dredging and/or placement sites but one or more background site has also reached the trigger, then this may indicate higher background levels are occurring independent of the dredging or placement activity (a natural weather event, for example). If this occurs, an assessment will be undertaken **within 24 hours** in consultation with the EPA to determine if dredging and/or placement can continue.

If the Hold trigger is reached at the North Haven dredge site and none of the background sites exceed the Alarm trigger, then dredging is to stop immediately and not start until approval is received from the EPA to continue dredging. Level 2 Alarm management measures are to be implemented for a period upon commencement. The exception to this would be if the background site/s are within 20% of the site that has exceeded, then dredging may continue, as this accounts for rolling median values either side of the trigger level. Conversely, if the Hold trigger is reached at the placement site and none of the background sites have reached the Hold trigger, then placement activities are to cease immediately until approval is received from the EPA to continue placement activities.

## 3.11 Quality Assurance and Quality Control

The following will be undertaken to ensure data quality and to minimise any data loss from the real-time monitoring equipment:

- The real-time data on the Eagle.io monitoring portal will be maintained regularly to ensure good quality data is being recorded. If poor quality data becomes evident (potentially due to sensor fouling or malfunction), appropriate rectification actions will be implemented (e.g. servicing trip).
- Sensors and equipment will be cleaned regularly (approximately once every four weeks, depending on weather conditions). All sensors will be calibrated prior to deployment as recommended by the manufacturer using standard solutions prepared from the National Institute of Standards and Technology (NIST) traceable reagents.
- Calibration checks will be undertaken during servicing trips to ensure accuracy and precision of sensor data is maintained. Sensor drift will be addressed by replacement or re-calibration of sensors.
- When sensors are serviced in the field, their condition and appearance will be noted. This will identify if a sensor has been biofouled or has any other noticeable issues. This data will be used to assist in the post-processing assessment of the data.
- A calibration log will be maintained – the log will contain all calibration details and standards used during calibration.

### 3.11.1 Data Quality Control Procedures

As real-time data is automatically downloaded by the web-based monitoring portal, any potential outliers and questionable data will be assigned a quality code which will then be examined further. Rules to flag potential outliers and questionable data will be as follows:

- If any individual measurement is >100% higher or lower than adjacent measurements (e.g. a brief spike in turbidity).
- If data is outside the bounds of typical readings, e.g. negative turbidity or turbidity higher than 1,000 NTU, pH values less than 4 or greater than 10.
- The data will be automatically plotted on the web-based monitoring portal as a time series chart and visually scanned for outliers and evidence of failed sensors, including data which has been assigned a poor-quality code. Obvious failures will result in the data being quarantined from the dataset.
- The use of twin turbidity sensors will assist investigations into the validity of potential outliers and questionable turbidity data. The two data sources will undergo automatic processing by the monitoring portal as follows:
  - Data from the two concurrent turbidity sensors will be downloaded and compared.
  - If the difference in readings is within 20%, then the average turbidity value will be used.
  - If the difference is greater than 20%, then the minimum turbidity value will be used (this assumes that biofouling would increase turbidity values).
- If turbidity readings are unusually high, data will then be examined with consideration to the metocean (wave data), meteorological conditions (data from the Bureau of Meteorology) or dredging activities to determine whether weather conditions or dredging works may have affected the measurements in question. If strong winds/waves and/or dredging activity do not accompany spikes in turbidity, the data will be considered potentially erroneous and subjected to further scrutiny.

# 4 Satellite-Inferred Turbidity

Satellite imagery will be used to produce satellite-inferred turbidity maps. Lower resolution (300 m) satellite imagery will be captured most days and higher resolution (10 m) satellite imagery will be captured every 2 to 3 days. Imagery will be processed to provide turbidity maps to:

- Complement measured turbidity in nearshore areas.
- Detect potential dredge plumes in areas not captured by deployed instrumentation.
- Qualitatively validate sensor readings at monitoring buoys – e.g. a high turbidity reading corresponds to a visible plume on satellite image
- Characterise dredge plumes close to dredging works for model validation purposes.

Satellite-inferred turbidity maps will be produced using a site-specific algorithm to convert satellite backscatter data. The algorithm will be calibrated by:

- Processing high resolution (Sentinel 2) and low resolution (Sentinel 3) satellite imagery for from 2024 when in-situ turbidity data were collected during the 2024 dredge trial).
- Comparing measured turbidity data to the satellite-derived turbidity data at each monitoring site to develop correlations between measured and satellite-derived products.

A technical note will be provided weekly reporting on the outcomes of the water quality monitoring and the associated relationship between dredging activities and turbidity results. The note will cover processed satellite imagery at dredging and sand placement sites, along with the metocean conditions measured at the time of the satellite image capture. All suitable and available satellite imagery will be assessed and included in each weekly technical note. In addition, a validation metric comparing satellite-inferred turbidity with measured turbidity data collected by the in-situ water quality monitoring buoys will be calculated.

# 5 Harmful algal bloom (HAB) and Hydrogen Sulphide

## 5.1 HAB

### 5.1.1 Context

South Australia has experienced several significant HAB events in recent years, affecting the Spencer Gulf, Gulf St Vincent, Kangaroo Island and parts of the state's south-east coastline. HAB taxa of concern include (but are not limited to) the genera *Karenia, Chattonella, Alexandrium, Dinophysis, Pseudo-nitzschia, Gymnodinium, Prorocentrum, Karlodinium, Akashiwo, Trichodesmium* and *Vicicitus*. Blooms of one or more of these algae can result in widespread impacts to marine ecosystems.

The South Australian Research and Development Institute (SARDI), which is part of the South Australian government department Primary Industries and Regions SA (PIRSA), undertake HAB monitoring program to provide early warning of HAB. The program consists of 166 routine sampling sites across seven regions in South Australia. The aim of the program is to deliver early detection, situational awareness, post-bloom vigilance, and risk-proportionate response across South Australia.

### 5.1.2 Monitoring Scope

The extended monitoring plan for HAB comprises the following:

<u>Fortnightly water sample collection:</u>

- Water samples are to be collected fortnightly at the eight monitoring sites as part of the WQMP.
- At each site, samples are to be collected in sample containers provided by the laboratory (Envirolab) as follows:
  - One 600 ml container filled and preserved with Lugol's iodine solution. Container to be kept in the dark and below 25°C.
  - Another 600 ml container filled but not preserved (live sample). Sample to be kept a few degrees below ambient temperature of the water but not refrigerated.
- Samples are to be submitted to the laboratory (Envirolab) within 24 hours to enable transport of samples to the analysing laboratory (Microalgal Services) within 24–48 hours.
- Samples to be analysed for full species count – i.e. enumeration and identification of phytoplankton to genus and species.

<u>Twice-weekly water sample collection:</u>

- Twice weekly (weather permitting) water grab samples will be collected at all eight sites and tested for full species count – i.e. enumeration and identification of phytoplankton to genus and species.
- Sampling procedures are the same as fortnightly sample collection outlined above.

<u>Algae sensors:</u>

- To provide a continuous measurement of total algae in the water column, algae sensors are to be installed on monitoring buoys at the following WQMP sites: B1, B2, B3, HEN and WB1.
- The total algae data will be managed and presented with the WQMP water quality data on the web-based data platform (Eagle.io).

## 5.2 Hydrogen Sulphide ($H_2S$)

### 5.2.1 Context

Hydrogen sulphide ($H_2S$) can form in marine sediments when organic material, such as decaying seagrass, algae, or other plant matter, accumulates and decomposes under low-oxygen (anoxic)

conditions. During this process, sulphate-reducing bacteria use sulphate naturally present in seawater as an electron acceptor, producing hydrogen sulphide as a metabolic by-product.

In small concentrations, $H_2S$ is a natural component of marine sediment processes and contributes to nutrient cycling. However, excessive accumulation can occur where organic loading is high or water exchange is poor (e.g. in sheltered embayments, seagrass die-offs, or areas of sediment disturbance). Elevated $H_2S$ can be toxic to benthic organisms and fish, particularly when sediments are disturbed and sulphide is released into the water column.

In well-oxygenated, open coastal marine waters, the risk of $H_2S$ accumulation is generally very low. Strong tidal flushing, wave action, and water column mixing characteristic of open coastal environments maintain dissolved oxygen concentrations that inhibit sulfate-reducing bacteria and rapidly oxidise any $H_2S$ produced at the sediment-water interface before it can accumulate or diffuse into the overlying water. Consequently, $H_2S$-related impacts are unlikely in dynamic coastal environments with good circulation and oxygen availability.

Nevertheless, despite the very low risk of $H_2S$ in the marine environment, DEW is taking a precautionary approach and including monitoring of $H_2S$ in this extended monitoring plan.

### 5.2.2 Monitoring Scope

The extended monitoring plan for $H_2S$ will comprise the following:

<u>Fortnightly water sample collection:</u>

- Surface water samples are to be collected fortnightly at the eight monitoring sites as part of the WQMP.
- In addition, benthic water samples are to be collected near the seabed at the four SARDI intake points. Samples are to be collected using a Van Dorn sampler.
- At each site, samples are to be collected in sample containers provided by the laboratory (Envirolab). Each container is pre-filled with preservative (zinc acetate) to immediately preserve the sample.
- Sample containers are to be kept in the dark and chilled (~4°C).
- Samples are to be submitted to the laboratory (Envirolab) for analysis of total sulphide in marine water.
- Total sulphide data to be converted to $H_2S$ using the temperature and salinity corrected sulphide dissociation constant, following the relationship: $H_2S$ = total sulphide / (1 + 10^(pH−pKa)). The pKa is adjusted for measured temperature and salinity conditions. Conversions should be checked against Table 8.3.10 in ANZG (2018): https://www.waterquality.gov.au/anz-guidelines/guideline-values/default/water-quality-toxicants/toxicants/sulfides-2000#:~:text=To%20determine%20sulfide%20concentration%2C%20the,the%20total%20sulfide%20in%20solution.

<u>Dredge material testing:</u>

Lead acetate strips are to be used as a screening test for $H_2S$ gas within dredge material. Testing is to be undertaken at the following sites and frequency:

- **Sites** – testing is to be undertaken of dredge material at the loading site (borrow area).
- **Frequency** – testing will be undertaken once per barge load throughout the campaign. Samples are to be collected within the last 10 buckets of the load.

Testing procedures using lead acetate strips as follows:

- **Collect the sample:**
  - Collect a sample of dredge material from the dredge bucket or the hopper.
  - Place the sample material into a clean container (e.g., glass jar, bucket, or sealed sampling vessel).

  - Fill the container enough to provide a representative sediment volume.
- **Create a headspace:**
  - Allow a headspace above the sediment (a few centimetres).
  - Seal the container with a lid or cover.
  - Allow gases to accumulate for a short period (commonly 5–30 minutes).
- **Expose the lead acetate strip:**
  - Dampen a lead acetate strip slightly with distilled water.
  - Suspend the moistened lead acetate test strip in the headspace without touching the sediment.
  - Keep the strip exposed to the air above the sample for a few minutes.
  - Do not place the strip directly into the sediment.
- **Interpret the result:**
  - No colour change indicates absence of $H_2S$.
  - Brown/grey/black staining indicates presence of $H_2S$. The darker the stain, the greater the relative $H_2S$ concentration, but the test is not quantitative.
- **Record results:**
  - Take a photo of the test strip to record the results. Make sure to show date, time and location in the photo on a label or adjacent paper/notepad.

## 5.3 Triggers and Management Measures

HAB and $H_2S$ monitoring data collected throughout the dredging program will be used in an adaptive management process with trigger values and management measures as outlined in the following.

### 5.3.1 Trigger Values

The trigger values for HAB sampling have been sourced from the draft HAB Cell Count Testing and Monitoring Plan (SARDI, 2026). For Karenia spp. (toxin producing species), the trigger value is **>10,000 cells/L**.

For the algae sensors on buoys, a consistent increasing trend will be the trigger for implementation of management measures.

In regard to $H_2S$, the trigger is a simple presence/absence, with detection of $H_2S$ triggering management measures.

### 5.3.2 Management Measures

If triggers are exceeded during the dredge program, the following management measures are to be implemented:

**HAB:**

- If there is a consistent increasing trend (>48 hours) on any of the algae sensors on buoys, water samples are to be collected in the area where the increasing trend occurred for laboratory analysis to test for harmful algae species and cell count.
- If elevated levels of harmful algae are detected at any site (>10,000 cells/L), dredging will cease immediately. An investigation will be undertaken in consultation with the EPA to determine the source, extent and significance of the result and identify any required management actions.
- Dredging and placement activities in the affected area will only recommence once the investigation has been completed, appropriate management actions have been implemented, and the EPA is satisfied that recommencement is appropriate.

**Hydrogen sulfide ($H_2S$):**

- If a positive test is received using a lead acetate test strip at the borrow area, additional testing of a sample of the barge contents will be undertaken during the voyage to the placement area if it is safe to do so due to sea state to confirm adequate oxidation. Where a re-test during transit is unable to be completed due to sea state and where a positive ($H_2S$) is received at the borrow area, placement will not occur at West Beach
- If elevated $H_2S$ concentrations are detected in a fortnightly water grab sample, additional *in-situ* testing of the dredge material (with a lead acetate test strip) will be undertaken as soon as practicable following receipt of the results. If positive $H_2S$ concentrations are detected using an *in-situ* lead acetate test strip at the dredge location (NBA3), material associated with the affected area will not be placed at either placement area pending further assessment.
- An investigation will be undertaken in consultation with the EPA to determine the source, extent and significance of the result and identify any required management actions. SARDI will be notified that an investigation is being undertaken.
- Dredging and placement activities in the affected area will only recommence once the investigation has been completed, appropriate management actions have been implemented, and the EPA is satisfied that recommencement is appropriate.

# 6 Roles and Responsibilities

The roles and responsibilities of the principal entities are detailed in **Table 7**.

***Table 6. Roles and Responsibilities***

| Entity | Role |
|---|---|
| Dredge Contractor | • Undertake appropriate adaptive management actions when water quality triggers reached<br>• Assist DEW and Swash with reporting requirements<br>• Provide DEW and Swash with requested information when investigating and responding to complaints received<br>• Notify DEW and the EPA in the event of an environmental incident<br>• Prepare and comply with the EPA-approved Dredge Management Plan |
| Swash | • Install, operate and maintain water quality monitoring equipment<br>• Collect water samples for laboratory analysis of TSS, turbidity, metals, total sulfide and ammonia at monitoring sites<br>• Provide weekly satellite images of dredge plumes to DEW and the EPA<br>• Set up and maintain water quality data management website portal, including data processing and sending trigger alert alarms to the appointed dredge contractor<br>• Undertake equipment servicing trips as required<br>• Prepare weekly summary reports and the final Water Quality Monitoring Report for DEW and the EPA |
| Department for Environment and Water | • Ensure the dredge contractor has appropriate environmental management systems and reporting protocols in place<br>• Provide a complaints hotline and respond to any complaints received<br>• Report any environmental incidents or non-conformances to the relevant agencies |

# 7 Reporting

Reporting will comprise the following:

- 'Alarm' and 'Hold' trigger alerts will be automatically reported to the dredge contractor, DEW and the EPA. Swash will follow up on any alerts to make sure they were received.
- Weekly summary reports of water quality data will be provided to DEW and EPA by close of business on Monday of the following week. The weekly satellite technical notes will be attached to these weekly reports.
- A final water quality monitoring report will be provided to DEW and EPA following cessation of dredging operations. This report will include raw data, summary of data, records of any exceedances (including explanation of causes and if adaptive management was required) and general discussion on water quality impacts with respect to the dredging and sand placement activities.

# 8 References

BMT (2019). *Adelaide Outer Harbor Channel Widening Project: Environmental Monitoring Program.* Report prepared for Flinders Ports.

Epic Environmental (2025). *Water Quality Monitoring Report – Phase 1 of the Adelaide Beach Management Review Implementation (ABMRI) dredge trial*. Report prepared for the Department for Environment and Water.

SA Environment Protection Authority (EPA) (2020). *Dredge Guideline*.

Wiltshire, K.H. (2023). *Analysis of near-shore turbidity data for the Adelaide metropolitan region: influence of harbour dredging and potential impacts on benthic habitats*. South Australian Research and Development institute (Aquatic and Livestock Sciences), Adelaide. SARDI Publication No. F2023/000317-1. SARDI Research Report Series No. 1195.

South Australian Government Data Directory (2026). South Australian Marine Benthic Habitats: South Australian Marine Benthic Habitats - Dataset - data.sa.gov.au

## 6.4 Appendix D – Seagrass Monitoring Plan

AQUATIC ASSESSMENTS

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# ADELAIDE SEAGRASS MONITORING PLAN 2026

7 May 2026

Aquatic Assessments

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# Revision Status

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# Executive Summary

This Seagrass Monitoring Plan (SMP) has been developed by Aquatic Assessments to support assessment of seagrass habitats associated with Adelaide Beach Management (ABM) 2026 sand replenishment program. The proposed works involve dredging sand from North Haven and transporting it for nearshore placement at West Beach, with the objective of addressing ongoing coastal erosion.

Under South Australian environmental legislation, dredging is a prescribed activity that must be undertaken in a manner that prevents environmental harm, including the loss of seagrass. A robust and defensible SMP is required to assess any future dredging-related impacts.

The primary objective of this SMP is to assess seagrass condition prior to and following dredging. Specifically, the program aims to:

- Characterise seagrass extent, percent cover, species composition, and condition
- Quantify natural spatial variability within and between Areas of Interest (AOIs)
- Establish a statistically robust dataset suitable for detection of changes to seagrass.

Consistent with State and National Guidelines for Dredging, the monitoring design is informed by dredge plume modelling and adopts a Beyond-BACI framework. Five AOIs have been defined, comprising two Impact sites (dredge footprint and placement area) and three Control sites with comparable environmental characteristics.

Towed Underwater Video (TUV) transects are adopted as the primary monitoring method due to their ability to provide continuous, high-resolution observations of seagrass habitat. TUV enables quantitative assessment of percent cover (primary indicator of harm), species composition, and condition indicators such as epiphyte load and sedimentation. This approach is considered best practice for detecting fine-scale spatial variability and is well aligned with key dredging impact pathways, including light reduction, sedimentation, and burial.

Analysis of the full Before and After monitoring results will characterise existing condition and compare to post-dredging condition in order to detect whether a change has occurred.

The outcomes of this SMP will provide:

- A transparent and regulator-aligned Beyond-BACI dataset
- A clear understanding of seagrass condition and variability across the study area

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# 1. Introduction

## 1.1. Background

The sand on Adelaide's beaches naturally moves from south to north, due to wind and waves. This causes coastal erosion at West Beach and a build-up of sand at the northern beaches, from Semaphore to North Haven. Major infrastructure such as West Beach Boat Harbour prevents the accumulation of sand on beaches immediately to the north, meaning less natural restoration and relatively increased loss of sand. The Adelaide Beach Management Review confirmed that West Beach needs urgent intervention. It identified the need for a large, once-off sand placement to rebuild the beach, followed by smaller, ongoing top-ups each year to keep it stable. Beach sand will be dredged from North Haven and transported by barge to West Beach for nearshore deposition.

The Environment Protection Authority (EPA) is South Australia's independent environment protection regulator that administers the *Environment Protection Act 1993* (EP Act). Dredging is a prescribed activity of environmental significance listed in Schedule 1 of the EP Act. Dredging activities must be undertaken in such a manner as to prevent environmental harm. As per the *Environment Protection (Water Quality) Policy 2015* (WQ Policy), environmental harm is, in part, defined as:

- Loss of seagrass or other native aquatic vegetation from waters

In the current scenario, dredging is being undertaken to address the urgent need to restore beaches and nearshore habitat at West Beach. A Seagrass Monitoring Plan (SMP) is required to determine if seagrass loss occurs as a result of the dredge activities.

## 1.2. Scope and Objectives

Aquatic Assessments (AA) has been commissioned by DEW to conduct assessment of seagrass habitats within the vicinity of the planned dredging and beach replenishment activities to be undertaken by DEW in 2026. The scope of work includes:

- Development of a seagrass monitoring plan that:
  - Quantifies baseline seagrass distribution, composition and structure
  - Characterises natural spatial variability within and between Areas Of Interest (AOI)
  - Establishes statistically robust dataset to enable detection of dredging-related impacts.
- Once the SMP has been approved, AA is required to implement the monitoring plan and provide associated reporting.

Consistent with National Assessment Guidelines for Dredging (NAGD, 2009) and EPA Dredge Guideline (EPA, 2020) impact pathways, the SMP is designed to:

- Identify & assess changes in seagrass percent cover and density
- Detect shifts in seagrass species composition (indicator of ecological condition)
- Assess habitat similarity/dissimilarity between impact and control sites
- Provide sufficient statistical power to detect ecologically meaningful change.

# 2. Review of Seagrass Ecosystems

## 2.1. Global significance

Seagrass habitats are foundational coastal ecosystems that support fisheries production, provide nursery habitat, stabilise sediments, regulate nutrient cycling, and store significant quantities of organic carbon over long timescales. Their ecological and economic importance is widely recognised, and recent syntheses increasingly frame seagrass

habitats as key nature-based solutions for biodiversity conservation and climate mitigation (Cullen-Unsworth and Unsworth, 2013, Lima et al., 2023).

The clearest global pattern in the literature is sustained habitat loss. A landmark synthesis found that seagrasses were disappearing at about 110 km² per year since 1980, with 29% of known area lost since records began, and that decline rates accelerated sharply in recent decades (Waycott et al., 2009). A subsequent global reconstruction incorporating 175 studies across 547 sites confirmed that losses have occurred in all major bioregions, with an estimated net decline of 5,602 km², equivalent to 19.1% of surveyed seagrass habitat since 1880 (Dunic et al., 2021). Although some regions show signs of stabilisation or partial recovery, global trends remain negative, and the evidence base is geographically biased toward well-studied regions, limiting full assessment of global extent and change (Dunic et al., 2021).

Current understanding indicates that seagrass loss is primarily driven by cumulative anthropogenic pressures acting across catchment-to-coast systems. Coastal development and declining water quality are the most consistently reported drivers, with nutrient enrichment, increased turbidity, dredging, sedimentation, anchoring, and hydrological modification all contributing to reduced light availability, physical disturbance, and diminished ecosystem resilience (Dunic et al., 2021, Trégarot et al., 2024). These stressors often act synergistically, lowering ecological thresholds and increasing susceptibility to collapse. Climate change further compounds these pressures through ocean warming, marine heatwaves, altered storm regimes, and sea-level rise, which can exacerbate physiological stress and trigger rapid and sometimes irreversible seagrass habitat decline (Holbrook et al., 2020, Johannessen, 2022).

Overall, the current state of knowledge is consistent: seagrass meadows are ecologically critical, globally threatened, and continue to decline under the combined influence of local anthropogenic pressures and climate change. However, the evidence also indicates that recovery is achievable where pressures are effectively managed and restoration efforts are appropriately scaled, reinforcing the importance of integrated management and long-term monitoring frameworks (Waycott et al., 2009, Dunic et al., 2021, Trégarot et al., 2023).

## 2.2. Seagrasses of Gulf St Vincent

Seagrass ecosystems of Gulf St Vincent and the Adelaide metropolitan coastline provide an important regional expression of the global patterns described above. These meadows are dominated by long-lived genera such as Posidonia and Amphibolis, which form extensive, persistent beds across soft-sediment shelves and support high biodiversity and ecosystem function (Clarke et al., 2021, Environment SA, 2023). Across South Australia, seagrasses cover approximately 9,600 km² and include 15 species, and store over 96% of the state's blue carbon (Environment SA, 2023, Bryars et al., 2008, SA Government).

The Adelaide metropolitan coastline is dominated by 7 species of seagrass (Table 1) that historically formed a near continuous band in shallow waters (Figure 1), providing critical habitat for fisheries species and stabilising sediments in an otherwise low relief coastal system. However, this region represents one of the most well-documented examples of largescale seagrass decline in temperate Australia. Since the 1950s, more than 6,200 ha of *Posidonia* and *Amphibolis* seagrass have been lost along the Adelaide coast, primarily due to reduced water clarity associated with nutrient enrichment and increased turbidity (Fox et al., 2007).

*Table 1 Dominant seagrass species along the Adelaide metropolitan coastal waters.*

| Species | Genus/Functional Type | Distribution in Gulf St Vincent | Light & Sedimentation Ecology |
|---|---|---|---|
| *Posidonia sinuosa* | Persistent, climax | Widespread, mid–outer gulf | High light requirement; slow growing with low turnover. Highly sensitive to reduced light from turbidity. Limited capacity to recover from burial; rhizome death occurs under prolonged sedimentation (Collier et al., 2016, Cambridge et al., 2007). |
| *Posidonia angustifolia* | Persistent, climax | Patchy, often deeper margins | Similar to *P. sinuosa* but slightly more depth-tolerant. Still requires high water clarity; sensitive to chronic light reduction and sediment smothering (Shepherd et al., 1989). |
| *Posidonia australis* | Persistent, climax | Localised patches (historically more extensive) | Very high light demand and extremely slow recovery rates. Highly vulnerable to turbidity and burial; often used as an indicator of long-term water quality decline (Kendrick et al., 2002). |
| *Amphibolis antarctica* | Persistent, canopy-forming | Shallow to mid-depth reefs and sands | Moderate–high light requirement. More tolerant of short-term turbidity than Posidonia, but highly susceptible to burial due to above-ground rhizome structure (Erftemeijer & Lewis, 2006). |
| *Amphibolis griffithii* | Persistent, canopy-forming | Patchy, often mixed with A. antarctica | Similar to *A. antarctica*; requires relatively clear water. Poor tolerance to sediment deposition as burial disrupts canopy and anchoring structure (Shepherd et al., 1989). |
| *Zostera muelleri* | Colonising / opportunistic | Sheltered embayments, estuarine margins | Lower light requirement than Posidonia/Amphibolis. Faster growth allows recovery from disturbance. More tolerant of sedimentation but still sensitive to chronic turbidity (Collier et al., 2016). |
| *Halophila australis* | Colonising / ephemeral | Patchy, often deeper or disturbed areas | Very low light requirement; can persist in deeper or more turbid waters. Rapid life cycle allows quick recolonisation after disturbance; relatively tolerant of sediment dynamics (York et al., 2013). |

Within Gulf St Vincent more broadly, seagrass loss has been widespread but spatially variable, with the most pronounced declines occurring in nearshore, urbanised environments. Degradation has been linked to declining water quality over the past 60–80 years, particularly in the northern gulf adjacent to Adelaide (Westphalen et al., 2004). In contrast, offshore and less disturbed regions retain relatively intact seagrass meadows, highlighting the importance of local stressors and catchment inputs in determining seagrass condition. Contemporary mapping studies indicate that Posidonia and Amphibolis meadows often occur as mosaics across depth gradients, with species distribution structured by light availability, hydrodynamics, and sediment characteristics (Clarke et al., 2021).

*Figure 1 Seagrasses along the Adelaide metropolitan coastline historically formed a near continuous band in shallow waters (NatureMaps).*

## 2.3. Dredging activities

Dredging activities can act as a pressure on nearby seagrass ecosystems, primarily through changes to water quality. Sediment disturbance during both extraction and placement phases may mobilise fine sediments and organic matter, generating turbidity plumes that can temporarily reduce light penetration and influence sediment dynamics. These processes are recognised pathways through which seagrass condition may be affected, particularly where changes are sustained or spatially extensive (Erftemeijer & Lewis, 2006, Brodersen et al., 2017; EPA, 2020).

The response of seagrass meadows to disturbance is influenced by their structural composition and species traits. Mixed meadows comprising persistent species (e.g. Posidonia and Amphibolis) and colonising species (e.g. Zostera and Halophila) can exhibit a degree of resilience due to functional complementarity. Persistent species contribute to long-term stability through extensive rhizome networks and carbon storage, while colonising species may facilitate recovery through relatively rapid growth and recolonisation (Lavery et al., 2013; Serrano et al., 2020). This diversity can enhance resistance to disturbance and support ecosystem functioning relative to monospecific stands (Bennett et al., 2022). However, the extent to which these mechanisms operate is dependent on the intensity and duration of any disturbance.

Seagrass density is also an important factor influencing ecosystem function and response to environmental change. Dense meadows can contribute to sediment stabilisation, attenuation of hydrodynamic energy, and improvements in local water quality through particle trapping and nutrient cycling (Fonseca and Cahalan, 1992; Greve et al., 2003). Where dredging activities alter turbidity or sediment dynamics, these feedbacks may be reduced, potentially influencing meadow condition over time.

Light availability is widely recognised as a key factor governing seagrass growth and survival. Elevated turbidity associated with dredging activities has the potential to reduce the amount of photosynthetically active radiation reaching seagrass canopies (Erftemeijer, 2014). In addition, nutrient enrichment and associated increases in epiphyte growth may further influence light availability at the leaf surface. Where light levels are reduced for extended periods, responses may include reduced growth rates and changes in meadow condition, depending on species-specific tolerances (Statton et al., 2018).

Sedimentation and burial are additional pathways through which dredging may influence seagrass. The deposition of suspended sediments on seagrass leaves can affect photosynthesis and gas exchange, while accumulation at the seabed may influence shoot and rhizome condition (Duarte et al., 2004; Marbà and Duarte, 1994; Erftemeijer, 2014). These effects are more likely to occur in low-energy environments where fine sediments settle more readily, although the magnitude of response is typically dependent on deposition rates and duration.

Dredging may also influence sediment biogeochemistry under certain conditions. Increased organic matter deposition can promote microbial activity within sediments, which in turn may reduce oxygen availability and lead to the formation of reduced compounds such as hydrogen sulphide ($H_2S$) (Figure 2) (Govers et al., 2014a,b). At elevated concentrations, sulphide can affect root and rhizome processes; however, the development and ecological significance of these conditions depend on local sediment characteristics, organic loading, and hydrodynamic context (Fraser and Kendrick, 2017; Holmer and Kendrick, 2013).

Overall, the interaction between dredging activities and seagrass ecosystems is complex and influenced by multiple, interacting pathways. The extent of any effect is generally dependent on the magnitude, duration, and spatial scale of dredging-related changes, as well as the inherent resilience of the seagrass meadow and prevailing environmental conditions.

## 2.4. Suitable Indicators of Harm

From a regulatory perspective, the definition of environmental harm is central to determining appropriate monitoring endpoints and assessment criteria. Under South Australian legislation, administered by the Environment Protection Authority, environmental harm is broadly defined as any adverse effect on an ecosystem. However, in the context of dredging and coastal water quality management, this is operationalised more specifically as the loss of seagrass (EP (*Water Quality*) Policy, 2015). Seagrasses are recognised as a key ecological indicator within South Australian coastal systems, including Gulf St Vincent, due to their sensitivity to light reduction, sedimentation, and nutrient enrichment, and their critical role in ecosystem function (Shepherd & Sprigg, 1976, Bryars & Neverauskas, 2004, Bryars et al., 2008). Accordingly, the primary measurable endpoint for assessing dredging-related impact is a reduction in seagrass extent or percent cover relative to baseline conditions.

Consistent with the NAGD, impact pathways associated with dredging, particularly increased turbidity, light attenuation, and sediment deposition, are expected to manifest initially as physiological stress and reduced growth, and, if sustained, lead to measurable declines in seagrass cover and eventual loss (Erftemeijer 2014, Collier et al., 2016). As such, quantitative assessment of percent cover along transects provides a direct, sensitive, and regulator-relevant metric for detecting change over the short timescales typical of dredging campaigns. This aligns with established monitoring frameworks in South Australia, where changes in cover are commonly used to infer ecological condition and compliance with environmental thresholds (EPA, 2012).

While total change in seagrass cover represents the primary indicator of harm, changes in species composition should also be considered as a secondary but ecologically meaningful metric. Seagrass assemblages in temperate South Australia comprise multiple species with differing tolerances to light limitation and sediment stress, such as Posidonia spp., which are generally slower-growing and more sensitive to disturbance, and Zostera or Heterozostera spp., which are often more opportunistic (Collier et al., 2016)(Table 1). A shift in community composition e.g. the decline or localised loss of a more sensitive species, may indicate early-stage impact even where total cover remains relatively stable. This is particularly relevant in patchy or mixed meadows, where compositional change can precede broader habitat loss and may signal reduced ecosystem resilience.

In this context, monitoring programs should prioritise robust quantification of percent cover as the primary compliance metric, while also documenting species composition to provide additional ecological context and early warning of change. Survey methods should be chosen that are suited to this dual requirement of, providing continuous, high-resolution assessment of both cover and community structure along repeatable transects. This ensures that monitoring outputs are directly aligned with regulatory definitions of harm while retaining sufficient ecological sensitivity to detect subtle, precursor changes in seagrass condition.

## 2.5. Monitoring Techniques

A range of methods are available for assessing seagrass extent and condition in the context of pre-dredge monitoring, including towed underwater video (TUV), satellite remote sensing, drone-based aerial surveys, and image-based analytical software tools (Table 2). Each approach has strengths and limitations depending on the spatial and temporal scale of interest, environmental conditions, and the specific impact pathways being assessed. Satellite remote sensing and drone-based surveys are well established for broad-scale habitat mapping and can provide valuable regional context, particularly over longer temporal scales (years to decades) (Dekker et al., 2006, Duffy et al., 2018). These methods are relatively cost-effective and allow for large spatial coverage, however, their application in impact assessment for dredging is constrained by water clarity, depth, and surface conditions, which can significantly limit detection of benthic features in temperate coastal systems such as Gulf St Vincent (Kirk, 2011, Hedley et al., 2016). Furthermore, the spatial resolution of satellite imagery (typically metres to tens of metres) and the surface-biased nature of drone imagery reduce their ability to resolve fine-scale patchiness, species composition, and early indicators of stress such as epiphyte loading or sediment deposition (Duffy et al., 2018). As such, these approaches are generally better suited to long-term trend analysis rather than detecting short-term ecological change associated with dredging campaigns conducted over months (Waycott et al., 2009).

*Table 2 Comparative summary of seagrass monitoring methods.*

| Method | Typical Application | Strengths | Limitations | Suitability for Short-Term Dredging Impact Assessment |
|---|---|---|---|---|
| **Towed Underwater Video (TUV)** | Fine-scale habitat mapping and condition assessment along transects | - Continuous, high-resolution data (cm-dm scale)<br>- Direct observation of percent cover, species composition, and condition (e.g. epiphytes, sedimentation)<br>- Less constrained by water clarity and surface conditions<br>- Repeatable transects suitable for BACI designs<br>- Strong alignment with dredging impact pathways (light, sedimentation, burial) | - Requires vessel and experienced operators<br>- Data processing effort required | **High (Primary Method)**<br>Best suited to detecting subtle, short-term (weeks-months) changes in seagrass condition |
| **Satellite Remote Sensing** | Broad-scale habitat mapping and long-term monitoring (regional scale) | - Large spatial coverage<br>- Cost-effective for regional assessments<br>- Suitable for long-term trend analysis (years–decades) | - Limited spatial resolution (metres–tens of metres)<br>- Strongly affected by turbidity, depth, and atmospheric conditions<br>- Limited ability to detect species composition or early stress indicators<br>- Requires validation | **Low (Supplementary Only)**<br>Not suitable for detecting short-term, fine-scale dredging impacts |
| **Drone Surveys** | Shallow water mapping and | - Higher resolution than satellite imagery | - Limited depth penetration | **Low–Moderate (Conditional Use)** |

| | | | | |
|---|---|---|---|---|
| | nearshore habitat assessment | - Flexible deployment timing<br>- Useful in very shallow, clear water | (typically <5 m)<br>- Strongly dependent on water clarity and surface conditions<br>- Surface-biased (limited detection of subsurface condition)<br>- Requires validation | Useful in ideal conditions but unreliable for consistent dredging impact assessment |

Towed underwater video (TUV) transects, analysed by an experienced assessor, provide a more direct and high-resolution means of characterising seagrass habitats. This method captures continuous imagery along defined transects, enabling detailed assessment of percent cover, species composition (where discernible), habitat boundaries, and indicators of condition such as epiphyte growth and sediment deposition (Short et al., 2006). Importantly, TUV is less constrained by surface conditions than aerial methods and can be deployed consistently across a range of depths and turbidity conditions typical of dredging environments (McKenzie et al., 2001, Coles et al., 2004). The continuous nature of the data allows for improved detection of spatial heterogeneity and more robust statistical comparison between Areas of Interest (AOIs), supporting Before-After-Control-Impact (BACI) style analyses (Underwood, 1994).

In the context of the NAGD, which emphasise the need to assess impact pathways such as light reduction, sedimentation, and burial, TUV provides a clear advantage (Commonwealth of Australia, 2009). These impact pathways often manifest as subtle, spatially variable changes in seagrass condition over relatively short timeframes (weeks to months), and therefore require monitoring methods capable of resolving fine-scale changes with high repeatability (Erftemeijer & Lewis, 2006, Collier et al., 2016). TUV transects can be precisely replicated over time, enabling direct comparison of seagrass extent and condition before, during, and after dredging activities, and providing a defensible basis for detecting change within the duration of a dredging campaign.

Accordingly, while satellite and drone-based aerial imagery methods may be used to provide supplementary regional context, and image analysis software may assist in data processing, TUV is considered the most appropriate primary method for pre-dredge seagrass monitoring in this study. Its ability to deliver continuous, high-resolution, ground-truthed observations aligned with key impact pathways ensures that it is best suited to detecting ecologically meaningful changes over short to long timescales associated with dredging operations.

## 2.6. Experimental Design Considerations

A robust experimental design is essential to ensure that seagrass monitoring can reliably detect dredging related impacts and distinguish them from natural spatial and temporal variability. Consistent with the NAGD, monitoring programs should be structured to explicitly test for changes attributable to dredging using a Before After Control Impact (BACI) or Beyond BACI framework (Underwood, 1994). This requires careful consideration of impact pathways, site selection, replication, and statistical power, with particular emphasis on the short temporal scale (months) over which dredging impacts are likely to occur.

A key input to the experimental design is dredge plume modelling, which predicts the spatial extent, intensity, and duration of suspended sediment plumes and associated light attenuation. Hydrodynamic and sediment transport models can be used to define gradients of exposure (e.g. high, moderate, and low impact zones) based on predicted turbidity, light reduction and sediment deposition rates (Brinkman et al., 2014, Jones et al., 2016). These outputs should be used to guide placement of each Areas of Interest (AOI) corresponding seagrasses in the vicinity of planned dredge and sand placement areas. Plume modelling should, however, be treated as predictive and validated through field measurements, recognising inherent uncertainties associated with model assumptions and environmental variability.

Plume modelling indicates that turbidity plumes are generally constrained within approximately 1 km offshore across most of the modelled area, with elevated concentrations highly localised around dredging and placement locations. The acute turbidity plume shows clear alongshore elongation consistent with prevailing hydrodynamic conditions, confirming that impacts will occur along a gradient rather than uniformly across the study area (Figure 2). Turbidity is highest proximal to placement locations and decreases rapidly with distance. This reinforces the need to monitor across the entire Impact AOIs, as predicted by the plume model to capture the full spectrum of ecological responses (Brinkman et al., 2014, Jones et al., 2016).

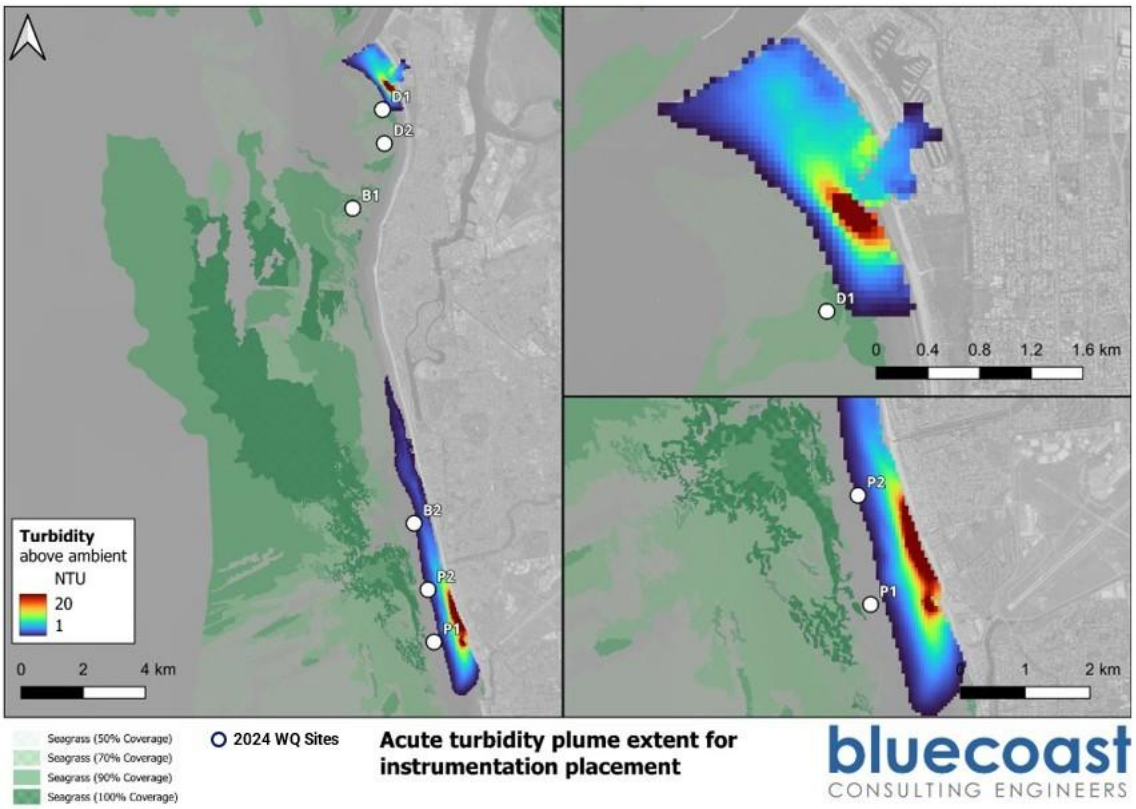


*Figure 2 The acute turbidity plume shows clear alongshore elongation consistent with prevailing hydrodynamic conditions.*

The expected sediment deposition footprint further refines the SMP by identifying areas where benthic smothering and light limitation are most likely to occur (Figure 3). Importantly, these zones overlap with mapped seagrass habitat, indicating a direct intersection between predicted impact pathways and sensitive habitats. Monitoring should therefore prioritise quantitative measures of percent cover and condition, including at the margins of impact zones, where early-stage effects may manifest as partial loss or degradation rather than complete removal (Erftemeijer and Lewis, 2006). The worst-case plume extent provides an upper bound for potential impact and is critical for risk-based design (Figure 4). Under certain conditions (e.g. wind shifts or stronger currents), the spatial footprint of turbidity and deposition may extend beyond the expected case.

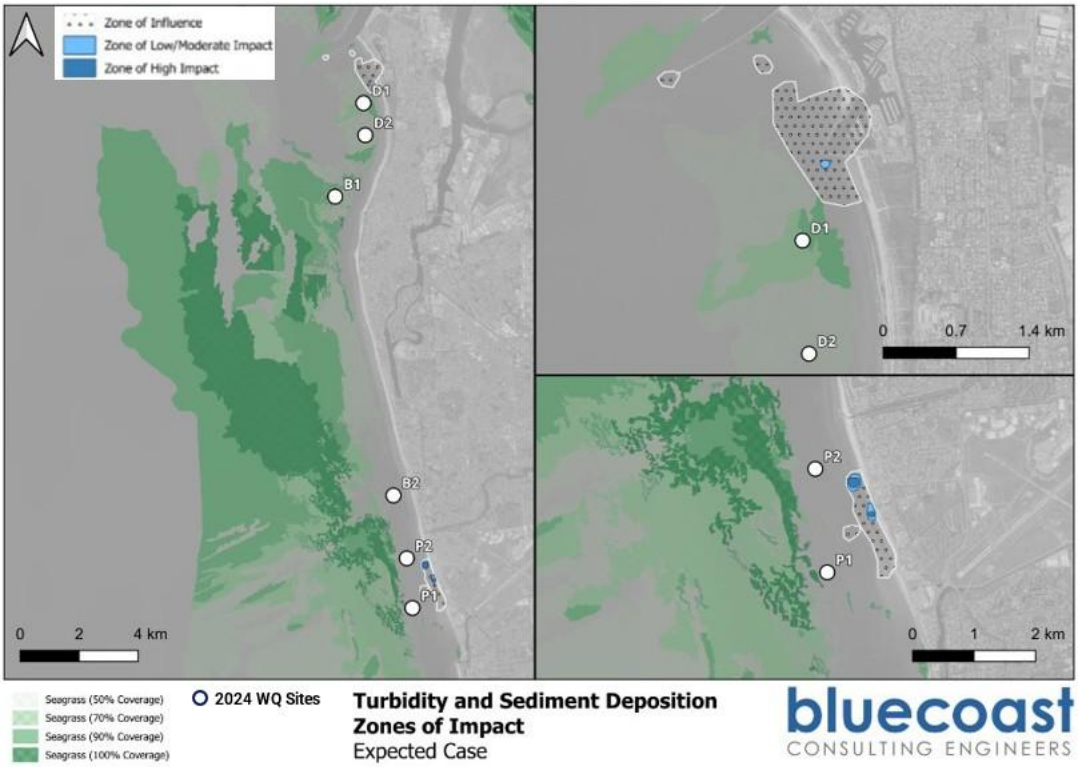


*Figure 3 The expected sediment deposition footprint further refines the impact assessment by identifying overlap with mapped seagrass meadows.*

The selection of appropriate Control locations is critical. Control sites must be outside plume influence while remaining ecologically comparable to Impact sites in terms of depth, substrate, hydrodynamic regime, and seagrass species composition (Underwood, 1994, Osenberg et al., 2006). In heterogeneous systems such as Gulf St Vincent, multiple Control sites are recommended to capture background variability and improve statistical robustness. Where possible, Controls should encompass both alongshore and offshore of Impact areas to account for regional gradients and minimise the risk of undetected plume exposure.

Within both Impact and Control AOIs, transect placement and replication must adequately characterise spatial variability and provide sufficient statistical power to detect change. This typically involves multiple fixed transects per AOI, positioned to representatively sample habitat while avoiding bias (e.g. preferential placement in dense or sparse patches). Power analyses based on existing datasets should be used to determine the number of transects required to detect ecologically meaningful changes in percent cover (e.g. 10–20%) with acceptable confidence (Mapstone, 1995). Transects should be permanent or precisely relocatable (e.g. GPS-referenced) to ensure repeatability, particularly given the need to detect subtle changes over short timeframes.

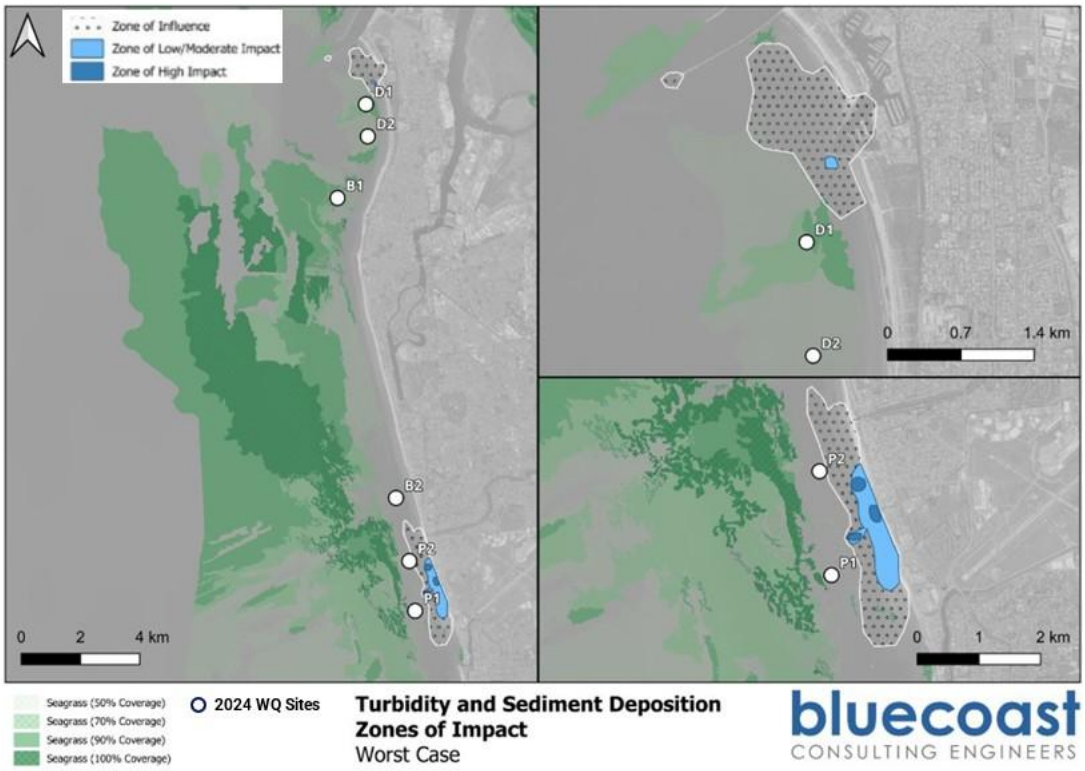


*Figure 4 The worst-case plume extent provides an upper bound for potential impact and is critical for risk-based design.*

Collectively, these considerations support a Beyond-BACI design in which Impact sites are distributed across the plume gradient, Control sites are located outside the maximum plume extent, transects are positioned within and at the margins of predicted impact zones, and physical measurements (e.g. turbidity) are co-located with biological monitoring. The spatial heterogeneity evident in the plume modelling further reinforces the need for high-resolution, continuous monitoring methods such as TUV, which can resolve fine scale variation in seagrass cover and condition across these gradients. By explicitly integrating plume modelling outputs into the sampling design, the monitoring program will be both scientifically robust and regulator-aligned, ensuring that it can detect seagrass loss where it is most likely to occur while maintaining defensible Control comparisons.

# 3. Methods

## 3.1. Survey Design

The Seagrass Monitoring Plan should adopt a Beyond-BACI design in which sampling locations are selected according to the predicted plume exposure gradient and multiple Control locations are included. Plume modelling indicates that increases in turbidity and sediment deposition are not uniformly distributed throughout the study area, but are concentrated around the dredging and placement areas (Figure 3 & Figure 4), with a greater alongshore than offshore extent (Figure 2). Consequently, the monitoring design must be capable of assessing both alongshore and offshore patterns of exposure and response.

Assessment of offshore seagrass habitats is particularly important because seagrass distribution within the study area is strongly depth-dependent, with meadows becoming more extensive and ecologically significant at depths greater than approximately 4 m. The deeper meadows typically occur closer to their lower depth limit, where light availability is naturally reduced and seagrass is therefore more susceptible to additional reductions in underwater light associated with dredging-induced turbidity. As a result, offshore seagrass may represent the most sensitive receptor to changes in water quality, despite being located further from the shoreline.

Furthermore, dredging-related impacts are expected to occur through multiple pathways, including reductions in light availability caused by suspended sediments, direct sediment deposition on seagrass leaves, and changes in sediment characteristics. These processes may vary substantially across depth gradients and cannot be adequately characterised by monitoring shallow habitats alone. Restricting monitoring to nearshore areas would risk overlooking

impacts on deeper seagrass meadows where the majority of seagrass biomass, habitat complexity, and ecosystem function occur.

Incorporating both shallow and offshore monitoring locations therefore provides a more representative assessment of seagrass condition across the full range of potentially affected habitats, improves the ability to detect spatial patterns of impact, and ensures alignment with EPA dredge guidelines and NAGD principles requiring monitoring programs to assess sensitive receptors within the predicted zone of influence.

### 3.1.1. Areas of Interest

The study design incorporates a total of five Areas Of Interest (AOIs), comprising two Impact AOIs and three Control AOIs (Figure 5). Coordinates for the boundaries of each AOI are provided in Appendix A. The “Impact” AOIs are located within the primary zones of disturbance and include the dredge footprint and the sediment placement area, where exposure to elevated turbidity and sedimentation is predicted to be greatest based on plume modelling (Figure 6 & 8). These locations represent the areas most likely to experience measurable changes in seagrass condition and are therefore central to detecting dredging related impacts.

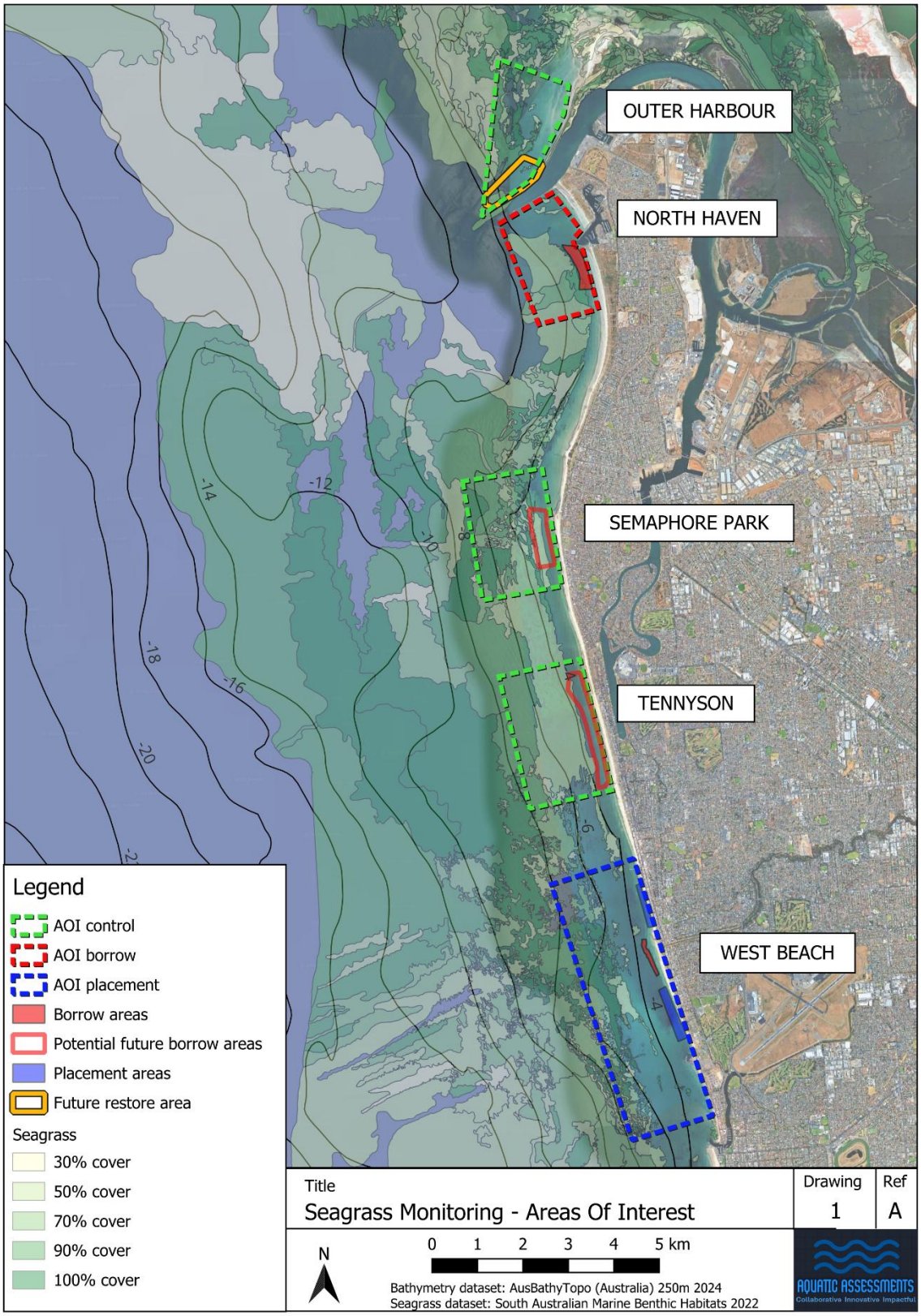


*Figure 5 The study follows an asymmetric Beyond-BACI design, incorporating a total of five Areas of Interest (AOIs), comprising two "Impact" AOIs and three Control AOIs. Figures 6-8 present a tighter view of: North (Outer Harbor, North Haven), Central (Semaphore, Tennyson), West Beach.*

Three Control AOIs have been selected to provide a robust basis for comparison and are located outside the predicted extent of expected and worst case plume modelling (Figure 6-8). Control sites have been chosen to represent comparable environmental conditions to the Impact AOIs, including similar depth ranges, hydrodynamic exposure, sediment characteristics, and seagrass assemblages. Areas identified by DEW for potential future dredging and restoration have been included in AOI to provide information for those areas (Figure 7).

This ensures that observed differences between Impact and Control sites can be attributed with greater confidence to dredging activities rather than underlying environmental variation. The inclusion of multiple Control AOIs is particularly important in heterogeneous systems such as Gulf St Vincent, where natural spatial variability can be high.

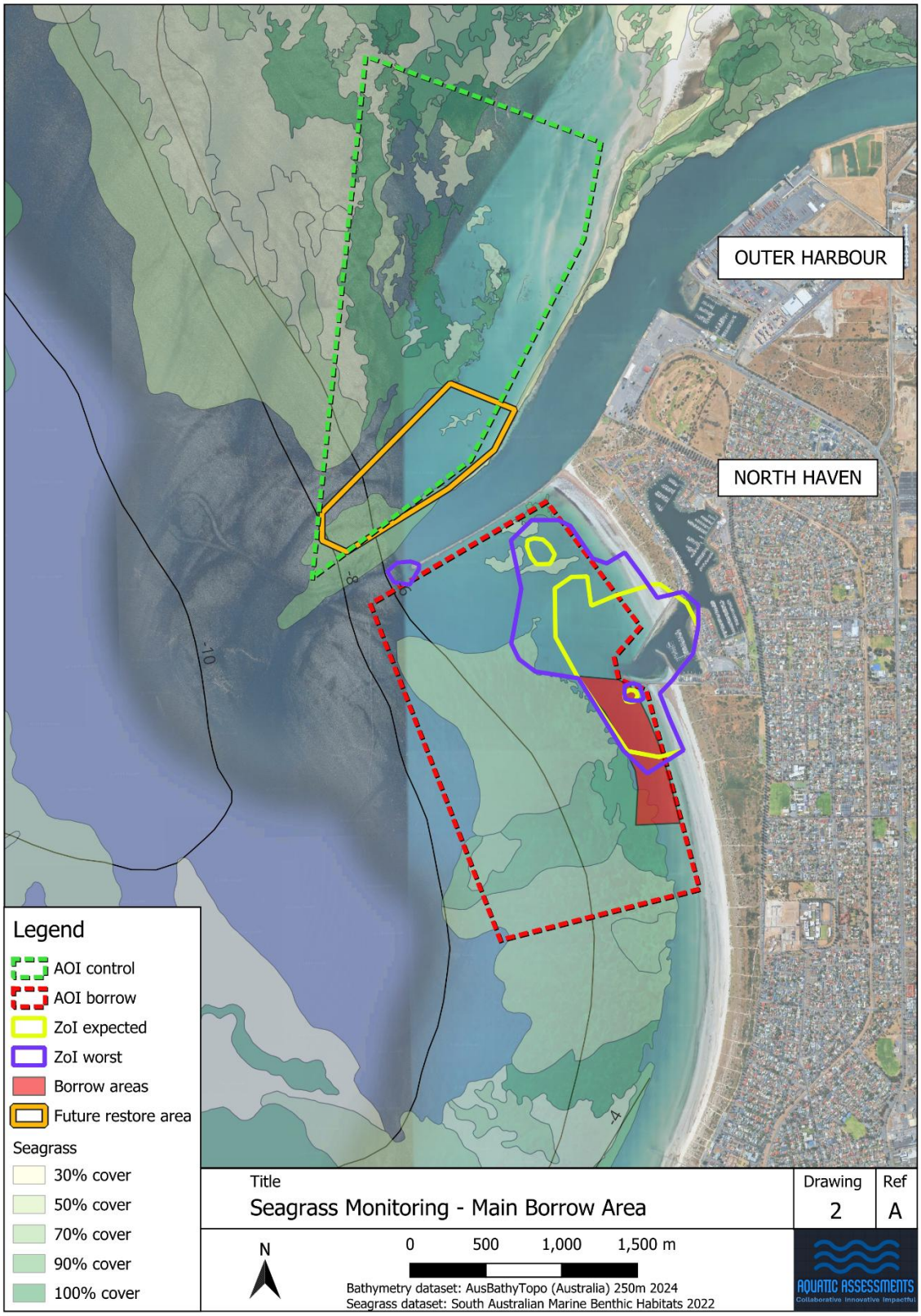


*Figure 6 Seagrass AOI have been developed according to plume modelling for expected and worst case scenarios around the dredge area.*

*Figure 7 AOI have been established to encompass Potential future borrow areas.*

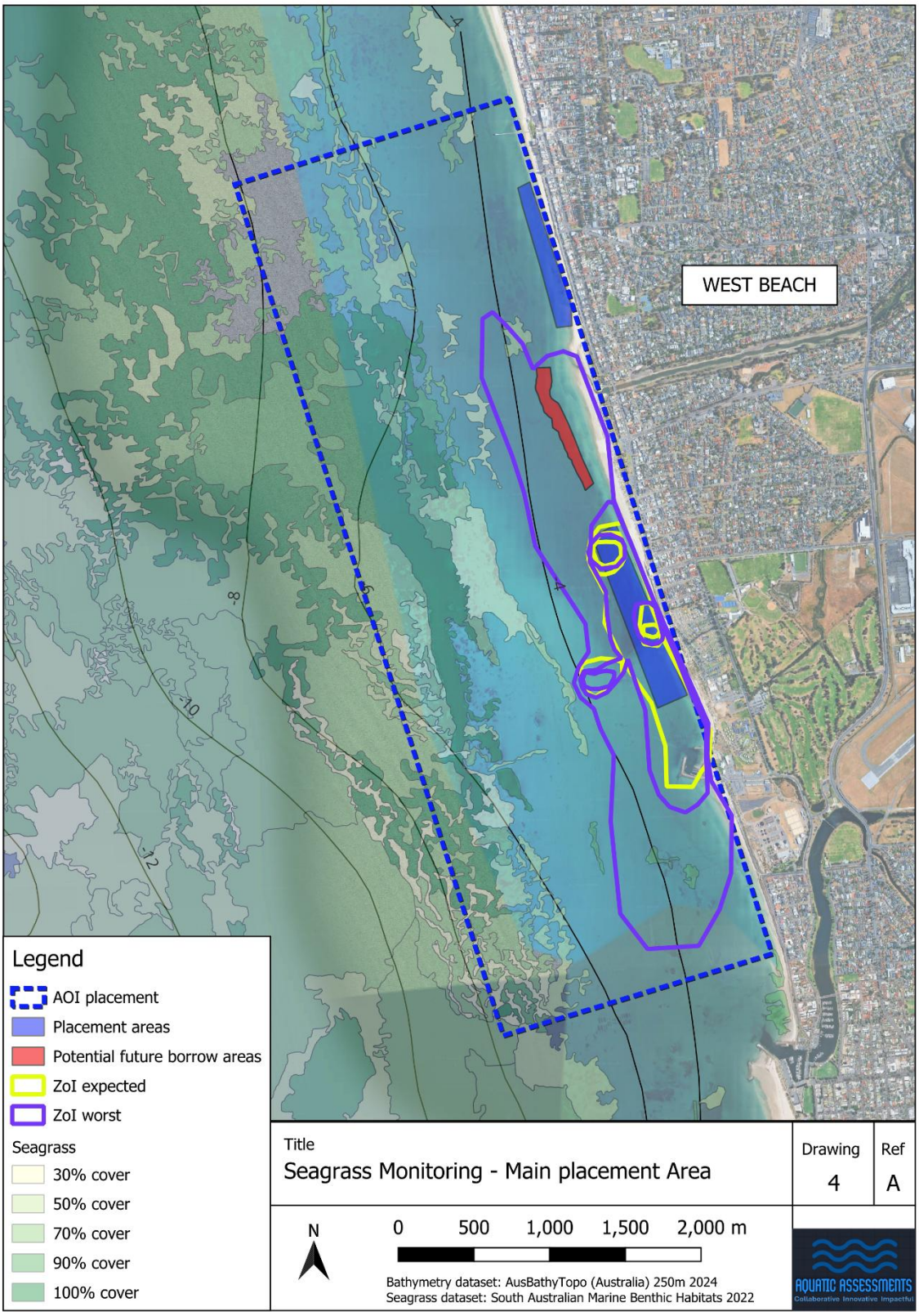


*Figure 8 Seagrass AOI have been developed according to plume modelling for expected and worst case scenarios around the placement area. The AOI includes a Potential future borrow area.*

The rationale for this design is supported by previous monitoring, which demonstrates that spatial variability between AOIs is a dominant driver of seagrass condition. As such, robust, repeatable Control-Impact comparisons are essential to distinguish dredging-related effects from natural background variability and to ensure that the monitoring program provides statistically defensible and regulator-relevant outcomes.

### 3.1.2. Timing, Duration and Frequency

The SMP adopts a Before-After-Control-Impact (BACI) framework, consistent with NAGD and EPA expectations. Key features:

- Replication at multiple spatial scales
- Comparison of impact vs control AOIs
- Capacity for integration with post-dredge monitoring

It is proposed that pre-dredge monitoring be conducted in autumn (May) with post-dredge monitoring occurring during similar conditions the following autumn (2027).

## 3.2 Monitoring Design

A multi-method, ground-truthed approach will be implemented, consistent with best practice and previous EPA-approved programs:

- Towed underwater video (primary method)
- Georeferenced transects
- Image-based quantitative analysis

This approach aligns with regulatory principles of direct observation and quantitative measurement of sensitive receptors to monitor ecosystem response.

**Transect Configuration**

The seagrass monitoring transects will be oriented perpendicular to the shoreline and surveyed from offshore to inshore to ensure consistent coverage across the depth gradient and the full extent of the seagrass habitat. Transects will be spaced at approximately even intervals of 150–200 m to provide representative spatial coverage within each Area of Interest while maintaining an efficient sampling effort. The start and end points of each transect have been pre-determined and GPS referenced (Appendix B) to ensure that identical transect locations can be revisited during subsequent monitoring events, thereby maximising comparability through time. To facilitate assessment of depth-related patterns and allow data to be pooled or compared across similar depth zones, each transect will be divided into consecutive 100 m segments for analysis, with habitat characteristics recorded separately for each segment. This approach enables changes in seagrass distribution, composition, density and cover to be assessed both along individual transects and across the broader monitoring area.

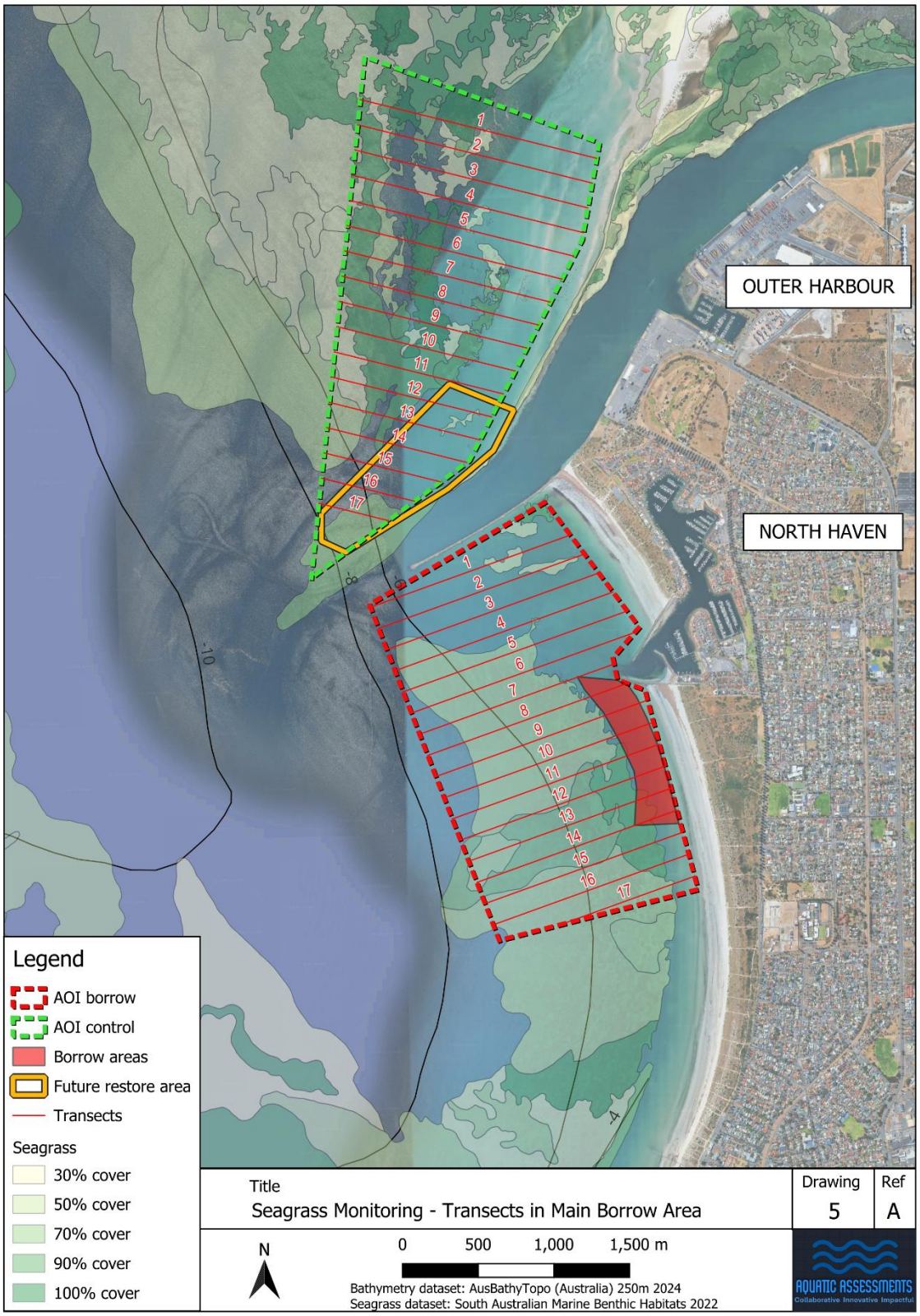


*Figure 9 Transect configuration will be perpendicular to shore and approximately evenly spaced throughout the AOI. The Outer Harbor AOI will provide information for the Future restore area.*

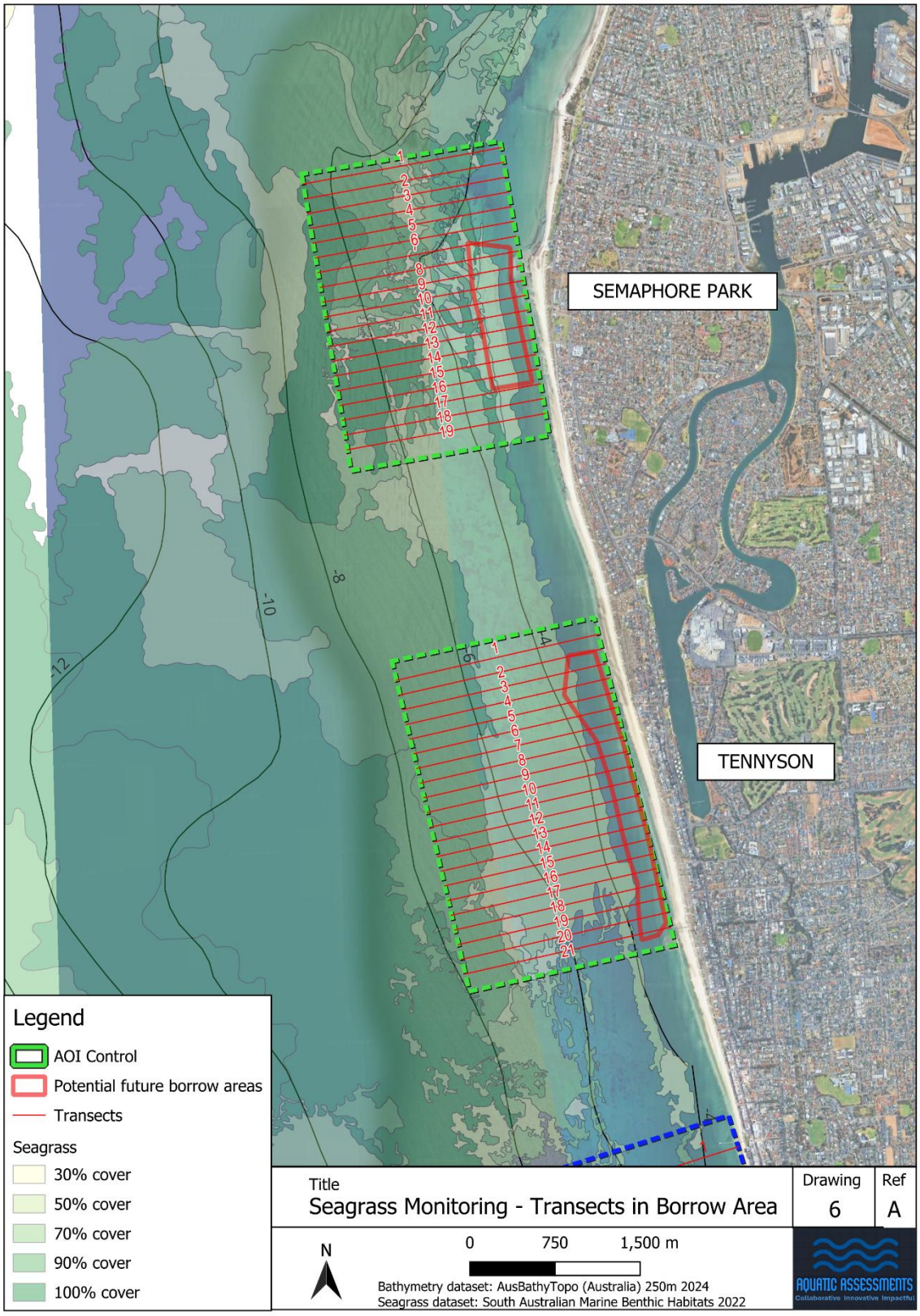


*Figure 10 Transects within Control AOI will provide information for potential future borrow areas.*

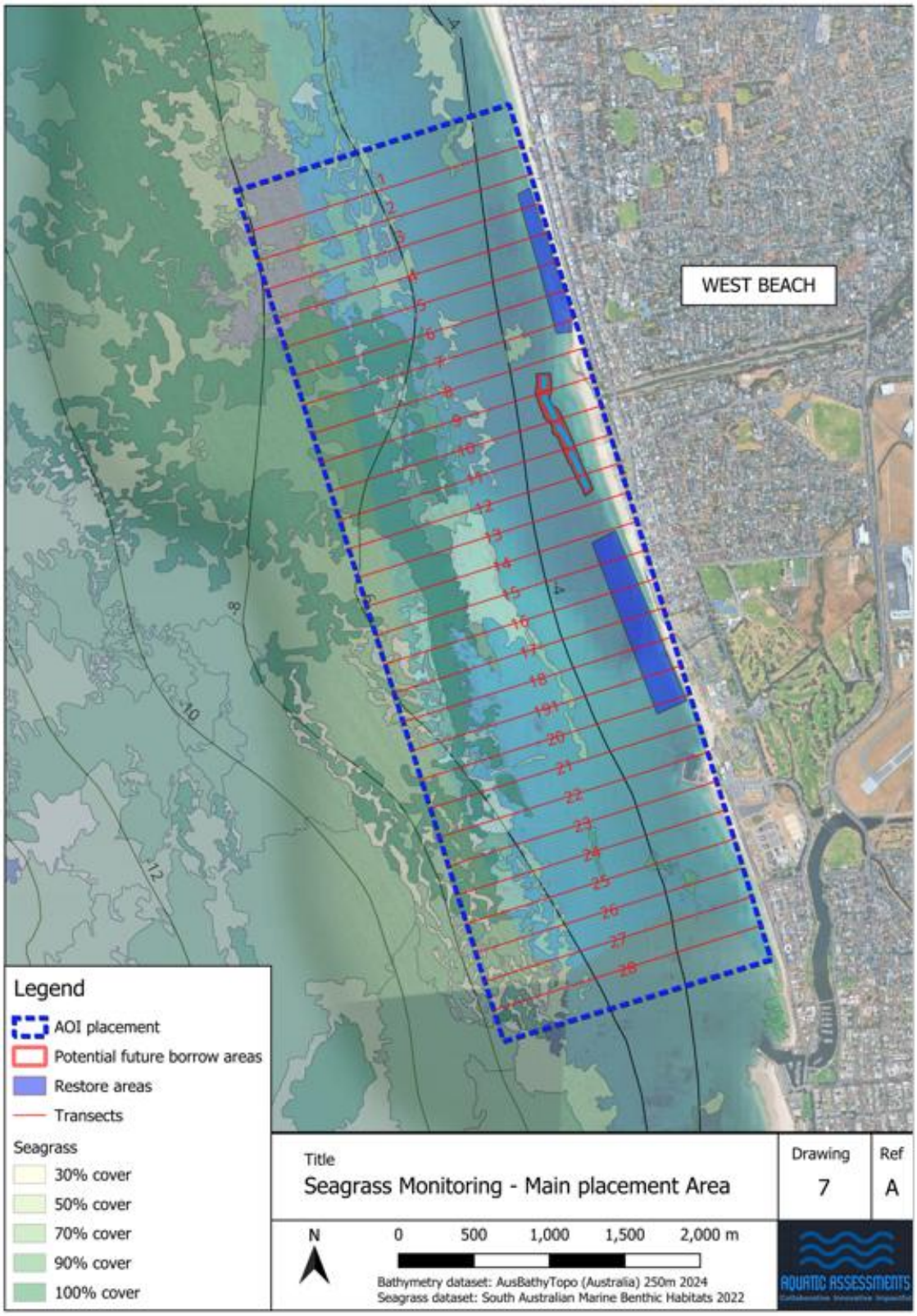


*Figure 11 West Beach AOI showing intersection of planned transects with intended restore area 2026, and potential future borrow areas.*

### Transect Number

The number of transects for each AOI is based on power analysis of previously collected transect data (S.D. 14.5%, σ = 210) which indicates that 10-15 transects per AOI are sufficient to detect a 15% change in total seagrass cover (α = 0.05, power = 0.8). However, given the high spatial variability observed within AOIs and the need to robustly distinguish temporal change from spatial heterogeneity, a minimum of 17 transects per AOI is recommended, with the number of transects per AOI dependent on AOI size. Increased replication is particularly important for larger AOIs (e.g. West Beach) to ensure adequate spatial representation and statistical robustness. A minimum of 17 transects per AOI is recommended, with transect numbers increased according to AOI size (Figure 9-11). The number of

transects for different AOI areas was scaled using the square root of the area. Outer Harbor was used as the reference area ($ref$).

Formula:

$$n = n(ref)\ x\ \sqrt{A(AOI)\ \div A(ref)}$$

*Table 3 Recommended minimum number of transects for each AOI.*

| AOI | Approximate Area | Minimum Transect Number |
|---|---|---|
| Outer Harbour | 3.7 km² | 17 |
| North Haven | 3.7 km² | 17 |
| Semaphore | 4.7 km² | 19 |
| Tennyson | 5.8 km² | 21 |
| West Beach | 10.2 km² | 28 |
| **Total** | **31.1 km²** | **154** |

## 3.3 Image analysis

Towed Underwater Video (TUV) transects will be analysed by an experienced assessor to quantify seagrass habitat characteristics, including percent cover, species composition, and indicators of condition (Figure 12). Video footage will be reviewed continuously, and habitat cover will be classified in standardised 10% cover classes (i.e. 0-10%, 11-20%, 21-30%, etc.) to provide a consistent and repeatable estimate of seagrass cover along each transect. Seagrass species will be identified where possible, allowing assessment of community composition and detection of any shifts in species dominance. While direct shoot density cannot be measured from video, relative density and canopy structure will be inferred qualitatively based on visual assessment of canopy continuity, and meadow structure.

Changes in habitat type (e.g. transitions between seagrass, bare sand, or mixed substrate) will be recorded continuously as a function of time along the video transect, enabling the proportional extent of each habitat type to be calculated for each transect (Figure 12). These proportions will be derived by converting time spent within each habitat class into a percentage of total analysable transect duration. Epiphyte load on seagrass leaves will also be recorded using categorical classes (0–30%, 30–60%, and 60–100%) to provide an indicator of seagrass condition and potential light limitation stress.

Sections of video that are unsuitable for analysis (e.g. due to poor camera angle, excessive turbidity, or loss of seabed visibility) will be identified and excluded from analysis to ensure data quality (Figure 12). The total analysable duration of each transect will be documented, and all habitat metrics will be standardised to this duration.

Spatial positioning of transects will be achieved through continuous GPS logging. GPS data will be recorded directly by the camera system where available and supplemented by an additional surface GPS receiver positioned as close as practicable to the camera tow point. This will ensure accurate georeferencing of habitat observations and enable precise relocation of transects for repeat surveys.

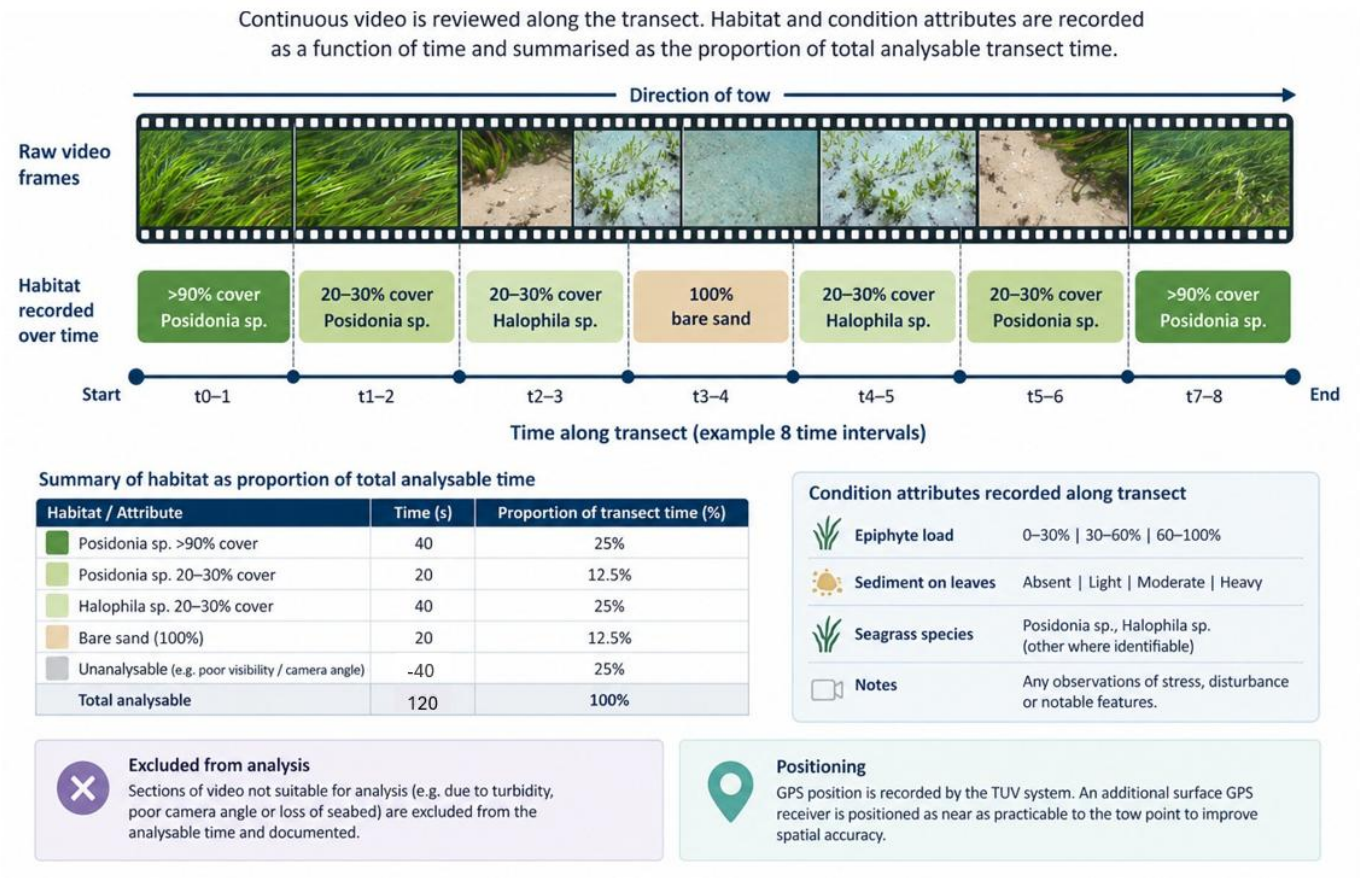


*Figure 12 Towed Underwater Video (TUV) transects will be analysed to quantify seagrass habitat characteristics, including percent cover, species composition, and indicators of condition.*

## 3.4 Data & statistical analysis

This program proposes pre- and post-dredge monitoring through characterising pre- and post-dredging seagrass condition, and spatial variability to detect dredging-related impacts. Towed Underwater Video (TUV) data will be summarised at transect and AOI scales for pre- and post-dredging monitoring.

Seagrass percent cover will be presented as:

- AOI summaries to describe central tendency and variability
- Transect-level analysis to show the distribution and degree of patchiness within AOIs
- Stacked bar charts of habitat proportions (e.g. Posidonia spp., Halophila spp., bare sand) to provide an intuitive overview of habitat composition.

Species composition will be visualised using ordination (e.g. nMDS) based on Bray-Curtis similarity to compare assemblages among AOIs and to identify natural groupings or gradients (e.g. depth or exposure-related patterns).

Statistical analysis will follow the general framework adopted in the previous monitoring program using PERMANOVA and Bray-Curtis resemblance matrices. Prior to analysis, seagrass cover data will be transformed to reduce the dominance of highly abundant taxa and improve sensitivity to changes in less abundant genera. Separate analyses will be undertaken for univariate and multivariate response variables. For univariate analyses, Euclidean distance matrices can be used to test for differences in total seagrass cover and related metrics among AOIs and between pre- and post-dredge survey periods. For multivariate analyses, Bray-Curtis similarity matrices will be generated using genus-level seagrass composition data.

The analytical model will include Time (Before vs After) and Treatment (Impact vs Control) as fixed factors, with AOI treated as a random factor nested within Treatment. Transects represent the independent replicate unit within each AOI. The critical statistical test is the interaction between Time and Treatment. A statistically significant interaction

indicates that changes observed through time at Impact AOIs differ from those observed at Control AOIs and therefore provides evidence of a potential dredging-related effect. In contrast, a significant effect of Time alone would indicate regional or seasonal variability occurring across all AOIs, while a significant Treatment effect alone would indicate inherent ecological differences between AOIs irrespective of dredging.

Non-metric multidimensional scaling (nMDS) ordination will be used to visualise patterns in seagrass community composition among AOIs and survey periods. nMDS plots are particularly useful for assessing whether Impact AOIs diverge from Control AOIs following dredging. In a stable system unaffected by dredging, pre- and post-dredge samples from Impact and Control AOIs would be expected to show substantial overlap. Conversely, a directional shift in post-dredge Impact AOIs away from Control AOIs may indicate ecological change associated with dredging activities.

Interpretation of results will consider both statistical and ecological significance. Detectable impacts may include reductions in total seagrass cover, increases in bare sand, increases in opportunistic macroalgae, changes in epiphyte load, or shifts in the relative abundance of seagrass genera. However, because dominant temperate genera such as Posidonia and Amphibolis are long-lived and slow-growing foundation species, impacts may not become fully apparent within a short timeframe. Accordingly, continued long-term monitoring is recommended to distinguish delayed dredging-related responses from natural seasonal and interannual variability and to account for the influence of concurrent regional stressors such as harmful algal blooms and marine heatwaves.

## 3.5 Data Quality

Only video segments deemed suitable for analysis (adequate visibility, appropriate camera angle, and clear seabed view) will be included. All habitat metrics will be standardised to the total analysable transect duration. Georeferencing will be applied using synchronised GPS to enable spatial mapping of observations and relocation of transects in any future surveys.

## 3.6 Reporting

Results will be interpreted as characterisation of seagrass extent, composition, and condition across AOIs, with explicit reference to predicted dredging impact pathways (sedimentation, burial) as outlined in the NAGD. Emphasis will be placed on:

- Establishing percent cover (primary indicator of potential future harm)
- Documenting species composition and habitat structure
- Quantifying natural spatial variability within and between AOIs
- Positioning each AOI within the modelled exposure gradient to identify areas of higher inherent risk.

Conclusions on dredging-related impacts will be guided by careful interpretation of pre- versus post-dredging data.

# 4. References

Anderson, M.J. (2001) A new method for non-parametric multivariate analysis of variance, Austral Ecology, 26(1), pp. 32–46.

Bennett, S. Wernberg, T. de Bettignies, T. Kendrick, G.A. Anderson, R.J. Bolton, J.J. Rodgers, K.L. Shears, N.T. (2022) Canopy-forming macroalgae and seagrass ecosystems: resilience, resistance and recovery, Biological Reviews, 97(2), pp. 617–636.

Brinkman, R. Logan, G. Baird, M. Wild-Allen, K. Skerratt, J. (2014) Modelling dredge plume transport and fate in marine environments, Journal of Coastal Research, 30(1), pp. 1–15.

Brodersen, K.E. Hammer, K.J. Schrameyer, V. Floytrup, A. Rasheed, M.A. Ralph, P.J. Kühl, M. Pedersen, O. (2017) Sediment resuspension and deposition on seagrass leaves impedes internal plant aeration and promotes phytotoxic H2S intrusion. Front. Plant Sci. 8:657.

Bryars, S. Neverauskas, V. (2004) Natural recolonisation of seagrasses at a disused sewage sludge outfall, Transactions of the Royal Society of South Australia, 128, pp. 103–111.

Bryars, S. Collings, G. Wear, R. 2008. Seagrasses of Gulf St Vincent and Investigator Strait, Chapter 11 in Natural History of Gulf St Vincent, Royal Society of South Australia Inc, pp 132−147.

Cambridge, M.L. McComb, A.J. (1984) 'The loss of seagrasses in Cockburn Sound, Western Australia. II. Possible causes of seagrass decline', Aquatic Botany, 20, pp. 265–285.

Clarke, K. Hennessy, A. McGrath, A. Daly, R. Gaylard, S. Turner, A. Cameron, J. Lewis, M. Fernandes, M.B. (2021). Using hyperspectral imagery to investigate large-scale seagrass cover and genus distribution in a temperate coast, Scientific Reports, 11, 4182.

Coles, R.G., McKenzie, L.J., Campbell, S.J. & Mellors, J.E. (2004) Seagrass-Watch: Manual for Mapping & Monitoring Seagrass Resources by Community (Citizen) Volunteers. Queensland Department of Primary Industries, Cairns.

Collier, C.J. Adams, M.P. Langlois, L. Waycott, M. (2016) Thresholds for light limitation in seagrass ecosystems. Marine Ecology Progress Series, 561, 1–15.

Commonwealth of Australia (2009) National Assessment Guidelines for Dredging. Canberra: Department of the Environment, Water, Heritage and the Arts.

Cullen-Unsworth, L.C. & Unsworth, R.K.F. (2013) 'Seagrass meadows, ecosystem services, and sustainability', Environment, DOI: 10.1080/00139157.2013.785864.

Dekker, A.G. Brando, V.E. Anstee, J.M. (2006) Retrospective seagrass change detection in a shallow coastal tidal Australian lake, Remote Sensing of Environment, 104(3), pp. 379–392.

Duarte, C.M., Terrados, J., Agawin, N.S.R., Fortes, M.D., Bach, S. and Kenworthy, W.J. (2004) Response of a mixed Philippine seagrass meadow to experimental burial, Marine Ecology Progress Series, 147, pp. 285–294.

Duffy, J.P. Cunliffe, A.M. DeBell, L. Sandbrook, C. Wich, S.A. Shutler, J.D. Myers-Smith, I.H. Varela, M.R. Anderson, K. (2018), Location, location, location: considerations when using lightweight drones in challenging environments. Remote Sens Ecol Conserv, 4: 7-19.

Dunic, J.C. Brown, C.J. Connolly, R.M. Turschwell, M.P. Côté, I.M. (2021) Long-term declines and recovery of meadow area across the world's seagrass bioregions. Global Change Biology. 27. 4096-4109.

EPA (2020) Dredge guideline. Environment Protection Authority.

Environment Protection Authority (2012) The South Australian monitoring, evaluation and reporting program (MERP) for aquatic ecosystems. Context and overview.

Environment SA (2023) State of the Environment Report: Marine habitats and ecosystems.

Erftemeijer, P.L.A. & Lewis, R.R. (2006) 'Environmental impacts of dredging on seagrasses', Marine Pollution Bulletin, 52, pp. 1553–1572.

Erftemeijer, P.L.A. (2014) Dredging-induced turbidity increases and effects on seagrass: a review, Marine Pollution Bulletin, 83(1), pp. 9–24.

Fonseca, M.S. and Cahalan, J.A. (1992) A preliminary evaluation of wave attenuation by four species of seagrass, Estuarine, Coastal and Shelf Science, 35(6), pp. 565–576.

Fraser, M.W., Kendrick, G.A. (2017) Belowground stressors and long-term seagrass declines in a historically degraded seagrass ecosystem after improved water quality. Sci Rep. 7(1):14469.

Fox, D.R. Batley, G.E. Blackburn, D. Bone, Y. Bryars, S. Cheshire, A. Collings, G. Ellis, D. Fairweather, P. Fallowfield, H. Harris, G. Henderson, B. Kampf, J. Nayar, S. Pattiaratchi, C. Petrusevics, P. Townsed, M. Westphalen, G. Wilkinson, J. (2007). Adelaide Coastal Waters Study: final report, volume 1: Summary of study findings November 2007.

Govers, L. de Brouwer, J.H.F. Suykerbuyk, W. Bouma, W.T.J. Lamers, L.P.M. Smolders, A.J.P. van Katwijk, M.M. (2014a) Toxic effects of increased sediment nutrient and organic matter loading on the seagrass Zostera noltii, Aquatic Toxicology, 155, pp. 253–260.

Govers, L.L. Lamers, L.P.M. Bouma, T.J, Eygensteyn, J. de Brouwer, J.H.F. Hendriks, A.J. Huijbers, C.M. van Katwijk, M.M. Smolders, A.J.P. (2014b) Seagrasses are negatively affected by organic matter loading and sulphide accumulation, Biogeosciences, 11, pp. 2923–2933.

Greve, T.M. Krause-Jensen, D. Rasmussen, M.B. Christensen, P.B. (2003) Means of rapid eelgrass (Zostera marina L.) recolonisation in former dieback areas, Aquatic Botany, 75(4), pp. 291–302.

Hedley, J. D. Roelfsema, C. M. Phinn, S. R.  Mumby, P. J. (2012) Environmental and Sensor Limitations in Optical Remote Sensing of Coral Reefs: Implications for Monitoring and Sensor Design. Remote Sensing, *4*(1), 271-302.

Holbrook, N.J. Sen Gupta, A. Oliver, E.C.J. Hobday, A.J. Benthuysen, J.A. Scannell, H.A. Smale, D.A. Wernberg, T. (2020) Keeping pace with marine heatwaves. Nat Rev Earth Environ 1, 482–493.

Holmer, M. Kendrick, G.A. (2013). High Sulfide Intrusion in Five Temperate Seagrasses Growing Under Contrasting Sediment Conditions. Estuaries and Coasts, 36(1), 116–126.

Johannessen, S.C. (2022). How can blue carbon burial in seagrass meadows increase long-term, net sequestration of carbon? A critical review. Envir. Res. Lett. 17, 093004.

Jones, R. Bessell-Browne, P. Fisher, R. Klonowski, W. Slivkoff, M. (2016) "Assessing the impacts of sediments from dredging on corals." Marine Pollution Bulletin, 102(1), 9–29.

Kirk, J.T.O. (2011) Light and Photosynthesis in Aquatic Ecosystems. Cambridge University Press.

Lavery, P.S. Mateo, M-Á. Serrano, O. Rozaimi, M. (2013) Variability in the Carbon Storage of Seagrass Habitats and Its Implications for Global Estimates of Blue Carbon Ecosystem Service. PLoS ONE 8(9): e73748.

Lima, M.A.C. Bergamo, T.F.  Ward, R.D. Chris. B.J. (2023) A review of seagrass ecosystem services: providing nature-based solutions for a changing world. Hydrobiologia. 850. 2655-2670.

Mapstone, B.D. (1995) Scalable decision rules for environmental impact studies, Ecological Applications, 5(2), pp. 401–410.

McKenzie, L.J. Campbell, S.J. Roder, C.A. (2001) Seagrass-Watch: Manual for Mapping & Monitoring Seagrass Resources by Community (citizen) volunteers. (Queensland Fisheries Service, NFC, Cairns) 100pp.

Osenberg, C.W. Schmitt, R.J. Holbrook, S.J. Abu-Saba, K.E. Flegal, A.R. (1994) Detection of environmental impacts: natural variability, effect size, and power analysis. Ecological Applications, 4(1), 16-30.

Serrano, O. Lavery, P.S. Rozaimi, M. Mateo, M.A. (2020) Influence of environmental factors on carbon storage in seagrass ecosystems, Global Biogeochemical Cycles, 34(7), e2019GB006331.

Shepherd, S.A. and Sprigg, R.C. (1976) Substrate Sediments and Subtidal Ecology of Gulf St. Vincent and Investigator Strait. In: Twidale, C.R., Tyler, M.J. and Webb, B.P., Eds., Natural History of the Adelaide Region, Mar. Ecol. Pro. Ser., Royal Society of South Australia, Adelaide, 161-174.

Short, F.T., McKenzie, L.J., Coles, R.G., Vidler, K.P., Gaeckle, J.L. 2006. SeagrassNet Manual for Scientific Monitoring of Seagrass Habitat, Worldwide edition. University of New Hampshire Publication.

Statton, J. Dixon, K.W. Irving, A.D. Jackson, E.L. Kendrick, G.A. Orth, R.J. Sinclair, E.A. (2018) Decline and restoration ecology of Australian seagrasses, Biological Reviews, 93(1), pp. 513–531.

Trégarot, E. Juan Pablo D'Olivo, J.P. Botelho, A.Z. Cabrito, A. Cardoso, G.O. Casal, G. Cornet, C.C. Cragg, S.M. Degia, A.K. Fredriksen, S. Furlan, E. Heiss, G. Kersting, D.K. Maréchal, J-P. Meesters, E. O'Leary, B.C. Pérez, G. Seijo-Núñez, C. Simide, R. van der Geest, M. de Juan, S. (2024). Effects of climate change on marine coastal ecosystems – A review to guide research and management. Biological Conservation, 289, 110394.

Underwood, A.J. (1994) On beyond BACI, Ecological Applications, 4(1), pp. 3–15.

Waycott, M. Duarte, C.M. Carruthers T.J.B., Orth, R.J. Dennison, W.C. Olyarnik, S. Calladine, A. Fourqurean, J.W. Heck, K.L. Hughes, A.R. Kendrick, G.A. Kenworthy, W.J. Short, F.T. Williams, S.L. (2009). Accelerating loss of seagrasses across the globe threatens coastal ecosystems, Proceedings of the National Academy of Science U.S.A. 106 (30) 12377-12381.

# Appendix A: AOI Boundary GPS

| AOI | Latitude | Longitude |
|---|---|---|
| Outer Harbor | -34.75831281 | 138.4641972 |
| | -34.76379232 | 138.4809858 |
| | -34.76954678 | 138.4795673 |
| | -34.78252318 | 138.4710316 |
| | -34.78927744 | 138.4594045 |
| North Haven | -34.79094956 | 138.4635371 |
| | -34.78510754 | 138.4764366 |
| | -34.80840977 | 138.4867536 |
| | -34.81114217 | 138.472306 |
| Semaphore | -34.8419455 | 138.4530905 |
| | -34.83971749 | 138.4722892 |
| | -34.86321258 | 138.4762863 |
| | -34.86563109 | 138.4571136 |
| Tennyson | -34.88084237 | 138.4606039 |
| | -34.87777219 | 138.4801715 |
| | -34.90394431 | 138.487185 |
| | -34.90723126 | 138.467258 |
| West Beach | 138.4719687 | -34.9223483 |
| | 138.4919212 | -34.91761534 |
| | 138.5093936 | -34.96900247 |
| | 138.4898246 | -34.97347379 |

# Appendix B: Transect GPS

| AOI | transect_id | point_type | lon_dd | lat_dd |
|---|---|---|---|---|
| **Outer Harbor** | 1 | start | 138.480756 | -34.76472456 |
| | 1 | end | 138.4638016 | -34.76086963 |
| | 2 | start | 138.4803938 | -34.76619391 |
| | 2 | end | 138.4635697 | -34.76236862 |
| | 3 | start | 138.4800316 | -34.76766327 |
| | 3 | end | 138.4633377 | -34.7638676 |
| | 4 | start | 138.4796694 | -34.76913262 |
| | 4 | end | 138.4631058 | -34.76536658 |
| | 5 | start | 138.4789298 | -34.77051618 |
| | 5 | end | 138.4628738 | -34.76686556 |
| | 6 | start | 138.4780419 | -34.77186607 |
| | 6 | end | 138.4626419 | -34.76836454 |
| | 7 | start | 138.4771541 | -34.77321595 |
| | 7 | end | 138.4624099 | -34.76986352 |
| | 8 | start | 138.4762662 | -34.77456582 |
| | 8 | end | 138.4621779 | -34.7713625 |
| | 9 | start | 138.4753783 | -34.77591569 |
| | 9 | end | 138.4619459 | -34.77286147 |
| | 10 | start | 138.4744904 | -34.77726554 |
| | 10 | end | 138.4617139 | -34.77436045 |
| | 11 | start | 138.4736024 | -34.77861539 |
| | 11 | end | 138.4614819 | -34.77585942 |
| | 12 | start | 138.4727144 | -34.77996523 |
| | 12 | end | 138.4612498 | -34.7773584 |
| | 13 | start | 138.4718264 | -34.78131506 |
| | 13 | end | 138.4610178 | -34.77885737 |
| | 14 | start | 138.47083 | -34.78264027 |
| | 14 | end | 138.4607858 | -34.78035634 |
| | 15 | start | 138.4689104 | -34.78375556 |
| | 15 | end | 138.4605537 | -34.78185531 |
| | 16 | start | 138.4669907 | -34.78487082 |
| | 16 | end | 138.4603216 | -34.78335428 |
| | 17 | start | 138.4650709 | -34.78598604 |
| | 17 | end | 138.4600895 | -34.78485324 |
| **North Haven** | 1 | start | 138.4636109 | -34.79111955 |
| | 1 | end | 138.4781738 | -34.78712203 |
| | 2 | start | 138.4641636 | -34.79239248 |
| | 2 | end | 138.4791672 | -34.78827394 |
| | 3 | start | 138.4647163 | -34.7936654 |
| | 3 | end | 138.4801606 | -34.78942585 |
| | 4 | start | 138.4652689 | -34.79493833 |
| | 4 | end | 138.481154 | -34.79057775 |
| | 5 | start | 138.4658217 | -34.79621125 |
| | 5 | end | 138.4821475 | -34.79172965 |
| | 6 | start | 138.4663744 | -34.79748417 |
| | 6 | end | 138.4826432 | -34.79301824 |
| | 7 | start | 138.4669271 | -34.79875709 |

| | | | | |
|---|---|---|---|---|
| | 7 | end | 138.4811005 | -34.79486652 |
| | 8 | start | 138.4674799 | -34.80003001 |
| | 8 | end | 138.482034 | -34.79603489 |
| | 9 | start | 138.4680327 | -34.80130293 |
| | 9 | end | 138.4834541 | -34.79706965 |
| | 10 | start | 138.4685854 | -34.80257584 |
| | 10 | end | 138.483838 | -34.79838896 |
| | 11 | start | 138.4691382 | -34.80384875 |
| | 11 | end | 138.4842218 | -34.79970827 |
| | 12 | start | 138.4696911 | -34.80512166 |
| | 12 | end | 138.4846056 | -34.80102757 |
| | 13 | start | 138.4702439 | -34.80639457 |
| | 13 | end | 138.4849895 | -34.80234688 |
| | 14 | start | 138.4707968 | -34.80766748 |
| | 14 | end | 138.4853733 | -34.80366619 |
| | 15 | start | 138.4713496 | -34.80894038 |
| | 15 | end | 138.4857572 | -34.8049855 |
| | 16 | start | 138.4719025 | -34.81021328 |
| | 16 | end | 138.4861411 | -34.8063048 |
| | 17 | start | 138.476816 | -34.81028941 |
| | 17 | end | 138.486525 | -34.8076241 |
| **Semaphore** | 1 | start | 138.4723635 | -34.84082712 |
| | 1 | end | 138.4532095 | -34.84331967 |
| | 2 | start | 138.4725639 | -34.84200532 |
| | 2 | end | 138.4534096 | -34.84449789 |
| | 3 | start | 138.4727643 | -34.84318352 |
| | 3 | end | 138.4536097 | -34.84567612 |
| | 4 | start | 138.4729647 | -34.84436172 |
| | 4 | end | 138.4538098 | -34.84685434 |
| | 5 | start | 138.4731651 | -34.84553992 |
| | 5 | end | 138.4540099 | -34.84803257 |
| | 6 | start | 138.4733656 | -34.84671812 |
| | 6 | end | 138.45421 | -34.84921079 |
| | 7 | start | 138.473566 | -34.84789632 |
| | 7 | end | 138.4544101 | -34.85038902 |
| | 8 | start | 138.4737664 | -34.84907452 |
| | 8 | end | 138.4546102 | -34.85156724 |
| | 9 | start | 138.4739668 | -34.85025271 |
| | 9 | end | 138.4548103 | -34.85274546 |
| | 10 | start | 138.4741673 | -34.85143091 |
| | 10 | end | 138.4550104 | -34.85392369 |
| | 11 | start | 138.4743677 | -34.85260911 |
| | 11 | end | 138.4552106 | -34.85510191 |
| | 12 | start | 138.4745682 | -34.85378731 |
| | 12 | end | 138.4554107 | -34.85628013 |
| | 13 | start | 138.4747686 | -34.8549655 |
| | 13 | end | 138.4556108 | -34.85745835 |
| | 14 | start | 138.4749691 | -34.8561437 |
| | 14 | end | 138.455811 | -34.85863657 |
| | 15 | start | 138.4751695 | -34.8573219 |
| | 15 | end | 138.4560111 | -34.8598148 |

| | | | | |
|---|---|---|---|---|
| | 16 | start | 138.47537 | -34.85850009 |
| | 16 | end | 138.4562113 | -34.86099302 |
| | 17 | start | 138.4755705 | -34.85967829 |
| | 17 | end | 138.4564114 | -34.86217124 |
| | 18 | start | 138.4757709 | -34.86085649 |
| | 18 | end | 138.4566116 | -34.86334946 |
| | 19 | start | 138.4759714 | -34.86203468 |
| | 19 | end | 138.4568117 | -34.86452768 |
| **Tennyson** | 1 | start | 138.480535 | -34.87912883 |
| | 1 | end | 138.4609903 | -34.88237513 |
| | 2 | start | 138.4808486 | -34.8802994 |
| | 2 | end | 138.4612861 | -34.88354865 |
| | 3 | start | 138.4811622 | -34.88146997 |
| | 3 | end | 138.461582 | -34.88472216 |
| | 4 | start | 138.4814758 | -34.88264054 |
| | 4 | end | 138.4618778 | -34.88589568 |
| | 5 | start | 138.4817895 | -34.88381111 |
| | 5 | end | 138.4621737 | -34.88706919 |
| | 6 | start | 138.4821031 | -34.88498168 |
| | 6 | end | 138.4624696 | -34.8882427 |
| | 7 | start | 138.4824168 | -34.88615225 |
| | 7 | end | 138.4627654 | -34.88941622 |
| | 8 | start | 138.4827304 | -34.88732282 |
| | 8 | end | 138.4630613 | -34.89058973 |
| | 9 | start | 138.4830441 | -34.88849339 |
| | 9 | end | 138.4633572 | -34.89176324 |
| | 10 | start | 138.4833577 | -34.88966395 |
| | 10 | end | 138.4636531 | -34.89293675 |
| | 11 | start | 138.4836714 | -34.89083452 |
| | 11 | end | 138.463949 | -34.89411026 |
| | 12 | start | 138.4839851 | -34.89200508 |
| | 12 | end | 138.4642449 | -34.89528377 |
| | 13 | start | 138.4842988 | -34.89317565 |
| | 13 | end | 138.4645408 | -34.89645728 |
| | 14 | start | 138.4846125 | -34.89434621 |
| | 14 | end | 138.4648368 | -34.89763079 |
| | 15 | start | 138.4849262 | -34.89551678 |
| | 15 | end | 138.4651327 | -34.8988043 |
| | 16 | start | 138.4852399 | -34.89668734 |
| | 16 | end | 138.4654286 | -34.8999778 |
| | 17 | start | 138.4855536 | -34.8978579 |
| | 17 | end | 138.4657246 | -34.90115131 |
| | 18 | start | 138.4858674 | -34.89902846 |
| | 18 | end | 138.4660205 | -34.90232482 |
| | 19 | start | 138.4861811 | -34.90019903 |
| | 19 | end | 138.4663165 | -34.90349832 |
| | 20 | start | 138.4864949 | -34.90136959 |
| | 20 | end | 138.4666125 | -34.90467183 |
| | 21 | start | 138.4868086 | -34.90254015 |
| | 21 | end | 138.4669084 | -34.90584533 |
| **West Beach** | 1 | start | 138.4927739 | -34.92012447 |

| | | | |
|---|---|---|---|
| 1 | end | 138.4728423 | -34.92485097 |
| 2 | start | 138.4933637 | -34.92186015 |
| 2 | end | 138.473447 | -34.92658313 |
| 3 | start | 138.4939536 | -34.92359584 |
| 3 | end | 138.4740517 | -34.92831528 |
| 4 | start | 138.4945435 | -34.92533151 |
| 4 | end | 138.4746564 | -34.93004744 |
| 5 | start | 138.4951334 | -34.92706719 |
| 5 | end | 138.4752611 | -34.93177959 |
| 6 | start | 138.4957234 | -34.92880286 |
| 6 | end | 138.4758658 | -34.93351174 |
| 7 | start | 138.4963133 | -34.93053854 |
| 7 | end | 138.4764706 | -34.93524389 |
| 8 | start | 138.4969033 | -34.93227421 |
| 8 | end | 138.4770754 | -34.93697603 |
| 9 | start | 138.4974933 | -34.93400987 |
| 9 | end | 138.4776802 | -34.93870818 |
| 10 | start | 138.4980834 | -34.93574554 |
| 10 | end | 138.4782851 | -34.94044032 |
| 11 | start | 138.4986734 | -34.9374812 |
| 11 | end | 138.4788899 | -34.94217245 |
| 12 | start | 138.4992635 | -34.93921686 |
| 12 | end | 138.4794948 | -34.94390459 |
| 13 | start | 138.4998536 | -34.94095252 |
| 13 | end | 138.4800997 | -34.94563672 |
| 14 | start | 138.5004438 | -34.94268818 |
| 14 | end | 138.4807047 | -34.94736886 |
| 15 | start | 138.5010339 | -34.94442383 |
| 15 | end | 138.4813096 | -34.94910098 |
| 16 | start | 138.5016241 | -34.94615948 |
| 16 | end | 138.4819146 | -34.95083311 |
| 17 | start | 138.5022143 | -34.94789513 |
| 17 | end | 138.4825196 | -34.95256523 |
| 18 | start | 138.5028045 | -34.94963078 |
| 18 | end | 138.4831247 | -34.95429736 |
| 19 | start | 138.5033947 | -34.95136642 |
| 19 | end | 138.4837297 | -34.95602947 |
| 20 | start | 138.503985 | -34.95310206 |
| 20 | end | 138.4843348 | -34.95776159 |
| 21 | start | 138.5045753 | -34.9548377 |
| 21 | end | 138.4849399 | -34.95949371 |
| 22 | start | 138.5051656 | -34.95657334 |
| 22 | end | 138.485545 | -34.96122582 |
| 23 | start | 138.5057559 | -34.95830898 |
| 23 | end | 138.4861502 | -34.96295793 |
| 24 | start | 138.5063463 | -34.96004461 |
| 24 | end | 138.4867553 | -34.96469003 |
| 25 | start | 138.5069367 | -34.96178024 |
| 25 | end | 138.4873605 | -34.96642214 |
| 26 | start | 138.5075271 | -34.96351587 |
| 26 | end | 138.4879657 | -34.96815424 |

| | | | |
|---|---|---|---|
| 27 | start | 138.5081175 | -34.9652515 |
| 27 | end | 138.488571 | -34.96988634 |
| 28 | start | 138.508708 | -34.96698712 |
| 28 | end | 138.4891762 | -34.97161844 |

## 6.5 Appendix E – Noise Management Plan

# Adelaide Beach Management Review

## Implementation Project – Dredge Trial

## Noise Monitoring Plan

S8105.2C5

September 2026

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| **Document Title** | : Adelaide Beach Management Review Noise Monitoring Plan |
| **Document Reference** | : S8105.2C5 |
| **Date** | : September 2026 |
| **Author** | : Adam Cook, MAAS |
| **Reviewer** | : Chris Turnbull, MAAS |

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# 1 INTRODUCTION

A Noise Monitoring Plan (**Plan**) has been prepared for the proposed Sand Dredging Trial at Adelaide metropolitan beaches (the **Project**). The Department for Environment and Water (**DEW**) is trialling dredging as a potential methodology for replenishment of coastal sands to combat tidal erosion. Dredging was previously trialled in 2024 as a means to manage erosion of beach sands on metropolitan beaches. Prior to the 2024 trial, beach erosion was managed through onshore excavation and transport of sand between metropolitan beaches.

For the 2026 trial, the proposed dredging would collect nearshore sand from Sand Borrow Area in North Haven and deposit it at Sand Placement Areas located at Henley Beach south or at West Beach.

The assessment is based upon the advice from DEW regarding proposed dredge activities.

## 2 PROPOSED ACTIVITIES

The specific dredging methodology for the Project is subject to equipment selections by the dredging contractor, however it is understood that dredging will be conducted in the Sand Borrow Area using either a Cutter Suction Dredge (**CSD**) or Backhoe Dredge (**BHD**). Split Hopper Barges (**SHB**) with tugboats will be used for transport of sand to the Sand Placement Area. Sand placement will involve SHBs depositing sand into 'nearshore boxes'. A smaller CSD (**Rehandling CSD**) may be used to 'rehandle' some of the sand from the 'nearshore boxes' into 'bar boxes' which are locations with water depth between 0 – 2 metres that the SHBs cannot access. The indicative location of Sand Borrow Areas and Sand Placement Areas and the transport routes are shown in Figure 1. Dredging for Sand Borrowing may occur at any location within the Sand Borrow Area. Dredging for rehandling will occur within the nearshore boxes within the Sand Placement Area. The nearshore boxes are at least 130 metres from the closest receivers.

As per the 2024 dredging trial, the above activities may operate on a 24-hour, 7-day-per-week basis, subject to suitable weather.

*Figure 1: Sand Borrow Area location, transport route and Sand Placement locations*

## 3 BACKGROUND NOISE MONITORING

Background noise monitoring was undertaken for the 2024 trial to determine the existing noise environment in the localities where noise-sensitive land uses were most likely to be affected by noise from the Project. Ambient noise in North Haven and West Beach is not expected to have changed significantly since the 2024 trial and so background monitoring in these locations was not repeated for 2026. Additional background monitoring has been conducted for the new placement area in Henley Beach South.

Unattended noise monitors were used for the noise monitoring, capturing ambient noise levels over a seven day period.

The noise monitoring locations for 2024 and 2026, along with the 2026 Sand Borrow Area, Sand Placement Areas and closest sensitive receivers are presented in Figure 2 through Figure 4.

*Figure 2: Noise monitoring location - North Haven*

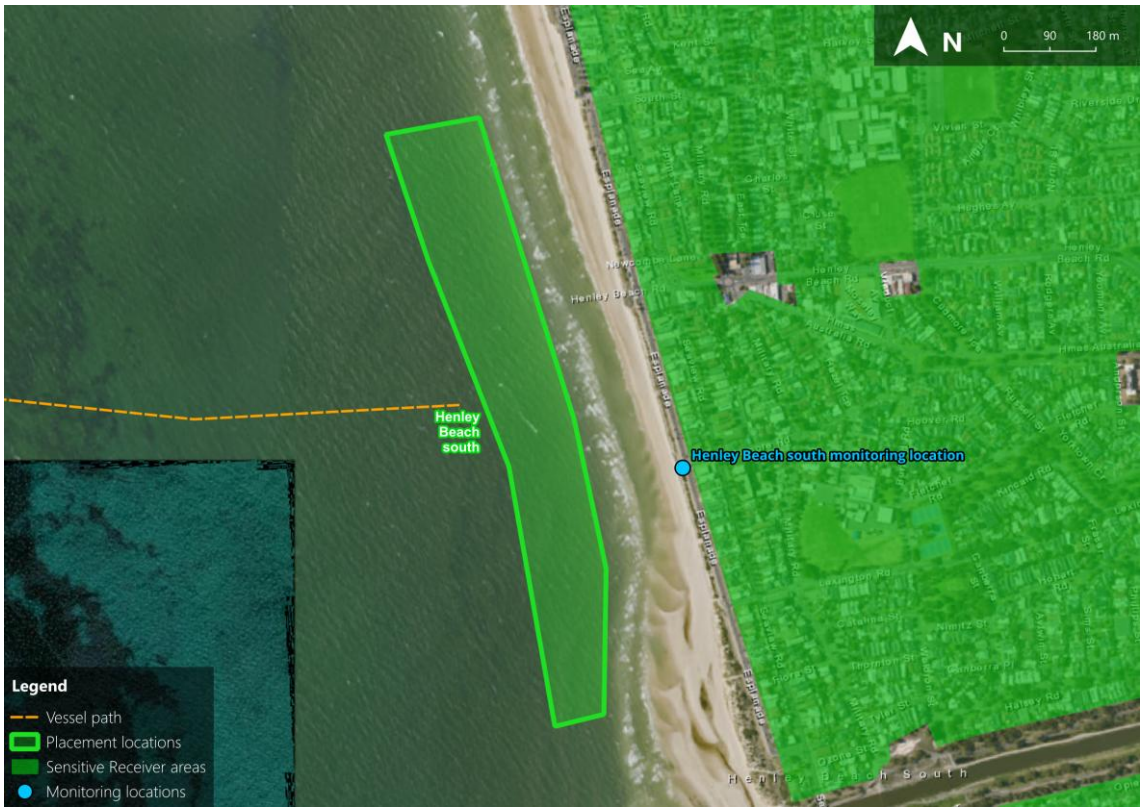



*Figure 3: Noise monitoring location – Henley Beach South*

*Figure 4: Noise monitoring location – West Beach*

Results of the background noise monitoring are provided in Appendix A. The results are summarised in Table 1.

*Table 1: Background Noise Monitoring Results, dB(A)*

| Time of day | Lowest Background Noise ($L_{90}$) | Mean Background Noise ($L_{90}$) | Lowest Average Noise ($L_{eq}$) | Mean Average Noise ($L_{eq}$) |
|---|---|---|---|---|
| **North Haven** | | | | |
| Day (6:00am to 10:00pm) | 35 | 51 | 61 | 68 |
| Night (10:00pm to 6:00am) | 33 | 39 | 38 | 58 |
| **Henley Beach South** | | | | |
| Day (6:00am to 10:00pm) | 43 | 52 | 51 | 60 |
| Night (10:00pm to 6:00am) | 38 | 49 | 47 | 54 |
| **West Beach** | | | | |
| Day (6:00am to 10:00pm) | 37 | 44 | 41 | 53 |
| Night (10:00pm to 6:00am) | 35 | 41 | 39 | 46 |

# 4 CRITERIA

## 4.1 Legislative Context

Coastal dredging generally requires approvals granted under the *Planning Development and Infrastructure Act 2016* (the **PDI Act**). The Planning and Design Code (the **Code**) is the principal Policy for assessment of activities administered under the PDI Act. The Code contains provisions which call for assessment of airborne noise emissions from certain types of activity.

Dredging is also required to comply with the *Environment Protection Act 1993*, which mandates the General Environmental Duty in Section 25: "*A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to minimise any resulting environmental harm.".* The South Australian Environment Protection Authority (**SA EPA**) is responsible for administering the Environment Protection Act. To assist in identifying potential impacts from common noise sources, SA EPA has produced a publication "Evaluation Distances for Effective Air Quality and Noise Management" (**Evaluation Distances Guideline**) which identifies the minimum distance of an activity to sensitive receivers for which EPA will typically require further evaluation of impacts. Dredging is a listed activity within this publication, and an evaluation distance of 300 metres is provided.

## 4.2 Policy and Guidelines

Under the *Assessment Provisions* for *Interfaces Between Land Uses* section of the Code, *Performance Objective 4.1* requires "*Development that emits noise (other than music) does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers)"*. To address this, the Deemed to Satisfy / Designated Performance Feature 4.1 is *"noise that affects sensitive receivers to achieve the relevant Environment Protection (Industrial and Commercial Noise) Policy criteria"* (the **Policy**). However, noise from vehicles, and noise from public infrastructure works are both specifically excluded from the *Environment Protection (Commercial and Industrial Noise) Policy 2023*.

Noise from dredging operations undertaken by DEW in State-controlled coastal waters could be considered as being within the scope of the Department for Infrastructure and Transport's **(DIT)** *Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities* (**DIT CM Guideline**). While the DIT CM Guideline can be used for temporary marine infrastructure projects, it was developed for road construction projects and as such is not well suited to marine activity. Furthermore, the DIT CM Guideline does not provide objective criteria for the assessment of noise from infrastructure works undertaken during daytime hours, only requiring those who conduct such works to reduce noise as far as is *reasonable and practicable*.

### 4.3 Noise Criteria

In the absence of suitable policy or guideline documents, reference is made to the recommendations of the *Guidelines for Community Noise 1999* (the **Guidelines**) published by the *World Health Organisation* (the **WHO**).

The WHO Guidelines include:

> *"To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB $L_{Aeq}$ for a steady continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB $L_{Aeq}$*
>
> …
>
> *At night, sound pressure levels at the outside facades of the living spaces should not exceed 45 dB $L_{Aeq}$ and 60 dB $L_{Amax}$, so that people may sleep with bedroom windows open."*

For the assessment, relevant receivers are based on the definition provided by the Planning and Design Code, which includes existing residential dwellings, land zoned primarily for residential purposes, childcare facilities, educational facilities, hospitals, supported accommodation (e.g. aged care facilities) and short-term accommodation such as hotels and caravan parks.

Based on the WHO guidelines, it is proposed that noise criteria for marine activities are adopted based on equivalent noise levels ($L_{eq}$) at the facade of receiver buildings as follows:

- during day hours (6:00 am to 10:00 pm) no greater than $L_{eq,16h}$ 50 dB(A)
- during night hours (10:00 pm to 6:00 am) no greater than $L_{eq,8h}$ 45 dB(A) or $L_{max}$ 60 dB(A)

It is noted that the night criterion provided by WHO guidelines is consistent with that applicable under the DIT CM Guideline, although considered over a longer duration.

The DIT CM Guidelines also provide requirements for documentation, public notification, noise measurement and/or modelling, and stakeholder engagement activity to be implemented for works outside of Standard Construction Hours.

# 5 ASSESSMENT

## 5.1 Project Activity

Predicted noise levels are based upon continuous dredge operation over the assessment period. That is, 16-hour operation for the day period, and 8-hour operation for the night period.

Sound power levels representative of typical vessels and associated plant used for each type of dredging have been adopted for the purpose of noise level predictions. The sound power levels are summarised in Appendix B. Noise emissions will be subject to vessel and equipment selections by the contractor(s).

## 5.2 Noise Prediction Methodology

Receiver noise levels from the dredging activities have been determined using *SoundPLAN* noise modelling software (Version 9.1), and the CONCAWE noise propagation algorithm with Weather Category 6 acoustic propagation conditions.

Predictions have been made for the noise at the receiver areas from vessels or equipment operating across all parts of each of the work areas shown in Figure 2, Figure 3, and Figure 4. In these predictions it is assumed that equipment operates in the same position for the whole duration of the assessment period. Of these potential operating positions, noise modelling results are summarised for the highest predicted level in the receiver areas. As such, predicted levels are considered representative of worst-case noise emissions from the works.

## 5.3 Predicted Noise Levels

Noise levels have been predicted for each of the potential dredging methodologies and work areas, based upon the following operational parameters which have been advised:

- Either CSD or BHD dredging could dredge continuously in the Sand Borrow Area, with extracted sand placed onto SHBs and transported to the Sand Placement Areas.
- SHBs are transported using tugboats and the tugboats are shared between the two barges or powered down when moored at the Sand Borrow Area until needed.
- Once filled with sand, each SHB will be transported from the Sand Borrow Area to the Sand Placement Area. SHBs will deposit sand at ‘nearshore boxes’ which are locations with water depth of 2 to 5 metres (AHD). Once deposited, the SHB will be transported back to the Sand Borrow Area. Each cycle of the SHB is expected to take six hours based upon observations from the 2024 dredging trial.

- A second smaller CSD may be used to 'rehandle' sand from the 'nearshore boxes' (**Rehandling CSD**). Rehandling will pump some of the newly placed sand into 'bar boxes' which are locations with water depth between 0 – 2 metres that the SHBs cannot access. If used, rehandling would occur continuously within the sand placement area.

The highest predicted $L_{eq}$ noise levels for each dredging methodology and work area shown in Table 2.

*Table 2: Highest predicted noise levels from Project activity*

| **Highest predicted noise level [$L_{eq}$, dB(A)] in most affected receiver locality** | | | | |
|---|---|---|---|---|
| **Work area** | **Vessel type** | | | |
| | **CSD** | **BHD** | **SHB with Tugboat** | **Rehandling CSD** |
| Sand borrow area 1 | 45<br>North Haven | 47<br>North Haven | 23<br>North Haven | N/A(2) |
| Sand placement area 1 | N/A(1) | N/A(1) | 30<br>Henley Beach South | 42<br>Henley Beach South |
| Sand placement area 2 | N/A(1) | N/A(1) | 33<br>West Beach | 43<br>West Beach |

Notes:

(1) Sand Borrow dredges are not proposed to be used in proximity of sand placement areas.

(2) The rehandling dredge is not proposed to be used at Sand Borrow Area 1

Predicted $L_{eq}$ noise levels show good agreement with measurements conducted during the 2024 dredge trial.

Based upon attended noise measurements in 2024 and 2026, $L_{max}$ noise levels for dredging are expected to be within 5 dB(A) of the predicted $L_{eq}$ measurements. For Sand Placement using SHBs $L_{max}$ noise levels of 52-60 dB(A) were measured during sand placement at the closest receiver to sand placement at West Beach, with variation due to the position of the SHB and tugboats. As SHBs will be used at the same or greater setback distances to receivers than in 2024, $L_{max}$ noise levels are expected to comply with the 60 dB(A) night criterion at all sensitive receiver locations.

The use of a Backhoe Dredge may exceed the night criterion by 2 dB(A) if operated at night at the closest part of the Sand Borrow Area to receivers in North Haven. As the noise emissions of the specific Backhoe Dredge to be used have not been measured, it is recommended that testing is conducted to confirm receiver noise levels. In the interim, use of the Backhoe Dredge at night should comply with the 300m separation distance from the Evaluation Distances Guideline.

## 6 RECOMMENDATIONS

Based upon the work methodologies provided, the majority of works associated with the Project are predicted to comply with noise criteria. The exception is use of a BHD at night at the closest part of the Sand Borrow Area to sensitive receivers.

Due to the variable nature of the works, noise monitoring and stakeholder engagement practices are to be implemented as proactive noise management strategies during the Project.

### 6.1 BHD Operation

If a BHD is proposed to be used at night, the location of this type of dredging should be restricted to distances at least 300 metres from the nearest sensitive receivers between the hours of 10:00 pm to 6:00 am. Measurements of operational noise from the specific Backhoe Dredge selected should be taken as soon as practicable to verify this requirement. An exclusion zone for night time use of the BHD is illustrated in Figure 5.

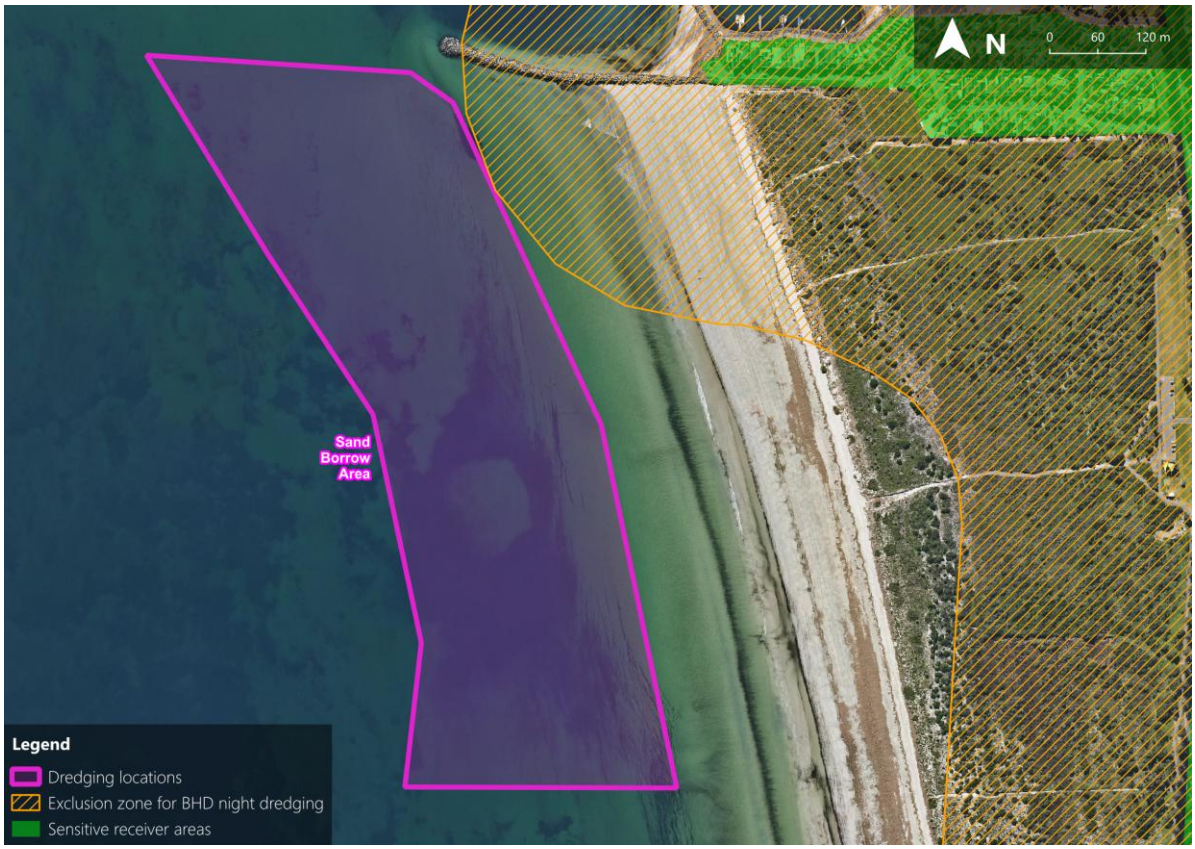



*Figure 5: Exclusion zone for BHD use during night hours*

## 6.2 Noise Monitoring

Attended noise monitoring will be undertaken during the Project, at locations representative of receivers closest to the active work areas. This monitoring will enable verification of predicted noise levels against the final selection of the dredging process and equipment.

The proposed noise monitoring program includes the following (subject to suitable weather conditions):

- Attended noise measurements on the first occurrence of each type of dredging, after set up of equipment is complete and dredging activity levels have normalised.
- Attended noise measurements when dredging equipment is located at the closest position to sensitive receiver locations.
- Attended noise measurements may be conducted in response to a noise-related complaint, if monitoring is deemed to be an appropriate response to quantify the level of noise at the complainant location.

Attended noise measurements will be conducted by a qualified acoustic engineer who is eligible for membership of Engineers Australia and the Australian Acoustical Society. Measurements will be taken using Class 1 or Class 2 sound level meters as defined by AS//NZS IEC 61672.1:2019.

Where noise measurements identify a potential exceedance of the noise criteria, DEW will be informed of the measured noise level and the circumstances under which the potential exceedance occurred. To manage any noise related risks, the following will be conducted (note that depending on the circumstance, this could involve one or more of the following, to be selected based on the cause of exceedance, measured noise level, and whether the action is reasonable and practicable):

- Review of the equipment operating at the time of the exceedance to determine if noise emissions are greater than expected, and if so the cause of any discrepancy.
- Placing a hold on operation of the equipment while any issue is resolved.
- Introduction of noise mitigation to the noise source.
- Introduction of an exclusion zone for the equipment.
- Reduction or change of the operating hours / duration of use of the equipment.
- Substitution of the equipment with an alternative equipment or process.

Further measurements of receiver noise levels will be undertaken once the changes are applied, to confirm the resolution of the exceedance or if any further action is required.

### 6.3 Stakeholder Engagement Practices

Noise-related content should be included in community and stakeholder engagement planning conducted for the Project. The following Stakeholder Engagement items are recommended for the Project:

- Designation of a Project Environmental Manager or Community Engagement Officer responsible for addressing noise issues and contactable by the community.
- Provision of a complaints phone number which is monitored on a 24-hour basis while works occur.
- Maintenance of a complaints register including the following complaint details:
    - Time and date of contact.
    - Time and date of noise issue.
    - Nature of noise issue and any particular noise sources / activities of concern.
    - Actions taken to address the noise concerns.
    - Contact details of the complainant and if follow-up is required.
- Advance notification for all residents and businesses likely to be impacted by the works. This could include public signage, and letter drops or doorknocking to beach-facing properties which interface with the work locations, with the following information provided in writing:
    - Overview of the works and justification for works occurring at night.
    - Date for the commencement of works, including anticipated completion date.
    - Contact name and number of the Project Environmental Manager, Community Engagement Officer or Site Supervisor.
    - If any extensions occur to timeframes or additional activities are required, follow-up information should be provided.
- Notification of local councils and relevant authorities is recommended to ensure that any noise issues are appropriately directed and/or managed.

## 7 CONCLUSION

A Noise Monitoring Plan has been prepared for the proposed Dredging Trial at Adelaide metropolitan beaches to be conducted in 2026. The plan considers the noise from proposed sand borrowing and placement near North Haven, Henley Beach South and West Beach.

Background noise monitoring was conducted in 2024 in the vicinity of North Haven and West Beach. This monitoring has been supplemented with an additional location in Henley Beach South for 2026. Generally, the monitoring results showed some periods of low background noise levels, particularly at night, but relatively high average noise levels.

Predictions of noise levels have been made based upon the proposed activities and noise data for typical equipment. Subject to measurement of the selected dredging equipment on site, noise from the Project is expected to comply with the Project's daytime noise criteria. Recommendations have been made for noise monitoring, backhoe dredging night time exclusion zones, and stakeholder engagement practices to manage any residual risk of night time criteria exceedance.

Based on the implementation of these recommendations where relevant, it is considered that all reasonable and practicable noise reduction measures will have been taken. As such, the Project will not unreasonably impact the amenity of sensitive receivers, achieving the relevant provisions of the South Australian Planning and Design Code related to environmental noise.

## APPENDIX A: BACKGROUND NOISE MONITORING RESULTS

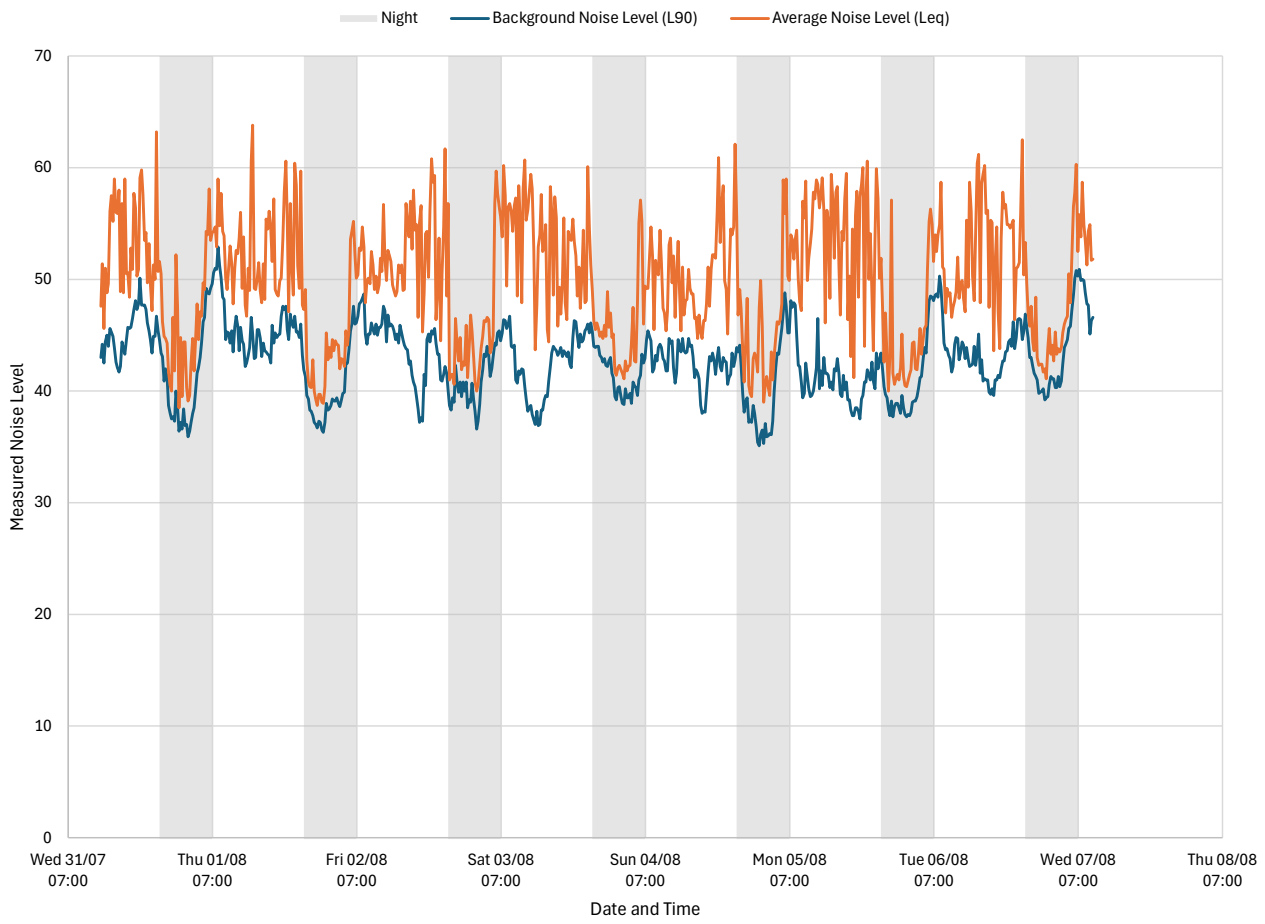



*Figure 6: West Beach Monitoring results (2024)*

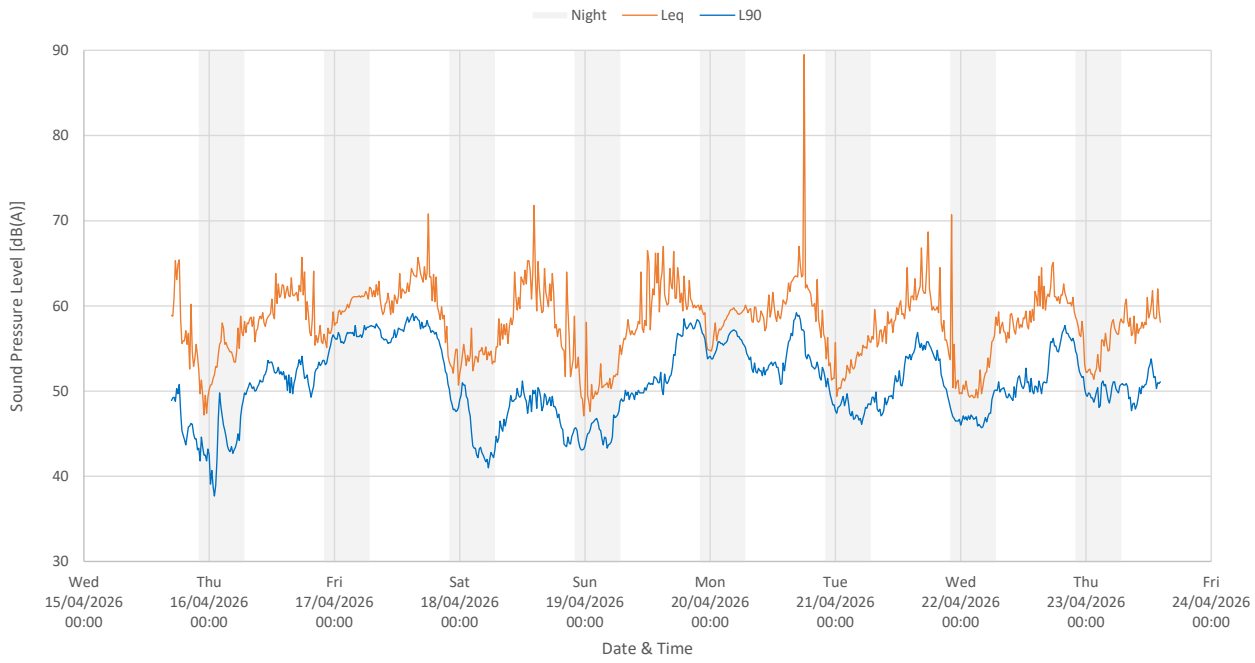



*Figure 7: Henley Beach South monitoring results (2026)*

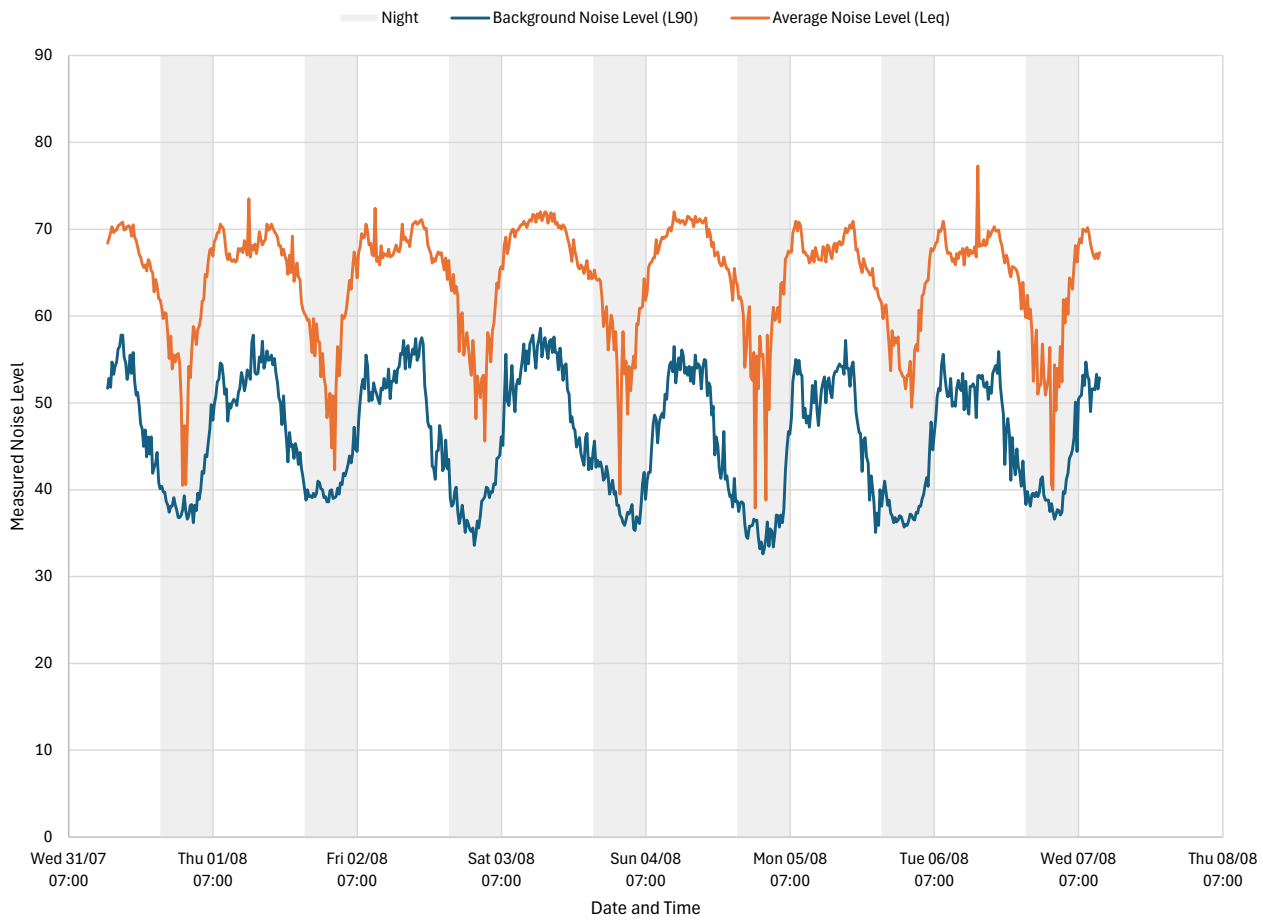



*Figure 8: North Haven Monitoring results (2024)*

## APPENDIX B: SOUND POWER LEVELS

| Item | Sound Power Level [dB(A)] |
|---|---|
| Cutter Suction Dredge | 102 dB(A) |
| Backhoe Dredge (based on mounted 30T excavator) | 104 dB(A) |
| Barge and 2 tugs(1) | 113 dB(A) |
| Small Cutter Suction Dredge for rehandling(2) | 98 dB(A) |

Notes:

(1) Cumulative sound power for barge and tugs

(2) Small CSD (Maritime Constructions dredge *Marcon*) measured at West Beach boat ramp in June 2026

## 6.6 Appendix F – Communication and Engagement Plan

# 2026 Sand replenishment via dredging

Engagement plan

**This engagement plan forms part of the Dredge Management Plan required as a condition of any licence granted by the Environment Protection Authority for dredging in South Australia.**

## Focus of the engagement plan

- To demonstrate how the Department for Environment and Water (the department) will communicate and engage the public in relation to the 2026 dredging project.
- To ensure that all people who are interested in beach management are provided with information, can ask questions and give feedback on the project.
- To support the implementation of the 2026 dredging project by raising public awareness of the proposed project, communicate details of planned dredging activities, and share information on possible impacts with potentially affected parties.
- To outline how engagement will be implemented.
- To supplement the broader media and communication objectives with targeted stakeholder engagement aimed at directing stakeholders to a central point of contact and source of updated information about the project, ensuring content remains accurate.
- To support strategic and purposeful liaison with the EPA, consultants, government agencies and key individual and community group stakeholders, to foster shared understanding of the project.

## What will make this engagement successful?

- Stakeholders are aware of the potential impacts of the 2026 dredging project on access and amenity, including any restrictions to on-water activities, the timeframe and frequency of dredging equipment operating in nearshore locations, and the environmental management measures in place, including noise, water quality and seagrass monitoring.
- 
- People with an interest in the dredge project know how to find further information.
- People understand the objective of the 2026 dredging project and how it will be regulated by the EPA.

## Key contacts

| ENGAGEMENT LEAD | PROJECT LEAD | Operations Lead SPOKESPERSON |
|---|---|---|
| **Andrea Murphy** | **Tom West** | **Felicity Beswick** |
| Community Engagement Manager – Coasts | Program Manager, Adelaide Beach Management | A/Team Leader Coastal Operations and Engineering |

## Key dates

**January 2026:** Government announced long-term sand replenishment program, with dredging planned to commence from 2027 subject to regulatory approvals.

**May 2026:** DEW apply for Environment Protection Authority (EPA) authorisation for a small-scale program of sand replenishment via dredging in 2026.

**July 2026:** EPA assessment of dredging application, including public consultation on proposed 2026 dredge project - equipment and operational methods, how environmental impacts will be managed, and how the EPA will regulate the activity.

**September 2026:** Communication of EPA decision regarding licence.

**September 2026:** Dredging project undertaken, subject to weather and operational requirements. Regular communication on operational project plans and progress, direct engagement with impacted stakeholders, and ongoing revision of public information needs e.g. fact sheets and FAQs.

**October to December 2026:** Conclusion of 2026 dredging project. Scientific monitoring reports for seagrass, noise and water quality are submitted to EPA as required. Dredge contractor submits closeout report to EPA. Project summary report made public via the DEW website.

## Background

The Adelaide Beach Management Review (ABMR) was established in 2022 in response to community concerns about sand management, with an Independent Advisory Panel tasked to recommend approaches that maintain sandy beaches, minimise disruption, and avoid environmental harm.

In May 2024, the Government endorsed the Panel's recommendations, including trialling dredging, maintaining West Beach with external sand, and further assessing long-term solutions. The Department for Environment and Water (DEW) implemented these actions through sand restoration at West Beach, dredging investigations and trials, and assessment of a sand recycling pipeline.

Findings were reported to Cabinet in June 2025, informing the Government's January 2026 decision to implement a long-term replenishment project via dredging to manage erosion hot spots and sand build-up along the Adelaide coast from West Beach to North Haven.

Subject to regulatory approvals, the project will include a once-off mass replenishment to restore West Beach with approximately 400,000 cubic metres of sand collected from north of the Outer Harbor channel breakwater, as well as ongoing recycling of sand from nearshore areas where sand builds up, and placement in areas where it is needed.

DEW lodged an application with the EPA for authorisation of a small-scale project of sand replenishment via dredging in 2026.

The purpose of the project is to trial alternative dredge program designs (including equipment, methods and monitoring regimes) and gather additional data to inform the design of the long-

term replenishment program from 2027 while minimising the need for trucking and quarry sand to maintain West Beach in 2026.

## IAP2 Spectrum of Public Participation

| **Inform** | **Consult** | Involve | Collaborate | Empower |
|---|---|---|---|---|

Informative and inclusive engagement will ensure stakeholder and community views are considered during the 2026 dredging project. This plan follows the International Association of Public Participation (IAP2) principles to outline the level of engagement each stakeholder category should expect from the department at each stage of the project.

Whereas the 2024 dredging trial utilised 4 levels of the IAP2 spectrum – Inform, Consult, Involve and Collaborate – the 2026 dredging project will utilise the Inform and Consult levels. This change is because the State Government has already publicly announced (pending approvals) that dredging will be the long-term method used for managing sand between West Beach and North Haven.

The department is committed to undertaking communication and engagement in line with the following Better Together Principles:

- We are clear on the engagement objectives, with IAP2 levels selected according to the level of influence that is appropriate to the dredging project and stipulated in the EPA Dredge Guidelines.
- We have long-standing relationships with our communities and the local knowledge embedded within. A full list of stakeholders is provided as Appendix A.
- We respect our communities and acknowledge the diverse range of views and values, and the significant connection to the coastline and marine environment.
- Community will have avenues to provide feedback.
- A variety of communication tools will be utilised to convey complex information in an easy-to-understand format.

## Capturing and addressing community feedback

Questions generated through the public consultation process will be addressed and provided to the EPA for consideration in assessing the application and used to generate publicly available fact sheets and FAQs.

During project delivery, a correspondence register will be established to capture public enquiries and responses.

Responses will be processed and generated as per the DEW community correspondence process. Wherever possible, the public will be encouraged to provide feedback in writing via email at DEWcoasts@sa.gov.au.

DEW's Complaints Handling Policy states: *Complaints are to be acknowledged promptly, ideally within five business days, and a substantive response provided within four weeks. Where*

*this timeframe is not achievable, the person making a complaint or their representative will be contacted and advised on the expected timeframe for a response.*

## Stakeholder analysis

A key stakeholder list is provided below. Stakeholders have been broken down into separate tabs including SA Government agencies, elected members and statutory bodies, metropolitan coastal councils and coastal clubs, and businesses and community groups, including those consulted in the 2024 trial.

Stakeholder mapping for the 2026 dredging project is based on acknowledging the existing relationships that the department has with agencies and authorities with responsibilities for regulation, coastal resource use, or aspects of coastal management, including coastal council staff and elected members and impacted communities. The approach for managing Adelaide's beaches is based on decades of research, monitoring and international best practice, with community input and historical knowledge intrinsically incorporated into departmental expertise.

As new stakeholders with new information needs are identified they will be added to the stakeholder list, and communications and engagement methods will be adapted to suit emerging information needs. The department encourages everyone who has an interest in the dredging project to contact us via email at DEWcoasts@sa.gov.au.

The below table outlines the main categories of stakeholders identified, the level of engagement that can be expected as part of this plan, and the engagement methods that the department will use to reach these stakeholders.

| Stakeholder group | EPA application | Pre-dredging | During operations | Post-dredging |
|---|---|---|---|---|
| **Coastal care and environmental interest groups** | Consult | Inform | Inform | Inform |
| **Coastal community members** | Consult | Inform | Inform | Inform |
| **Coastal clubs and businesses** | Consult | Inform | Consult | Inform |
| **Elected members** | Consult | Inform | Inform | Inform |
| **Council executives and key staff** | Consult | Inform | Inform | Inform |
| **DIT** | Consult | Inform | Inform | Inform |
| **PIRSA (SARDI)** | Consult | Inform | Inform | Inform |
| **Environment Protection Authority** | Consult | Inform | Consult | Inform |
| **First Nations communities** | Consult | Inform | Inform | Inform |
| **General public** | Consult | Inform | Inform | Inform |
| **Beach and ocean users** | Consult | Inform | Inform | Inform |

## First Nations consultation and engagement

Two members of the ABMR Independent Advisory Panel were representatives of the Kaurna community – a Kaurna Elder and knowledge holder, and a Kaurna young person with a degree in environmental science and heritage protection. The Kaurna representatives provided advice to the panel during the review and engaged with the Kaurna Yerta Advisory Committee and the Kaurna community on behalf of the panel.

The department recognises the Adelaide coastline as the traditional lands of the Kaurna people. Peak bodies for the Kaurna community are included in the stakeholder list and will be engaged through the tactics listed within this document.

## Key messages

**Application process:**

- DEW has lodged an application with the EPA to support dredging activity to occur in 2026 to manage erosion hot spots and sand build-up along the Adelaide coast from West Beach to North Haven.
- If approved, the application proposes to undertake dredging in September 2026 with up to 90,000 cubic metres of sand taken from nearshore of North Haven and delivered to West Beach and Henley Beach South. Sand will be delivered to the nearshore environment, similar to the dredging trial in 2024, and as described in detail in the Dredge Management Plan.
- By undertaking some dredging activity this year, DEW will be able to capture more data and gain enhanced operational understanding to inform the full sand replenishment program due to commence in 2027.
- Works will occur up to 24 hours a day for seven days a week.
- This type of dredging is the most common method of beach replenishment globally, as well as in Australia.
- The Dredge Management Plan was open for public consultation via the EPA's Public Register.
- If approved, beachgoers may see dredging equipment close to shore during the works between West Beach and North Haven. There may be short-term restrictions to some on-water activities during sand collection and delivery. DEW will work closely with local clubs, coastal users and businesses to minimise any disruption to events or activities.
- Dredging requires EPA authorisation via a licence and approved DMP which sets out how dredging and sand placement will occur, and how impacts to marine life, water quality, public health, and local communities will be managed.

**Operations:**

- We're keeping Adelaide's beaches sandy and safe by moving sand from where it naturally builds up to where it's needed. This protects the coast, nearby roads and homes, and keeps beaches great for recreation.
- Sand naturally drifts from south to north along Adelaide's coast, which means some beaches gain sand while others – like West Beach and Henley Beach South – lose sand and erode.

- If we don't replace lost sand, beaches narrow and erosion worsens, reducing protection for the foreshore and nearby infrastructure.
- A small-scale dredging project will be undertaken in September 2026 with up to 90,000 cubic metres of sand taken from a nearshore area just south of North Haven Marina breakwater and delivered to West Beach and Henley Beach South. The sand will be placed in the nearshore environment where natural wave action can gradually move it onshore to help maintain beach width and improve protection from storms and erosion.
- Dredging is the careful collection of sand from areas where it naturally builds up on the seabed and then moving that sand to beaches where it's needed. Work can occur up to 24 hours a day for seven days a week.
- This approach reuses sand that is already part of the coastal system and avoids removing sand from land or sensitive areas.
- All dredging will be licensed and regulated by the EPA and managed under an approved Dredge Management Plan (DMP). The DMP sets out how dredging and sand placement will occur, and how impacts to marine life, water quality, public health, and local communities will be managed.
- The project is guided by decades of monitoring, the findings of the independent Adelaide Beach Management Review, and the outcomes of the 2024 dredging trial. Community safety and protecting the local environment are central considerations during operation, with managed work zones and strict contractor conditions in place.
- The Adelaide Beach Management Review considered a range of options for managing Adelaide's beaches and found that dredging provides the best balance of environmental care, cost, flexibility, safety and community outcomes.
- Dredging allows sand to be collected and placed at different locations as coastal conditions change over time, providing greater flexibility than fixed infrastructure options.
- Extended pipelines were found to be the most expensive and least flexible option and would still require significant infrastructure and beach-based operations. Trucking was ruled out as a long-term solution because it would significantly affect community access to and enjoyment of Adelaide's beaches, as well as generate traffic, noise and other environmental impacts.
- The long-term program is based on coastal monitoring, scientific investigations and community consultation, and will be reviewed after five years to ensure it continues to deliver the best outcomes for Adelaide's beaches.
- Dredging is one of the most commonly used sand management methods around the world, with working examples in the Netherlands, Singapore and the United States, and closer to home in Port Phillip Bay (Victoria), Busselton (Western Australia), the Tweed River and Gold Coast (Queensland), and the Murray Mouth (SA).
- There is currently no established link between dredging activities and the harmful algal bloom. Environmental conditions will continue to be monitored throughout the program in accordance with licence requirements and environmental management plans.
- DEW is working with the Office of Algal Bloom Response to monitor the presence of microalgal species, including Karenia species, in areas where dredging operations are occurring. Algal cell counts will be undertaken twice a week at eight monitoring sites throughout dredging operations.

- You can receive direct updates about coastal management including the replenishment program by subscribing to DEW Coasts e-news and SMS alerts .

## Communications and engagement tools and techniques

Communications and engagement will be undertaken to inform stakeholders and the community of planned activities and timing. This will include direct engagement with key stakeholders and broader community information. Methods may be adjusted as required.

**Application/Pre-dredging** (June/July/August 2026):

| Tactic | Audience | Details |
|---|---|---|
| **Factsheet** | • Broader community<br>• Affected clubs and businesses<br>• Coastal councils | • Explanation of works<br>• Collection area<br>• Placement zones<br>• How environmental impacts are managed<br>• Noise management<br>• Seagrass protection<br>• Water quality monitoring<br>• Operation hours<br>• Contact details for queries.<br><br>Hard copies available to provide coastal clubs and businesses for distribution. Content replicated as web copy on the Adelaide Beach Works page |
| **Web content** | • Broader community<br>• Affected clubs and businesses | • Explanation of works<br>• Collection area<br>• Placement zones<br>• Operation hours<br>• How environmental impacts are managed<br>• Contact details for queries |
| **DEW Coasts e-news** | • Broader community<br>• Previously engaged stakeholders | • Brief explanation of work<br>• Notification of application<br>• Invitation to take part in EPA consultation from July 10-24 |
| **SMS Alert** | Previously engaged stakeholders | • Notification of application<br>• Invitation to take part in EPA consultation from July 10-24 |

| | | |
|---|---|---|
| **Face-to-Face meetings** | • City of Charles Sturt<br>• City of Port Adelaide Enfield<br>• North Haven Surf Life Saving Club<br>• West Beach SLSC<br>• Adelaide Sailing Club<br>• Henley Sailing Club | • Explanation of works and DMP application process<br>• Establish contact points for collaboration throughout project |
| **FAQ** | General public | A set of Frequently Asked Questions (FAQs) will provide clear and accessible information to the public will be developed. This resource will be regularly updated as new questions are received by the department or the EPA, ensuring that the community has access to the most current and relevant information |

**During operations** (September 2026):

| Tactic | Audience | Details |
|---|---|---|
| **Factsheet** | • Broader community<br>• Affected clubs and businesses<br>• Coastal councils | Updates to original factsheet, as required, based on:<br>• Community feedback<br>• Any operational changes<br><br>Hard copies available to provide coastal clubs and businesses for distribution. Content replicated as web copy on the Adelaide Beach Works page |
| **Postcards** | • Coastal residents<br>• Broader community<br>• Affected clubs and businesses | Simple DL postcard with minimal text but QR code linking to the full details on the DEW website. To be handed out at community events, on beaches and used for direct mail |
| **Direct mail via post** | Coastal residents | Bulk mailout to coastal residents including hard copies of the fact sheet |

| | | |
|---|---|---|
| **FAQ** | • Broader community<br>• Affected clubs and businesses | Updated and reviewed regularly, these will address common questions arising through public consultation and dredging operations, including:<br>• Collection area<br>• Placement zones<br>• How environmental impacts are managed<br>• Noise management<br>• Seagrass protection<br>• Water quality monitoring<br>• Operation hours<br><br>Made available on the Adelaide Beach Works page of the DEW website. |
| **Web content** | • Broader community<br>• Affected clubs and businesses | • Explanation of works<br>• Collection area<br>• Placement zones<br>• Operation hours<br>• How environmental impacts are managed<br>• Contact details for queries<br>• Updates as necessary with detail on operational changes |
| **Coasts e-news** | • Broader community<br>• Previously engaged stakeholders | • Notification of approval and start date<br>• Explanation of works<br>• Link to website for details and fact sheet<br>• Updates as necessary with detail on operational changes (timing of when sand delivered to each placement areas) |
| **SMS alert** | Previously engaged stakeholders | • Notification of approval and start date<br>• Link to website for further detail<br>• Updates as necessary with detail on operational changes |

| | | |
|---|---|---|
| **Face-to-face meetings** | Directly impacted stakeholders | • Meetings, as required to discuss operational impacts and measures to minimise community disruption<br>• Updates as necessary with detail on operational changes |

**Post operations** (November-December 2026):

| Tactic | Audience | Details |
|---|---|---|
| **Web content** | • Broader community<br>• Previously engaged stakeholders<br>• Government agencies | Project summary report uploaded to the DEW website on the Adelaide Beach Works page. |
| **Coast e-news** | • Broader community<br>• Previously engaged stakeholders | Link to the project summary report to close out the project with the public |
| **Monitoring reports** | EPA | As required, scientific monitoring reports submitted to the EPA, including:<br>• Seagrass<br>• Noise<br>• Water quality<br>• Contractor close-out report |

# Appendix A: Stakeholder list

| Coastal clubs / businesses |
|---|
| Adelaide Sailing Club |
| Angas Inlet Boat Club |
| Beach Break Café |
| Birdlife Australia |
| Blue Ice Charters |
| Brighton and Seacliff Yacht Club |
| Brighton Surf Life Saving Club |
| Brindabella Sailing |
| Conservation Council of South Australia |
| Cruising Yacht Club of South Australia |
| Experiencing Marine Sanctuaries |
| Fort Glanville Caravan Park |
| Friends of Grange Beach |
| Friends of Grange Beach and Tennyson |
| Friends of Gulf St Vincent |
| Friends of Minda Dunes |
| Friends of North Haven Dunes |
| Friends of St Vincent Gulf |
| Fuego by the Sea |
| Garden Island Yacht Club |
| Glenelg Surf Life Saving Club |
| Grange Jetty Café |
| Grange Sailing Club |
| Grange Surf Life Saving Club |
| Henley and Grange Historical Society |
| Henley Beach Business Association |
| Henley Beach South Dune Care Group |
| Henley Coastal Voice |
| Henley Dunes Care Group |
| Henley Sailing Club |
| Heritage Restoration Dune Group |
| Joe’s Kiosk |
| Kaurna Yerta Aboriginal Corporation |

| |
|---|
| Largs Bay Sailing Club |
| Largs Pier Kiosk |
| Mirani's Café |
| North Haven Dunes Group |
| North Haven Marina |
| North Haven Surf Life Saving Club |
| OzFish |
| Port Adelaide Resident's Environment Protection Group |
| Port Adelaide Sailing Club |
| Port Environment Centre |
| RecFish SA |
| Robarra |
| Royal South Australian Yacht Squadron |
| Sandpiper Dunes Group |
| Save Our Shores: Semaphore Largs Bay |
| Save West Beach Sand |
| Sea Squadron West Beach |
| Seacliff Surf Life Saving Club |
| Semaphore Largs Dunes Group |
| Semaphore Mainstreet Association / traders |
| Semaphore Surf Life Saving Club |
| Shelley's Semaphore |
| Small Boat Club |
| Somerton Surf Life Saving Club |
| Somerton Yacht Club |
| St Kilda Boat Club |
| SUBCO |
| Surf Life Saving SA |
| Taperoo Dunes Group |
| Temptation Sailing |
| Tennyson Dunes Group |
| West Beach Parks |
| West Beach Surf Life Saving Club |
| Western Adelaide Coastal Residents Association |

| Councils and statutory bodies |
| --- |
| Adelaide Coastal Councils Network |
| City of Charles Sturt |
| City of Holdfast Bay |
| City of Port Adelaide Enfield |
| City of West Torrens |
| LGA SA |
| SA Climate Ready Coasts |
| SA Coastal Councils Association |
| West Beach Parks |

| SA Government agencies |
| --- |
| Coast Protection Board |
| Department of Environment and Water |
| Department for Infrastructure and Transport |
| Department for Primary Industries and Regions |
| Green Adelaide |
| National Parks and Wildlife Service |
| SA Water |
| South Australian Research and Development Institute |

| Elected members of Parliament |
| --- |
| Member for Colton, Aria Bolkus |
| Member for Gibson, Sarah Andrews |
| Member for Hindmarsh, Hon Mark Butler |
| Member for Lee, David Wilkins |
| Member for Morphett, Toby Priest |
| Member for Port Adelaide, Cheyne Rich |

## 6.7 Appendix G – 2025 Sediment Sampling and Analysis Report

bluecoast CONSULTING ENGINEERS

Government of South Australia
Department for Environment and Water

# AMBRI sediment investigations

| | |
|---|---|
| **To** | Government of South Australia – Department for Environment and Water (DEW) |
| **From** | Bluecoast Consulting Engineers |
| **Reference** | P24462_ABMRISedimentMonitoring_R2.00 |
| **Date** | 14 May 2026 |
| **Subject** | **Analysis of sediment in ABMRI borrow and placement areas** |

## 1. Introduction and context

This report supports the ongoing monitoring of the 2024 Adelaide Beaches Management Review Implementation (ABMRI) beach nourishment trial. The beach nourishment trial involves dredging sand from the nearshore area at North Haven (SBA1) and placing the material in the nearshore zone at West Beach, supplemented by mechanical bypassing of additional sand from the West Beach sand trap. This approach was selected following the ABMR scientific review, which identified dredging-based backpassing as a viable option for managing chronic sand deficits along the Adelaide metropolitan coastline.

The technical note documents the sediment sampling and benthic observations undertaken to describe the seabed conditions, 12-months after the works, at the borrow and placement sites. The aim being to understand the rate of infilling, how the dredged areas are infilling, the characteristics of infill material, and how placed sand placed in the nearshore system is behaving. The findings contribute to broader assessments of the performance and long-term feasibility of dredging-based sand recycling as a coastal management tool. This memo should be read in conjunction with Blueocast's 2025 report *P24462 _ Sand management using dredgers – sand sourcing and other feasibility assessments* for full context.

A single day of diver-based fieldwork was undertaken to obtain sediment cores and benthic imagery, with laboratory analysis performed on each homogenised sample. The results form part of the evidence base informing ongoing ABMRI monitoring and future management decisions.

## 2. Scope of works

The scope of the fieldwork, developed with DEW, involved collecting sediment data and benthic observations at the North Haven borrow area (SBA1) and the West Beach placement areas. The data was collected on 23 October 2025 by East West Dive and Salvage under Bluecoast's guidance. The fieldwork activities were:

- divers collecting shallow sediment cores at ten (10) sample sites as well as benthic observations using underwater camera
- underwater video transects capturing benthic observations along two lines in SBA1

The sampling sites and benthic video transects are shown in Figure 1 with the coordinates given in Table 1.

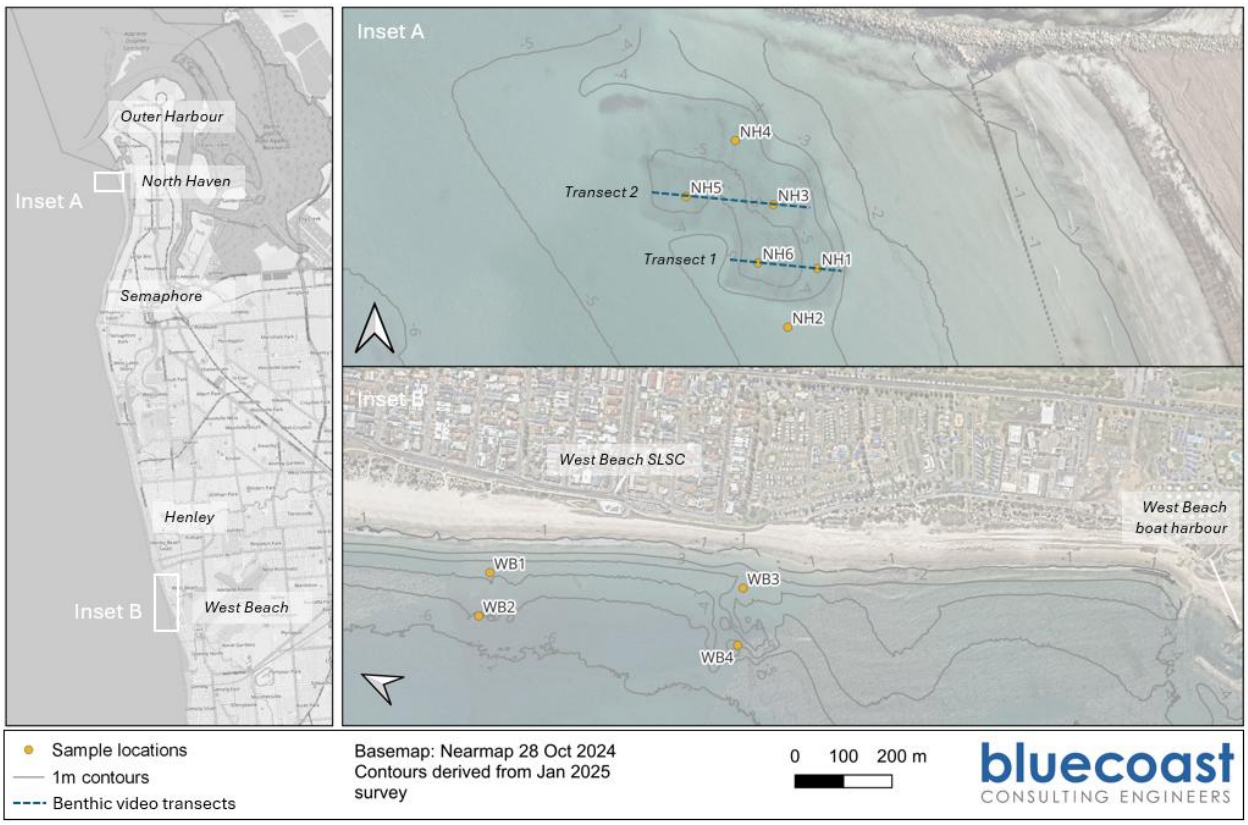



**Figure 1: Map of sampling sites and benthic video transects.**

Each of the cores collected were homogenised and samples transfer to the laboratory for analysis. Physical and chemical parameters including:

- Particle size distribution (including hydrometer for fines fractions) and moisture content
- Metals and metalloids
- Total Organic Carbon (TOC)
- PFAS
- BTEXN
- TRH and TPH
- Pesticides
- Organotins
- PAHs
- Acid Volatile Sulfide (AVS) and Chromium Reducible Sulfur (CRS)

# 3. Methodology

## 3.1 Sediment sampling

At each sampling location, divers manually recovered sediment cores using hand-driven coring tubes, which were advanced into the seabed with the aid of a mallet. Cores were retrieved to the maximum

achievable depth with a target depth of 1m, or until refusal. Following collection, the cores was photographed and descriptions of the sediment colour, materials of note or stratification recorded.

Sediment from each core was then homogenised in a clean container. Following homogenisation, samples were transferred into laboratory-supplied containers using clean stainless-steel spoons and disposable nitrile gloves to minimise the risk of contamination.

All reusable sampling equipment was thoroughly cleaned between locations to prevent cross-contamination. Samples were immediately placed in a refrigerator and maintained under appropriate temperature control prior to delivery to the certified analytical laboratory (Envirolab's Adelaide lab). All samples were accompanied by completed chain of custody documentation in accordance with standard field and quality assurance protocols.

### 3.2 Benthic observations

Concurrently with the sediment sampling, benthic observations were recorded, and underwater video and photographs were taken by the dive team. It was noted that the visibility during the fieldwork was very poor (sub 10cm) so the photographs available are limited to those at the North Haven sites.

In addition to the observations at each sample site, two video transects were undertaken in the North Haven area. Video of the seabed along these transects was recorded by the dive team. The start and end point of each transects (refer to Figure 1) are:

- Transect 1: NH1 to NH6
- Transect 2: NH3 to NH5

## 4. Results

### 4.1 Sediment physical analysis

Sediment characteristics results from the particle size distribution analysis are shown in Table 1 with the PSD curves for each sample shown in Figure 2. The laboratory documentation for these analyses and summary sheet of the physical characteristics are given in Appendix B.

**Table 1: PSD analysis results.**

| Sample ID | Easting | Northing | Core depth (m) | D50 (mm) | Cu | Fines (%) | Gravel (%) |
|---|---|---|---|---|---|---|---|
| **North Haven (SBA1)** | | | | | | | |
| **NH1** | 269,672 | 6,146,561 | 0.70 | 0.11 | 1.5 | 6 | 0 |
| **NH2** | 269,656 | 6,146,529 | 0.72 | 0.11 | 1.5 | 4 | 0 |
| **NH3** | 269,648 | 6,146,596 | 0.55 | 0.11 | 1.6 | 7 | 1 |
| **NH4** | 269,627 | 6,146,630 | 0.75 | 0.11 | 2.2 | 13 | 2 |
| **NH5** | 269,601 | 6,146,600 | 0.80 | 0.11 | 1.5 | 6 | 3 |

| Sample ID | Easting | Northing | Core depth (m) | D50 (mm) | Cu | Fines (%) | Gravel (%) |
|---|---|---|---|---|---|---|---|
| **NH6** | 269,640 | 6,146,564 | 0.61 | 0.11 | 1.5 | 7 | 0 |
| **West Beach** | | | | | | | |
| **WB1** | 271,588 | 6,130,257 | 0.74 | 0.13 | 2.0 | 5 | 8 |
| **WB2** | 271,497 | 6,130,240 | 0.64 | 0.12 | 1.7 | 10 | 3 |
| **WB3** | 271,780 | 6,129,770 | 0.64 | 0.13 | 1.8 | 4 | 1 |
| **WB4** | 270,393 | 6,131,170 | 0.61 | 0.19 | 2.2 | 2 | 1 |

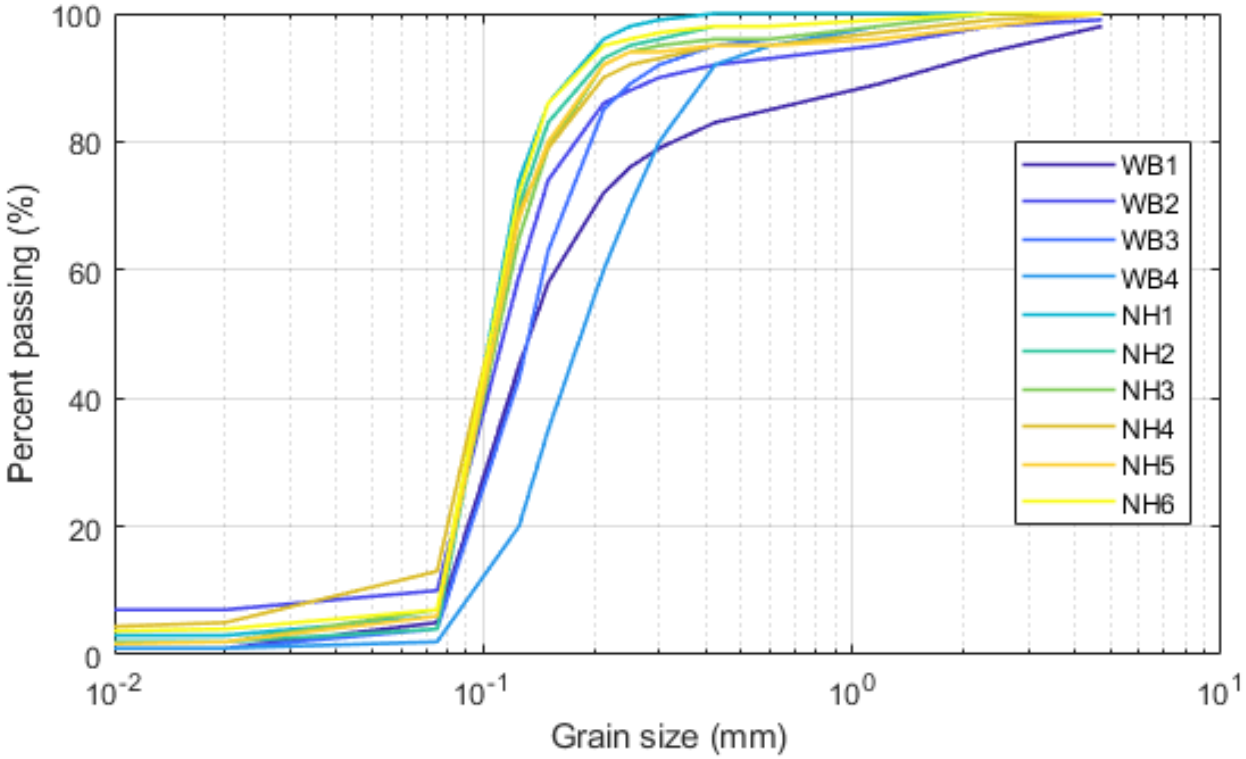



**Figure 2: PSD curves for all samples.**

## 4.2 Sediment chemical analysis

The majority of chemical parameters were either below laboratory reporting limits or present at very low concentrations. Metals, metalloids, organochlorine pesticides, PCBs, BTEXN, TRH fractions and PFAS were generally not detected or were detected at trace levels well below the applicable guideline values. Total organic carbon (TOC) content was low across all samples, consistent with the coarse sandy nature of the seabed in the survey area. The dataset indicates that the sampled sediments are predominantly chemically inert, low-organic marine sands with minimal accumulation of contaminants (i.e. clean marine sand). Comparison against ANZG (2018) sediment quality guideline values, NADG (2009) ISQG and

SQG-High thresholds, and SA EPA soil benchmarks confirms that no analytes exceeded relevant screening criteria, and no patterns indicative of localised contamination were observed.

PAHs were detected at low levels across a small number of samples, with most compounds below reporting limits. Detected PAHs included phenanthrene, fluoranthene, pyrene, benz(a)anthracene and benzo(a)pyrene, with maximum concentrations of 40–71 µg/kg. While no specific guideline values are given for individual PAHs, all results were well below the ANZG (2018) total PAH DGV and NAGD (2009) screening level of 10,000 µg/kg.

Assessment of reduced inorganic sulfur showed very low AVS (<0.5–5.8 µmol/g) and low CRS (0.03–0.08% S) across all sites. Under the *National Acid Sulfate Soils Guidance – Dredging of ASS Sediments (Simpson et al. 2018)* and the *National ASS Identification and Laboratory Methods Manual (Sullivan et al. 2018)*, AVS and CRS are used to identify sulfidic materials with potential to release $H_2S$ when disturbed, with AVS ≥0.01% S (≈3 µmol/g) commonly associated with monosulfidic black ooze (MBO) and elevated $H_2S$ risk. All samples fall below or only marginally above this threshold and occur within coarse, low-TOC, strongly alkaline sands, which the guidelines specify are not classed as sulfidic and are unlikely to generate $H_2S$. This interpretation is consistent with international dredging guidance (IADC 2015, A Common-Sense Approach for $H_2S$ Release During Dredging), which notes that sandy, well-oxygenated sediments rarely release $H_2S$ when disturbed.

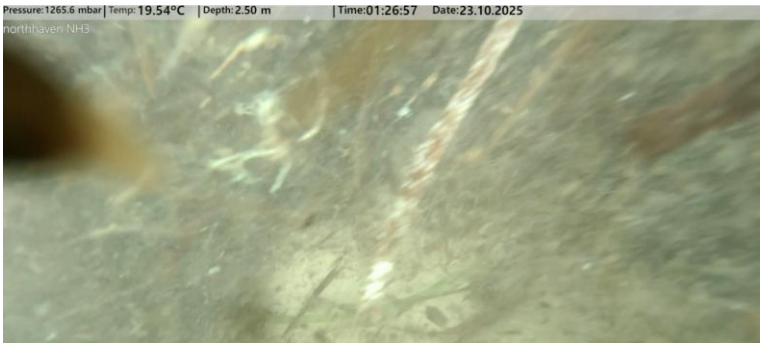
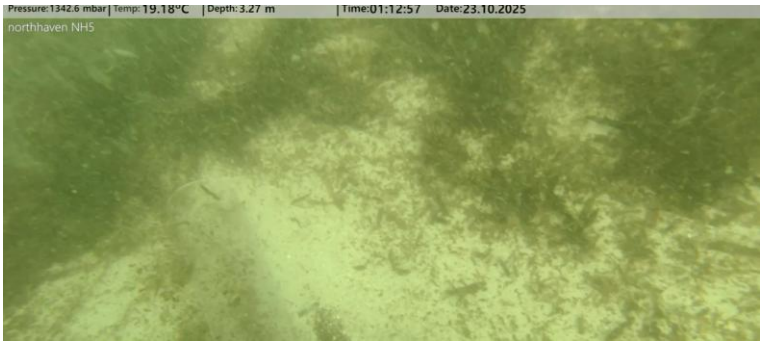
The laboratory documentation for these analyses and summary sheet of the chemical analyses are given in Appendix B.

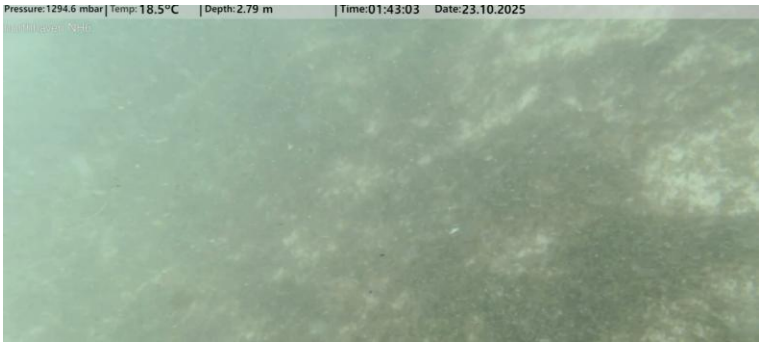
## 4.3 Benthic observations

Observations and images from each of the sites are given below in Table 2. Note the images shown are screenshots from video, the video at each site has been provided along with this report.

**Table 2: Benthic observations.**

| Site | Observations | Image |
|---|---|---|
| **NH1** | Predominantly sand. Patchy dead areas of seagrass wrack sitting on top of sand. | |

| Site | Observations | Image |
|---|---|---|
| **NH2** | Patchy seagrass wrack on the surface of sand. | |
| **NH3** | Surface covered with seagrass wrack. Sand below the seagrass. |   |
| **NH4** | Surface covered by seagrass wrack. | |
| **NH5** | Patchy dead seagrass on top of sand. |   |

| Site | Observations | Image |
|---|---|---|
| **NH6** | Patchy dead seagrass. Sand below seagrass. |   |
| **WB1** | Bare sand, no seagrass or wrack visible. | *No image available due to limited visibility.* |
| **WB2** | Bare sand, no seagrass or wrack visible. | *No image available due to limited visibility.* |
| **WB3** | Bare sand, no seagrass or wrack visible. | *No image available due to limited visibility.* |
| **WB4** | Bare sand, no seagrass or wrack visible. | *No image available due to limited visibility.* |
| **Transect 1 – NH1 to NH6** | Seagrass wrack of varying thickness over bare sand. | |
| **Transect 2 – NH3 to NH5** | Seagrass wrack of varying thickness over bare sand. | |

# 5. Analysis of infilling material

The purpose of this data collection is to examine the infill material from the SBA1 sand borrow area and determine if the material is similar to the existing native material and would be suitable for re-dredging. Figure 3 shows the location and depth of the cores collected during this fieldwork campaign and confirms that it is representative of the material has infilled since the October beach nourishment trial in 2024.

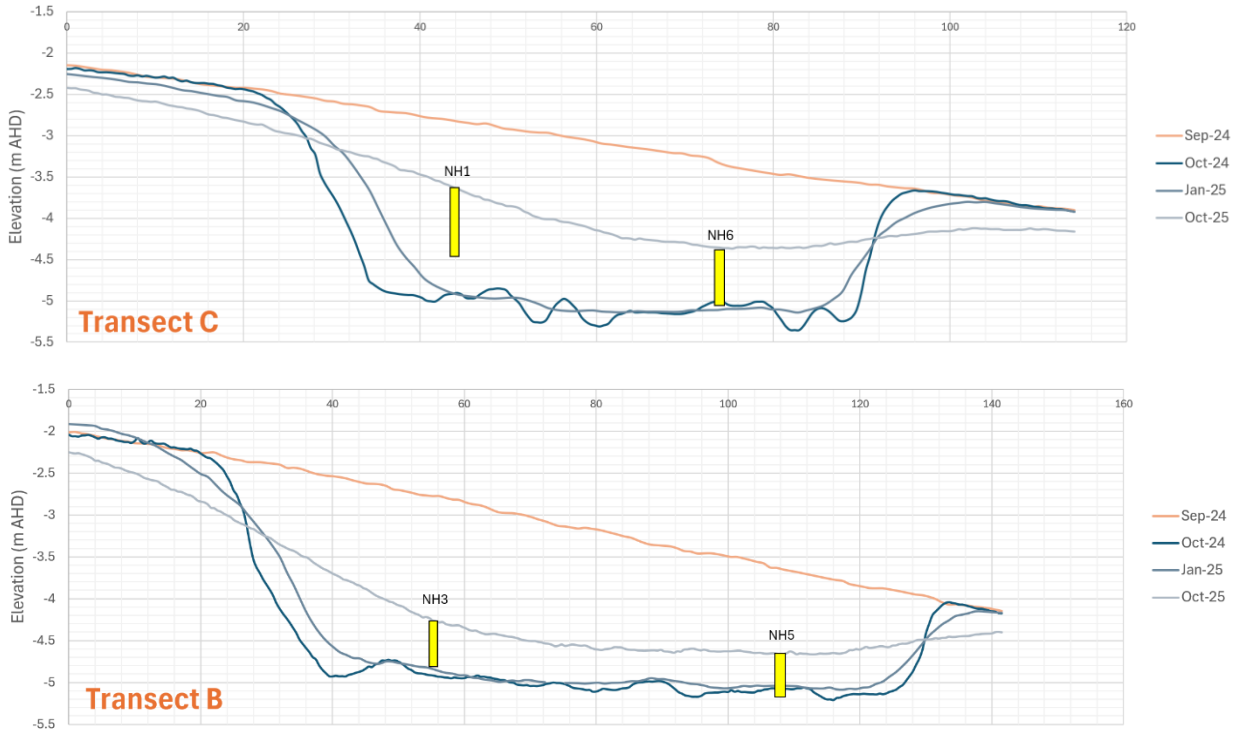



**Figure 3: Location and depth of cores sampled October 2025.**

The characteristics of the infill material compared to the native seabed material prior to the October trial works is compared in Table 3. The values shown for the infill material are averaged from the samples shown in Figure 3 while the native material is averaged from nearby samples taken during the pre-works sampling campaigns, refer to Stage 1 and 2 of JBS&G 2024 Largs Bay Sediment Characterisation reports.

**Table 3: Comparison of native and infill material at North Haven (SBA1).**

| | Native material (pre-trial) | Infill material (post-trial) | Like pre-trial? |
|---|---|---|---|
| **Median grain size D50 (mm)** | 0.10 | 0.11 | Yes |
| **Fines content (%)** | 8.0 | 6.5 | Yes |
| **Cu** | 1.45 | 1.51 | Yes |
| **TOC (%)** | 0.70[1] | 0.31 | Yes |

**Note:** *1.* Value only available from a single sample (ID S33 from JBS&G Largs Bay Stage 2 sediment sampling report)

There was no noticeable difference in the characteristics of the sites within the dredge footprint and those slightly outside (the location of NH2 was sited just south of the dredge cut area as shown on Figure 1). This indicates that the material is infilling with material from around the immediate surrounds of the dredge cut (which can also be inferred from the slumping of the batter shown in subsequent surveys in Figure 3).

Based on the most recent survey provided by DEW, the infilling rates of SBA1 have been assessed as given in Table 4 below. A decrease in the infilling rate has been observed since the original dredging, likely due to the cut becoming a less prominent seabed feature. The infilling volumes are calculated based on the volume increase within the dredge cut area only.

**Table 4: Infilling rates observed at SBA1.**

| Survey date | # of days since dredging | Mean elevation difference (m) | Surveyed vol. removed ($m^3$) | % infilled | Rate (% of dredged vol. per yr)) |
|---|---|---|---|---|---|
| **13/01/2025** | 79 | 0.18 | 16,781 | 9 | 43 |
| **25/10/2025** | 364 | 0.63 | | 34 | 34 |

The comparative infilling rates from the sand borrow area immediately south of West Beach boat harbour (SBA3) are given in Appendix C. The infilling rates are significantly higher in SBA3 (four times higher) than in SBA1 corresponding with the higher energy environment at West Beach compared with the northern end of Largs Bay.

Examining the material sampled at the West Beach Placement area (Table 5), the characteristics have similarities to both the native material at the placement and borrow sites indicating mixing of the placed material with the native sand.

**Table 5: Comparison of sampled material with native material from the borrow and placement areas.**

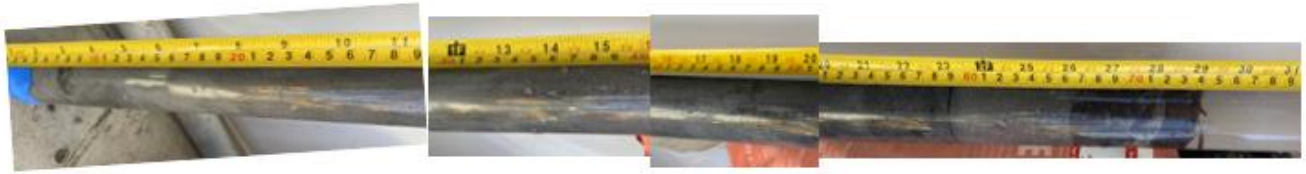
| | Native material at placement site[2] | Material sampled in this campaign[3] | Native SBA1 material (pre-dredge) |
|---|---|---|---|
| **Median grain size d50 (mm)** | 0.15 | 0.15 | 0.10 |
| **Fines content (%)** | 3.0 | 10.0 | 8.0 |
| **Cu** | 1.9 | 1.7 | 1.5 |

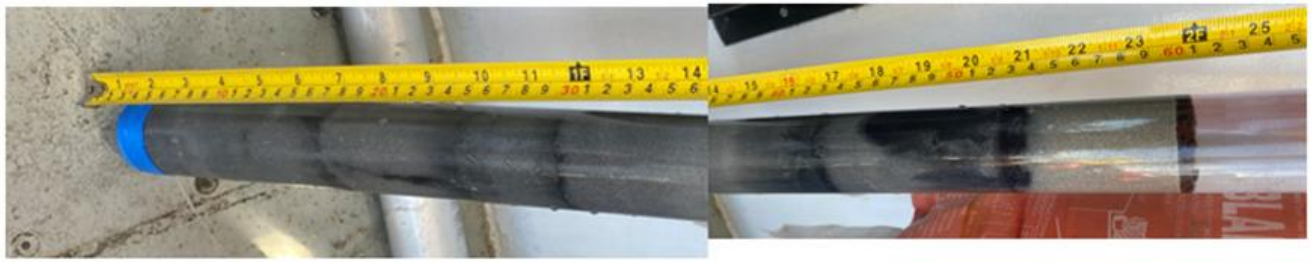
**Note:** *2.* Sample ID S66, S78 and S79 from JBS&G Largs Bay Stage 3 sediment sampling report. *3.* Only Sample WB2 is considered as it appears to be mostly situated in the area still containing placed material. The other three West Beach samples all have fines content at or below 5%.

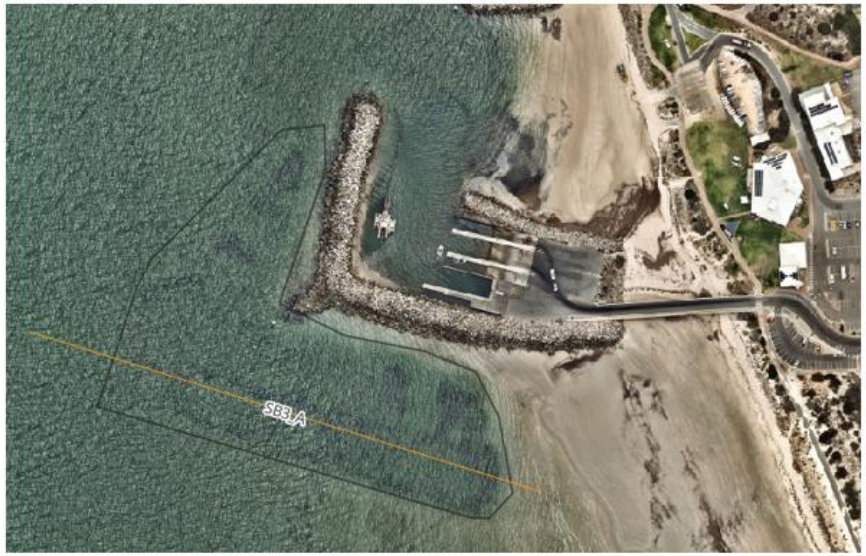
# Appendix A: Core photos and logs

| Location ID | Description | Core photo |
|---|---|---|
| **WB1** | **0-0.25m** fine light grey sand<br>**0.25-0.65m** brown to light grey fine sand<br>**0.65-0.73m** dark grey to fine | |
| **WB2** | **0-0.05m** light brown fine-grained sand with a thin layer of organic matter at the TOC<br>**0.05-0.63m** fine grey sand | |
| **WB3** | Composition of core is generally light grey fine-grained sand with a layer of organic matter/wrack at the TOC | |

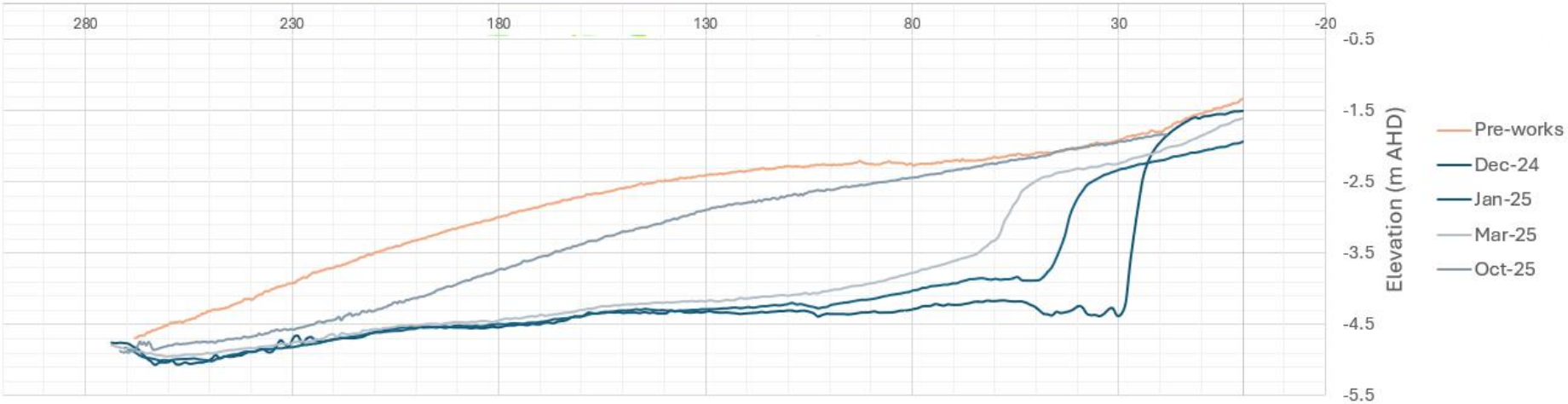
| Location ID | Description | Core photo |
|---|---|---|
| **WB4** | Composition of core is generally dark grey fine-grained sand with a layer of organic matter/wrack at the TOC | |
| **NH1** | **0-0.05m** wrack<br>**0.05-0.48m** fine grey sand<br>**0.48-0.5m** band of darker material<br>**0.5-0.85m** fine grey sand | |
| **NH2** | Fine grey sand | |

| Location ID | Description | Core photo |
|---|---|---|
| **NH3** | **0-0.05m** wrack and organic matter<br>**0.05-0.15m** faint yellow fine-grained sand<br>**0.15-0.56m** grey fine sand with thin bands of darker material | |
| **NH4** | **0-0.08m** wrack and organic matter within sand<br>**0 08– 0.74m** fine grained sand bands of different shades of grey, lighter at the bottom of core. |  |
| **NH5** | **0-0.12m** fine grained light/dark grey sand with pockets of light brown sand closer to TOC<br>**0.12- 0.18m** black clay pocket rising approx. 2cm higher on RHS of tube<br>**0.18-0.79m** fine grained grey sand with darker sand blemishes in the 46cm to 51 cm range | |

| Location ID | Description | Core photo |
|---|---|---|
| **NH6** | **O**rganic matter at **top of core**<br>**0-0.06m** light yellow fine grained sand<br>**0.06-0.15m** notably deposit of dark grey/black fine material.<br>**0.15-0.6m** light grey fine sand with thin bands of darker sediment |  |




| SBA3 | West Beach | | | | |
|---|---|---|---|---|---|
| | # of days | Vol. change (m3) | Infilling rate (m3/yr) | % infilled | Infilling rate (% of dredged volume per year) |
| 2/12/2024 | | | | | |
| 14/04/2025 | 133 | 10,360 | 28,431 | 25% | 68% |
| 25/10/2025 | 327 | 22,649 | 25,281 | 54% | 60% |
| | | | | | |
| SBA1 | North Haven | | | | |
| | # of days | Vol. change (m3) | Infilling rate (m3/yr) | % infilled | |
| 26/10/2024 | | | | | |
| 13/01/2025 | 79 | 1,563 | 7,223 | 9% | 43% |
| 25/10/2025 | 364 | 5,650 | 5,666 | 34% | 34% |



# Appendix B: Laboratory summary and documentation

| Replicate | Sample no | Lab ref | Sample ID | Metals & metalloids | | | | | | | | | | | | | | | | TOC | PFAS | | | BTEXN | | | | TRH | Organochlorine | | | | | | | | | | Polychlorinated Biphenyls | Organotins | PAHs | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Aluminium | Antimony | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Selenium | Silver | Vanadium | Zinc | Total Organic Carbon in | Total Positive PFHxS & I | Total Positive PFOS & PF | Total Positive PFAS | Benzene | Toluene | Ethylbenzene | Xylene total | C6-C10 | 4,4-DDE | gamma - BHC | Dieldrin | Cis-chlordane | Trans-chlordane | 4,4-DDT | 4,4-DDD | Endrin | Heptachlor epoxide | Total PCBs | Tributyltin as Sn | Phenanthrene | Fluoranthene | Pyrene | Benzo(a)anthracene | Benzo(a)pyrene |
| | | | Units | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | µg/kg | µg/kg | µg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | | | | | µg/kg |
| | | | PQL | 10 | 1 | 0.5 | 0.1 | 0.5 | 0.5 | 0.5 | 10 | 0.5 | 0.5 | 0.01 | 0.5 | 0.1 | 0.1 | 0.5 | 0.5 | 100 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.6 | 25 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 0.5 | | | | | 5 |
| | | | ANZG (2018) - Sediment Quality DGV | | 2 | 20 | 1.5 | 80 | | 65 | | 50 | | 0.15 | 21 | | 1 | | 200 | | | | | | | | | 280 | 1.4 | 0.9 | 2.8 | | | 1.2 | | 2.7 | | 34 | | | | | | |
| | | | ANZG (2018) - Sediment Quality GV-high | | 25 | 70 | 10 | 370 | | 270 | | 220 | | 1 | 52 | | 4 | | 410 | | | | | | | | | 550 | 7 | 1.4 | 7 | | | 5 | | 60 | | 280 | | | | | | |
| | | | NADG 2009 ISQG | | **2** | **20** | **1.5** | **80** | | **65** | | **50** | | **0.15** | **21** | | **1** | | **200** | | | | | | | | | **550** | | **0.32** | **280** | **0.5** | **0.5** | **1.6** | **2** | **10** | | **23** | **9** | | | | | |
| | | | NADG 2009 SQG-High | | 25 | 70 | 10 | 370 | | 270 | | 220 | | 1 | 52 | | 3.7 | | 410 | | | | | | | | | | 27 | 1 | 270 | 6 | 6 | 46 | | 120 | | | 70 | | | | | | |
| | | | SA EPA Waste Fill | | | 20 | 3 | | | 60 | | 300 | | 1 | 60 | | | | 200 | | | | | 1 | 1.4 | 3.1 | 14 | | | | | | | 2000 | | | 2000 | 2000 | | | | | | 1000 |
| | | | SA Intermediate Waste Soil | | | 200 | 30 | | | 2000 | | 1200 | | 30 | 600 | | | | 14000 | | | | | 5 | 50 | 100 | 180 | | | | | | | 2000 | | | 2000 | 2000 | | | | | | 2000 |
| | | | 95% upper confidence level (ProUCL). | 1974 | 0.504 | 3.006 | 0.0662 | 4.512 | 0.627 | 1.814 | 2498 | 2.266 | 30.41 | 0.011 | 1.86 | 0.175 | - | 6.668 | 4.145 | | | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.304 | | | | | - |

## Post-ABMRI

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 393916 | | 3300 | <0.5 | 7.4 | <0.1 | 7.8 | 1 | 2 | 3500 | 4 | 52 | 0.01 | 3 | 0.3 | <0.1 | 12 | 6.7 | 2900 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | <5 | 10 | 10 | 7 | 8 |
| 1 | 1 | 393916 | | 1500 | <0.5 | 3 | <0.1 | 6.3 | 0.8 | 1 | 2200 | 3 | 40 | <0.01 | 2 | 0.3 | <0.1 | 9.1 | 6.5 | 3300 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | <5 | <5 | <5 | <5 | <5 |
| 0 | 2 | 393916 | | 980 | <0.5 | 2 | <0.1 | 6.5 | <0.5 | 1 | 1400 | 5 | 42 | <0.01 | 2 | 0.2 | <0.1 | 5 | 6.8 | 1500 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | 40 | 71 | 67 | 30 | 30 |
| 0 | 3 | 393916 | | 610 | <0.5 | 2 | <0.1 | 4 | <0.5 | 0.5 | 1200 | 2 | 32 | <0.01 | 1 | 0.2 | <0.1 | 3 | 4 | 1300 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | <5 | <5 | <5 | <10 | <5 |
| 0 | 4 | 393916 | | 370 | <0.5 | 1 | <0.1 | 2 | <0.5 | 0.5 | 740 | 1 | 19 | <0.01 | 0.9 | 0.1 | <0.1 | 2 | 2 | 800 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | <5 | 10 | 20 | 8 | 8 |
| 0 | 5 | 393916 | | 710 | <0.5 | 2 | <0.1 | 4 | <0.5 | 0.6 | 1100 | 2 | 34 | <0.01 | 1 | 0.2 | <0.1 | 3 | 5 | 1200 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | 10 | 30 | 30 | 20 | 10 |
| 0 | 6 | 393916 | | 810 | <0.5 | 2 | <0.1 | 4 | <0.5 | 0.7 | 1300 | 3 | 38 | <0.01 | 1 | 0.2 | <0.1 | 4 | 5 | 2000 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | <5 | <5 | <5 | <5 | <5 |
| 0 | 7 | 393916 | | 1000 | <0.5 | 2 | <0.1 | 6.3 | <0.5 | 1 | 1700 | 4 | 49 | <0.01 | 2 | 0.2 | <0.1 | 5 | 9.4 | 6500 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | 10 | 30 | 30 | 10 | 20 |
| 0 | 8 | 393916 | | 1300 | <0.5 | 3 | <0.1 | 7.6 | 0.6 | 2 | 2100 | 5.8 | 49 | <0.01 | 2 | 0.3 | <0.1 | 6 | 13 | 4200 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | 8 | 20 | 20 | 10 | 10 |
| 0 | 9 | 393916 | | 1200 | <0.5 | 2 | <0.1 | 5.9 | <0.5 | 1 | 1800 | 4 | 47 | <0.01 | 2 | 0.2 | <0.1 | 5 | 8.6 | 2900 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <0.5 | <5 | 10 | 10 | 9 | 10 |
| 0 | 10 | 393916 | | 830 | <0.5 | 2 | <0.1 | 5.4 | <0.5 | 0.7 | 1300 | 3 | 39 | <0.01 | 2 | 0.1 | <0.1 | 3 | 5.3 | 1700 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 | <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | | <1 | <5 | <0.5 | <5 | 7 | 8 | <5 | 6 |
| 0 | 11 | 393916 | | 1400 | <0.5 | 4 | <0.1 | 6.6 | 0.8 | 1 | 2200 | 3 | 40 | <0.01 | 2 | 0.2 | <0.1 | 8 | 5.5 | | | | | | | | | | | | | | | | | | | | | | | | | |

bluecoast
CONSULTING ENGINEERS

# Appendix C: SBA3 infilling analysis

| Sample ID | Lat | Long | Core depth (m) | Moisture content (%) | TOC (mg/kg) | TOC (%) | D50 (mm) | D10 | D60 | D90 | D16 | D84 | Cu | Fines (%) | Gravel (%) | Coarse Silt (%) | Fine Silt (%) | Clay in soils (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WB1 | -34.944483 | 138.498867 | 0.74 | 31 | 2900 | 0.29 | 0.13 | 0.08 | 0.16 | 1.42 | 0.09 | 0.51 | 2.0 | 5.0 | 7.5 | 4.0 | <1 | <1 |
| WB2 | -34.944617 | 138.497867 | 0.64 | 26 | 1500 | 0.15 | 0.12 | NaN | 0.13 | 0.30 | 0.08 | 0.20 | | 10.0 | 2.9 | 3.0 | <1 | <1 |
| WB3 | -34.948917 | 138.500833 | 0.64 | 25 | 1300 | 0.15 | 0.13 | 0.08 | 0.15 | 0.27 | 0.09 | 0.21 | 1.8 | 4.0 | 0.6 | 3.0 | <1 | <1 |
| WB4 | | | 0.61 | 19 | 800 | 0.13 | 0.19 | 0.10 | 0.21 | 0.40 | 0.11 | 0.34 | 2.2 | 2.0 | 0.6 | 1.0 | <1 | <1 |
| | | | | | | 0.08 | | | | | | | | | | | | |
| NH1 | -34.797167 | 138.482383 | 0.7 | 28 | 1200 | 0.12 | 0.11 | 0.08 | 0.11 | 0.17 | 0.08 | 0.15 | 1.5 | 6.0 | 0.0 | 3.0 | <1 | <1 |
| NH2 | -34.797450 | 138.482200 | 0.72 | 24 | 2000 | 0.2 | 0.11 | 0.08 | 0.12 | 0.19 | 0.08 | 0.16 | 1.5 | 4.0 | 0.3 | 2.0 | <1 | <1 |
| NH3 | -34.796850 | 138.482133 | 0.55 | 37 | 6500 | 0.65 | 0.11 | 0.08 | 0.12 | 0.20 | 0.08 | 0.17 | 1.6 | 7.0 | 0.6 | 5.0 | 1.0 | 1.0 |
| NH4 | -34.796533 | 138.481917 | 0.75 | 32 | 4200 | 0.42 | 0.11 | NaN | 0.12 | 0.21 | 0.08 | 0.18 | | 13.0 | 1.6 | 8.0 | 2.0 | 1.0 |
| NH5 | -34.796800 | 138.481617 | 0.8 | 28 | 2900 | 0.29 | 0.11 | 0.08 | 0.12 | 0.20 | 0.08 | 0.17 | 1.5 | 6.0 | 2.6 | 4.0 | 1.0 | 1.0 |
| NH6 | -34.797133 | 138.482033 | 0.61 | 26 | 1700 | 0.17 | 0.11 | 0.08 | 0.12 | 0.18 | 0.08 | 0.15 | 1.5 | 7.0 | 0.3 | 3.0 | 1.0 | 1.0 |

## 6.8 Appendix H – 2026 Sediment Sampling and Analysis Report

bluecoast CONSULTING ENGINEERS

Government of South Australia
Department for Environment and Water

# AMBRI trial extension sediment investigations

| | |
|---|---|
| **To** | Government of South Australia – Department for Environment and Water (DEW) |
| **From** | Bluecoast Consulting Engineers |
| **Author** | T. Fallon |
| **Reviewer** | E. Watterson |
| **Reference** | P24462_TrialExtSampling_R1.00 |
| **Date** | 13 July 2026 |
| **Subject** | **Baseline sediment analysis for ABMRI trial nourishment extension** |

## 1. Introduction and context

This report documents additional baseline sediment sampling and laboratory analysis undertaken to support planning for future Adelaide Beaches Management Review Implementation (ABMRI) nourishment works.

The proposed beach nourishment works involve dredging sand from the nearshore area at North Haven and transporting the material for placement within the nearshore zone at West Beach. Previous sediment characterisation has been undertaken for the broader Largs Bay and North Haven borrow areas. The additional sampling described in this report was undertaken to supplement the existing baseline dataset, providing further physical and chemical characterisation of the proposed borrow and placement areas, and address additional analytes requested by stakeholders.

The sampling and analysis included sediment chemistry screening consistent with the National Assessment Guidelines for Dredging (NAGD), physical sediment characterisation, benthic observations, and additional laboratory analyses relevant to acid sulfate soils, reduced sulfur species and potential hydrogen sulfide ($H_2S$) generation.

The field sampling program, methodology, laboratory analysis program and results are presented herein. The intention is to provide a factual basis for considering sediment suitability and management requirements for future dredging and placement works.

## 2. Scope of works

The scope of works comprised sediment sampling at North Haven, West Beach and Henley Beach South. Acting under Bluecoast's supervision, the fieldwork was undertaken by East West Dive and Salvage in June 2026. The field program included:

- diver-based sediment core sampling
- benthic photographs and seabed observations
- sample processing and dispatch to the analytical laboratory
- laboratory analysis of physical and chemical sediment characteristics

The sampling locations are shown in Figure 1. Coordinates, sample IDs and core depths are provided in Appendix A.

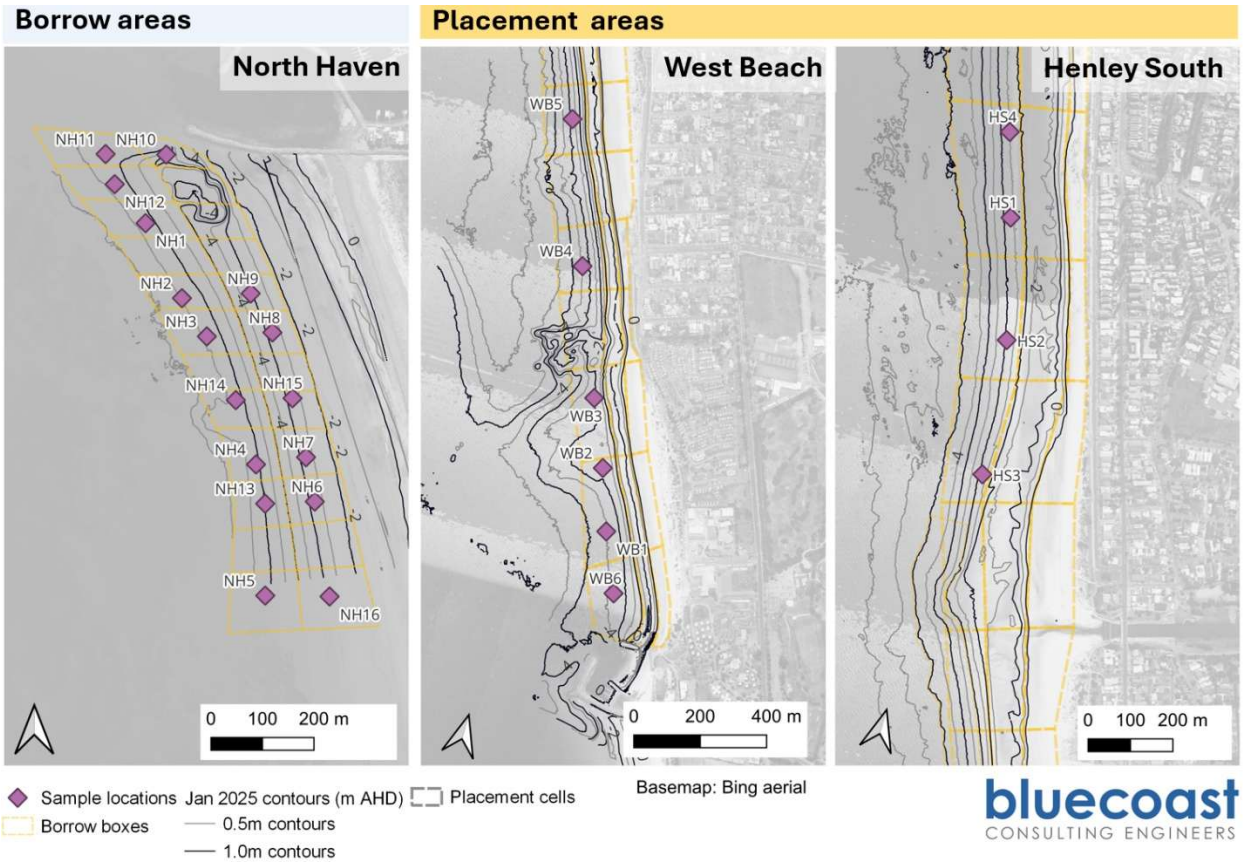



**Figure 1: Sediment sampling locations.**

# 3. Methodology

Sediment cores were recovered by divers using hand-operated core sampling equipment. At each location, cores were advanced into the seabed to the maximum achievable depth or until refusal.

Following recovery, each core was photographed and described. Core descriptions included sediment colour, apparent stratification, shell content, organic matter, wrack, darker sediment layers and other notable features. This approach is consistent with the previous reporting method, where cores were photographed, logged, homogenised and submitted for laboratory analysis.

Sediment from each core was homogenised in a clean container before being transferred into laboratory-supplied sample containers. Clean sampling utensils and disposable nitrile gloves were used to minimise the potential for cross-contamination. Reusable sampling equipment was cleaned between locations. Samples were stored under appropriate temperature control prior to delivery to the analytical laboratory, with chain of custody documentation accompanying the submitted samples.

Benthic photographs and seabed images were collected during the sampling program where visibility and field conditions allowed. The diver records also note that seafloor, sample and vessel location images were uploaded and catalogued following the fieldwork.

The analysis suite included:

- particle size distribution
- moisture content
- metals and metalloids;

- total organic carbon
- PFAS
- BTEXN
- TRH/TPH
- organochlorine pesticides
- PCBs
- organotins
- PAHs
- nutrients
- acid sulfate soil parameters (SPOCAS suite)
- chromium reducible sulfur
- acid volatile sulfide / simultaneously extracted metals.

Analytical results were compared against relevant screening criteria, including NAGD sediment screening levels, ANZG sediment quality default guideline values and relevant SA EPA criteria where applicable.

# 4. Results

## 4.1 Fieldwork and sample recovery

Sediment core samples were successfully collected from North Haven, West Beach and Henley South locations over the June 2026 field program. Sampling at North Haven was undertaken across two field days, with the 18 June 2026 fieldwork aborted due to weather and additional samples collected on 23 June 2026.

The recovered cores generally comprised sandy marine sediments, with variable shell content, fines, darker sediment bands and organic matter. Core photographs and field logs are provided in Appendix A.

## 4.2 Sediment physical analysis

Particle size distribution results indicate that the sampled sediments are generally sandy marine sediments, with variable fines and gravel content between sample locations. The key physical parameters for nourishment compatibility are:

- **D50**, representing the median grain size
- **fines content**, representing the proportion of material finer than the adopted fines threshold
- **gravel content**, representing the proportion of material coarser than 2mm
- **uniformity coefficient**, indicating the degree of sorting.

Physical sediment results are summarised in Table 1and presented as particle size distribution curves in Figure 2.

**Table 1: PSD analysis results.**

| Borrow area | | | | | Placement area | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID | D50 (mm) | Cu | Fines (%) | Gravel (%) | Sample ID | D50 (mm) | Cu | Fines (%) | Gravel (%) |
| **North Haven** | | | | | **West Beach** | | | | |
| **NH1** | 0.10 | 2.05 | 13 | 1 | **WB1** | 0.16 | 2.54 | 8 | 2 |
| **NH2** | 0.10 | 2.26 | 14 | 1 | **WB2** | 0.14 | 1.72 | 7 | 0 |
| **NH3** | 0.11 | 1.51 | 7 | 0 | **WB3** | 0.14 | 2.06 | 4 | 2 |
| **NH4** | 0.11 | 1.84 | 11 | 0 | **WB4** | 0.15 | 4.18 | 13 | 14 |
| **NH5** | 0.11 | 1.53 | 5 | 0 | **WB5** | 0.12 | 1.66 | 6 | 6 |
| **NH6** | 0.10 | 1.42 | 6 | 0 | **WB6** | 0.14 | 1.86 | 5 | 7 |
| **NH7** | 0.10 | 1.48 | 10 | 0 | **Average** | **0.14** | **1.97** | **6** | **3** |
| **NH8** | 0.10 | 1.46 | 9 | 0 | | | | | |
| **NH9** | 0.10 | 1.42 | 10 | 0 | **Henley Beach South** | | | | |
| **NH10** | 0.10 | 1.43 | 7 | 0 | **HS1** | 0.15 | 1.86 | 2 | 1 |
| **NH11** | 0.10 | 2.56 | 17 | 0 | **HS2** | 0.13 | 1.80 | 7 | 0 |
| **NH12** | 0.10 | 2.89 | 19 | 0 | **HS3** | 0.11 | 1.65 | 10 | 0 |
| **NH13** | 0.10 | 2.30 | 14 | 0 | **HS4** | 0.13 | 1.84 | 8 | 0 |
| **NH14** | 0.11 | 1.83 | 12 | 0 | **Average** | **0.13** | **1.84** | **7** | **0** |
| **NH15** | 0.11 | 1.53 | 5 | 0 | | | | | |
| **NH16** | 0.11 | 1.52 | 8 | 0 | | | | | |
| **Average** | **0.10** | **1.90** | **11** | **0** | | | | | |

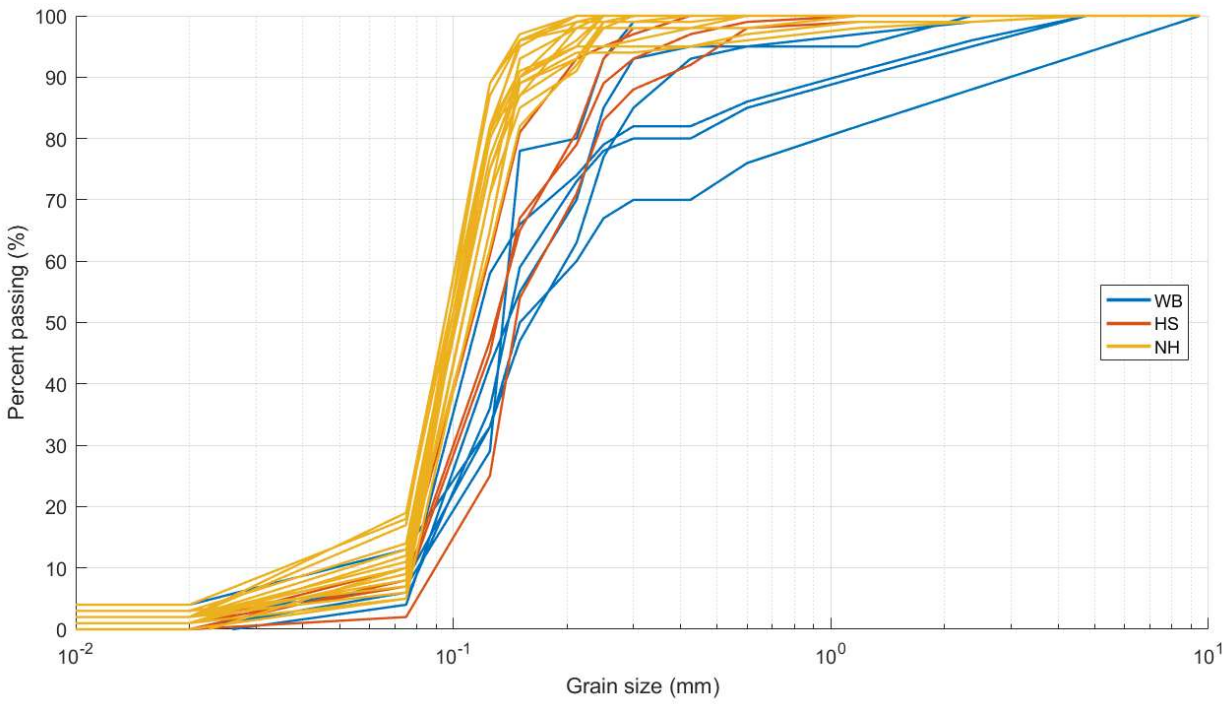



**Figure 2: PSD curves for all samples.**

## 4.3 Sediment chemical analysis

The chemical screening results indicate that conventional contaminants are not the primary material management issue for the sampled sediments. A summary screening table is given in Appendix B.

Metals and metalloids were generally reported at low concentrations and below the adopted sediment quality screening values. PFAS, BTEXN, TRH/TPH, organochlorine pesticides, PCBs, organotins and PAHs were generally not detected or were detected at low concentrations relative to the adopted screening criteria where available.

Total organic carbon was generally low, consistent with the sandy nature of the sampled seabed material. Some samples contained visible organic matter, wrack or darker sediment bands in the core logs, but the chemical dataset does not indicate widespread organic-rich contaminated sediment.

The results are generally consistent with previous sediment characterisation, which found targeted inorganic and organic contaminants to be below relevant screening values or laboratory reporting limits and concluded that the sampled sediments were chemically suitable for nearshore and/or onshore placement.

The acid sulfate soil and reduced sulfur results indicate that the sampled sediments were generally alkaline, with pH KCl values typically between 9.4 and 9.8. Titratable actual acidity was below the laboratory reporting limit across the dataset, indicating that samples were not acidic at the time of testing.

Some samples reported peroxide oxidisable sulfur and net acidity excluding acid neutralising capacity. These results indicate that some potential acidity may be present in the sediment. However, acid neutralising capacity was also reported across the dataset, and net acidity including acid neutralising capacity was generally below the laboratory reporting limit.

Assessment of reduced inorganic sulfur showed generally low AVS and CRS concentrations across the sampled sites. AVS ranged from <0.5 to 2µmol/g dry weight, and CRS ranged from <0.005 to 0.08%S.

The reported AVS concentrations are equivalent to approximately <0.0016 to 0.0064%S, which is below the 0.01%S AVS threshold referenced in national acid sulfate soil guidance for classification of monosulfidic material (Sullivan et al., 2018).

Overall, the results indicate generally alkaline sediment conditions, low AVS and CRS concentrations across the sampled borrow and placement areas and no widespread net acidity after accounting for acid neutralising capacity. The main exception in the broader dataset was NH9, which reported higher total sulfur and calculated sulfide sulfur than the other samples

### 4.4 Benthic observations

Benthic photographs and seabed observations were collected during the diver sampling program where visibility allowed. Seafloor images, sample images and vessel location images were collected and catalogued as part of the field program. These are provided in Appendix A.

### 4.5 Summary of results

The additional baseline sampling and analysis indicates that:

- the sampled sediments are generally sandy marine sediments
- physical characteristics vary between North Haven, West Beach and Henley South sample locations
- conventional contaminants were generally low or non-detect
- results are generally consistent with previous baseline sediment characterisation
- the sampled sediments are generally alkaline.

The full analytical summary tables are provided in Appendix B and all laboratory documents provided in Appendix C.

## 5. References

Sullivan, L.A., Ward, N.J., Toppler, N.R. and Lancaster, G. (2018). *National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual.* Department of Agriculture and Water Resources, Canberra, ACT.

# Appendix A: Core photos and logs

| Details | Core and benthic photos |
|---|---|
| **North Haven** | |
| **Sample ID: NH1**<br>**Recovery: 71cm**<br>**Coordinates: -34.797291 138.48076**<br>**Benthic observations: Bare sand floating seagrass** | <br> |

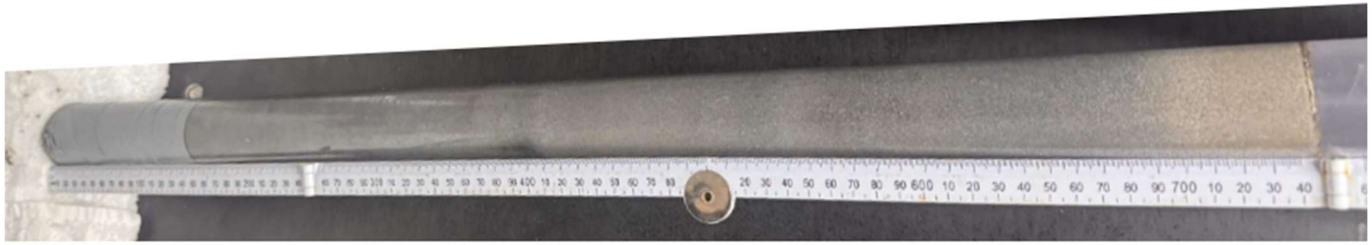
| Details | Core and benthic photos |
|---|---|

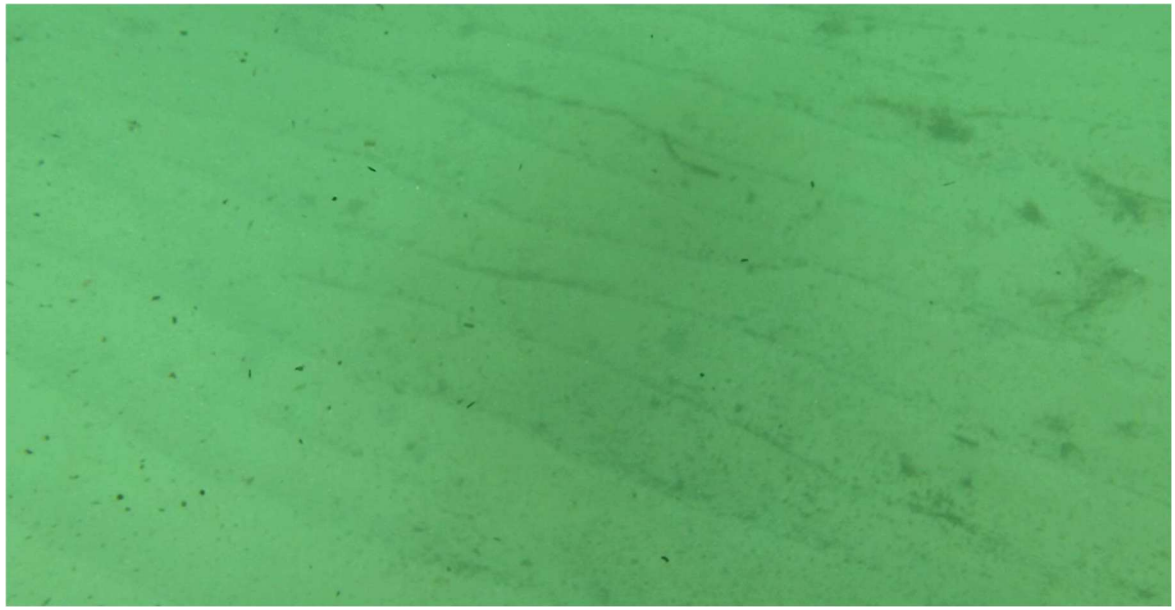
**Sample ID: NH10**

**Recovery: 74cm**

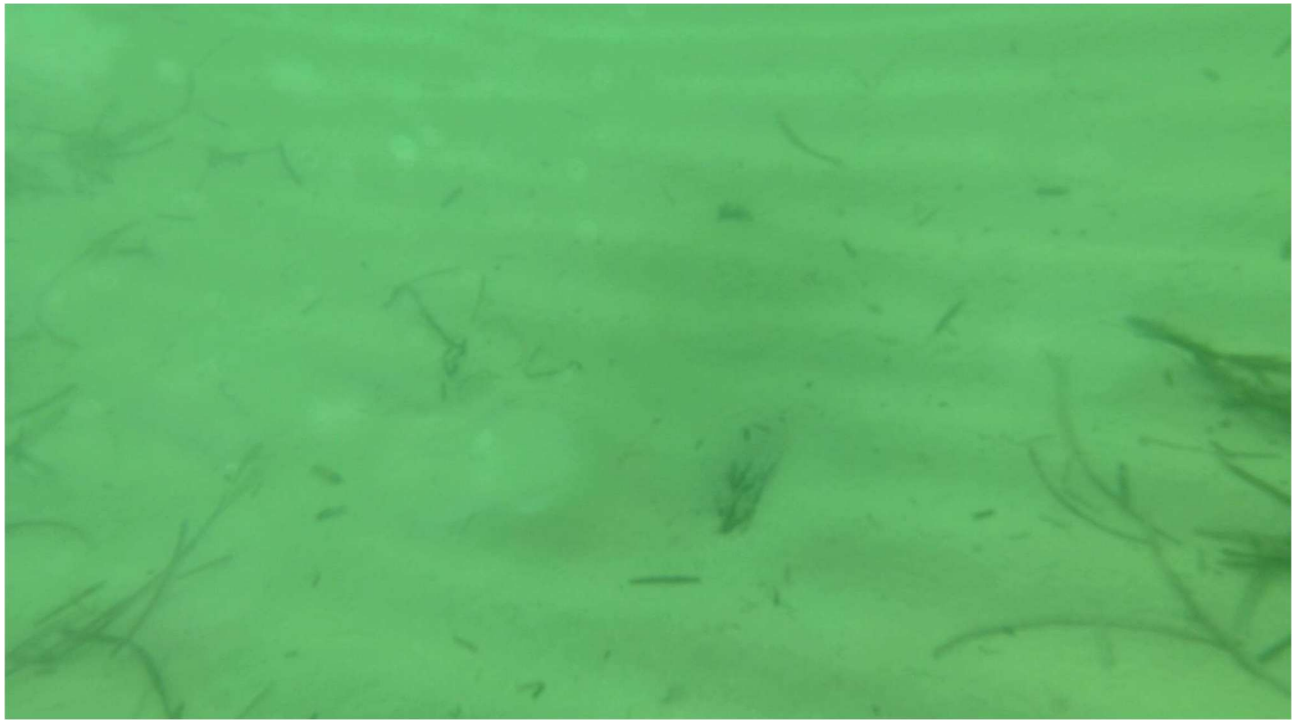
**Coordinates: -34.796098 138.481235**

**Benthic observations: Bare sand floating seagrass**





| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH11**<br>**Recovery: 86cm**<br>**Coordinates: -34.796063 138.479948**<br>**Benthic observations: Bare sand floating seagrass** | |



| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH12**<br>**Recovery: 65cm**<br>**Coordinates: -34.796595 138.480126**<br>**Benthic observations: Bare sand floating seagrass** | <br> |

| Details | Core and benthic photos |
|---|---|

**Sample ID: NH13**

**Recovery: 68cm**

**Coordinates: -34.802257 138.48315**

**Benthic observations: Bare sand**

| Details | Core and benthic photos |
|---|---|

**Sample ID: NH14**

**Recovery: 85.5cm**

**Coordinates: -34.80043 138.482582**

**Benthic observations: Bare sand**

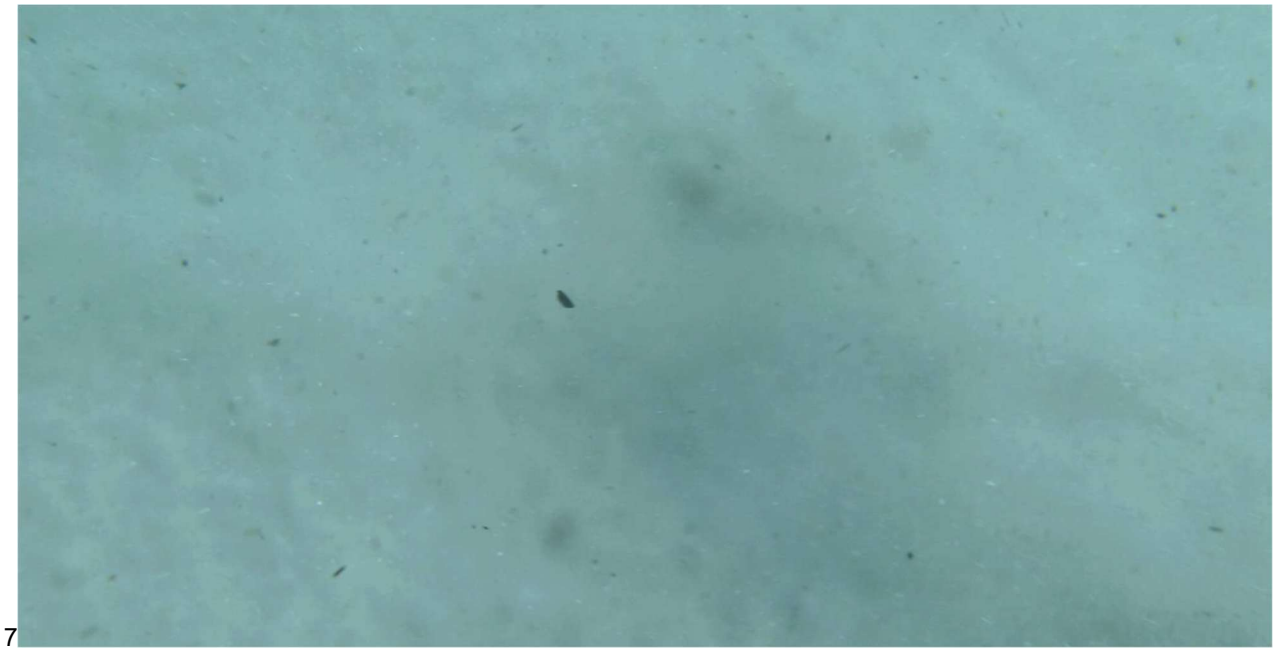
| Details | Core and benthic photos |
|---|---|

**Sample ID: NH15**

**Recovery: 61.5cm**

**Coordinates: -34.800423 138.483787**

**Benthic observations: Bare sand**

7 

| Details | Core and benthic photos |
|---|---|

**Sample ID: NH16**

**Recovery: 61cm**

**Coordinates: -34.803912 138.484467**

**Benthic observations: Bare sand and floating seagrass**

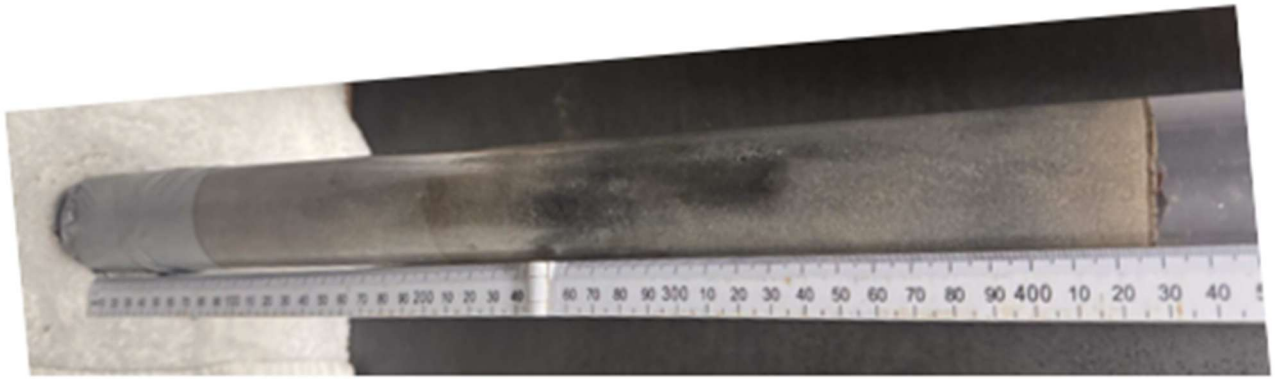
| Details | Core and benthic photos |
|---|---|

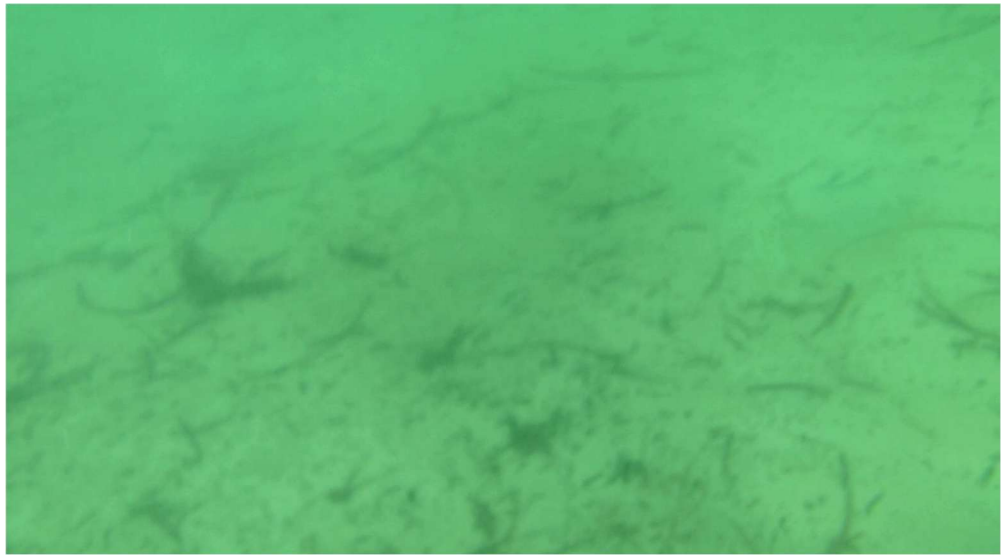
**Sample ID: NH2-A**

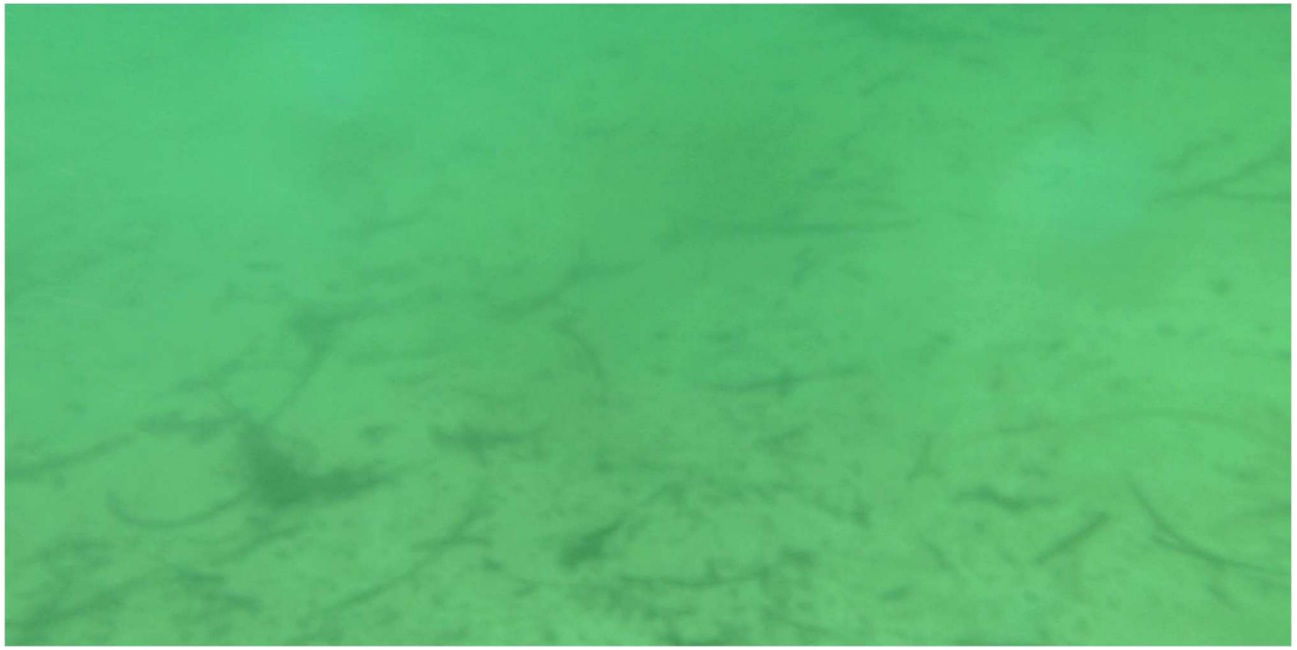
**Recovery: 42.8cm**

**Coordinates: -34.798621 138.481493**

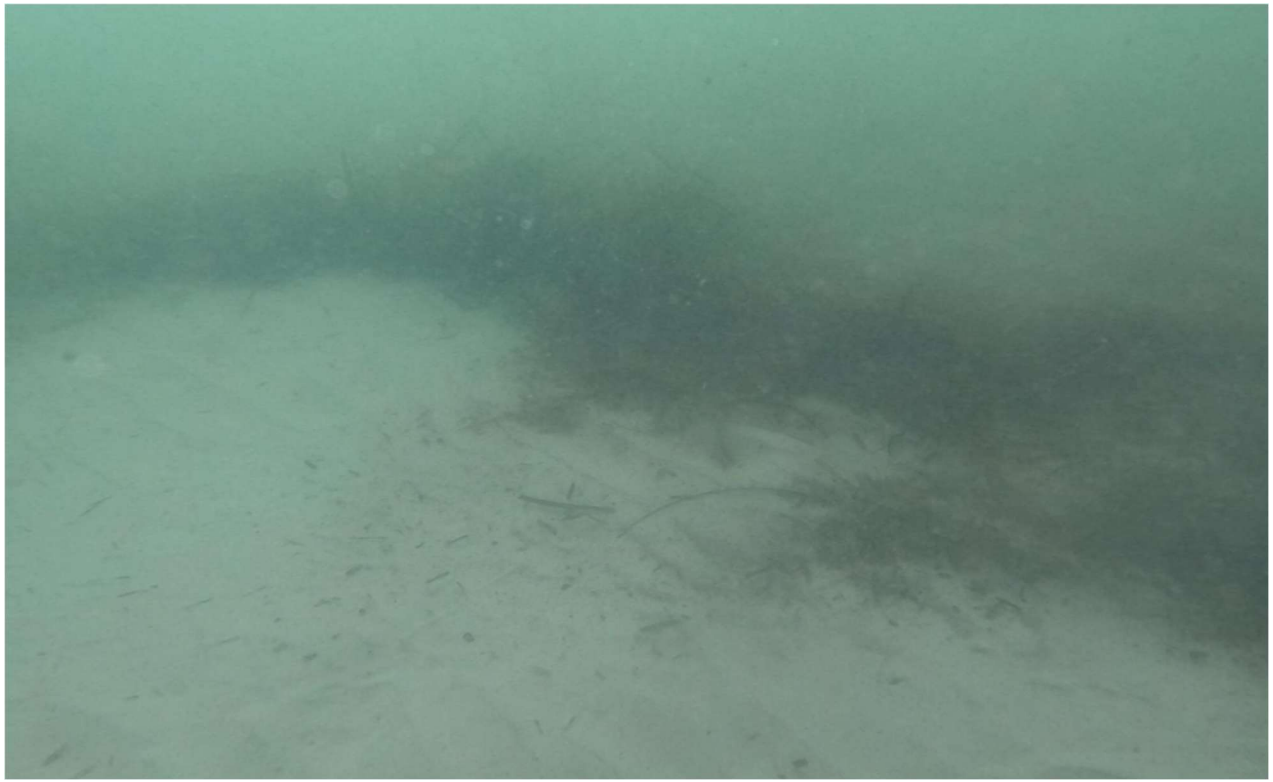
**Benthic observations: Bare sand and floating seagrass**





| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH2-B**<br>**Recovery: 48.5cm**<br>**Coordinates: -34.798621 138.481493**<br>**Benthic observations: Bare sand and floating seagrass** | <br>  |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH3**<br>**Recovery: 78cm**<br>**Coordinates: -34.799302 138.482**<br>**Benthic observations: Bare sand and floating seagrass** | <br> |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH4**<br>**Recovery: 72cm**<br>**Coordinates: -34.801566 138.482976**<br>**Benthic observations: Bare sand and floating seagrass** | <br>  |

| Details | Core and benthic photos |
|---|---|

**Sample ID: NH5**

**Recovery: 72cm**

**Coordinates: -34.803868 138.483102**

**Benthic observations: Bare sand and floating seagrass**

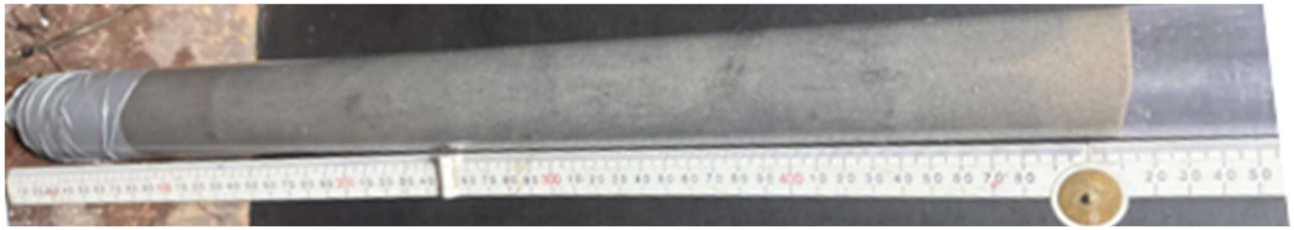
| Details | Core and benthic photos |
|---|---|

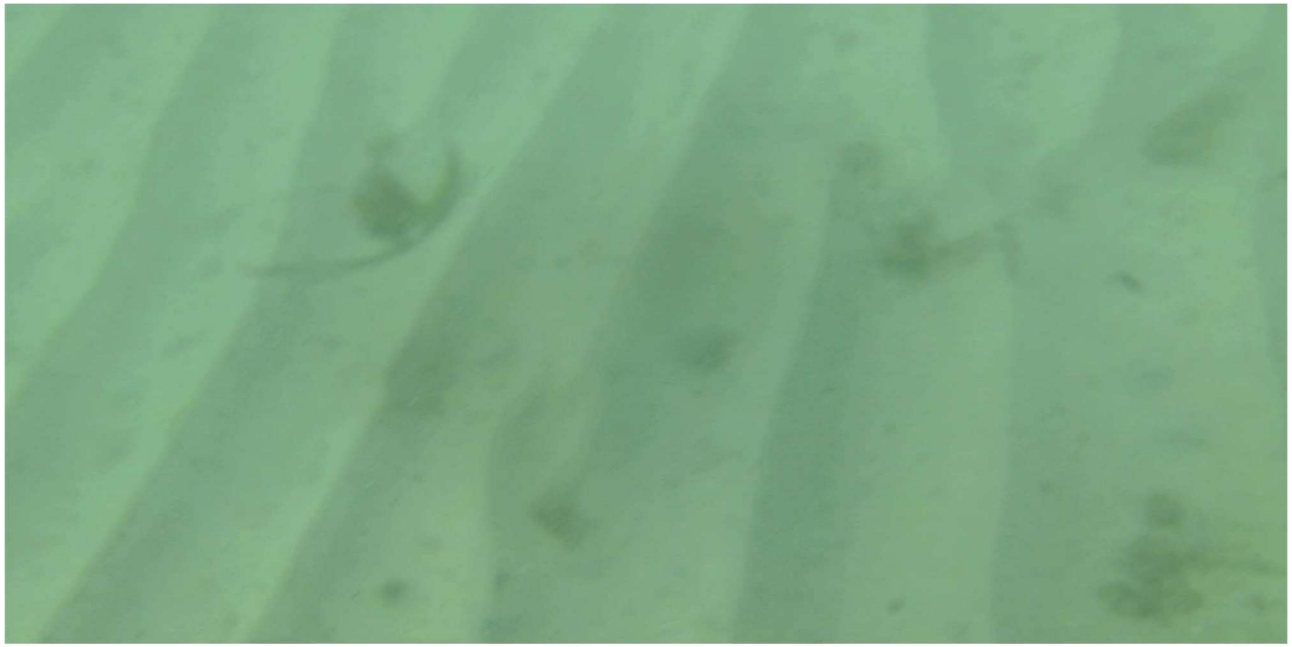
**Sample ID: NH6**

**Recovery: 61.5cm**

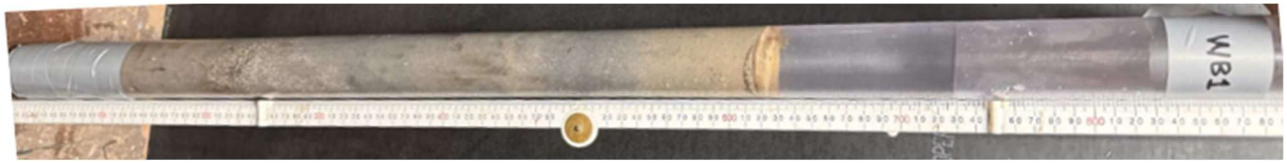
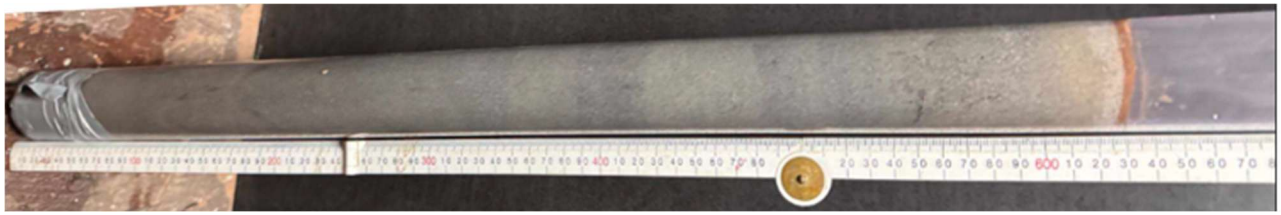
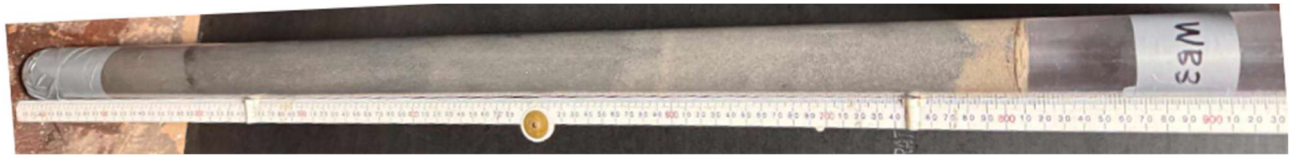
**Coordinates: -34.802243 138.484204**

**Benthic observations: Bare sand and floating seagrass**

| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH7**<br>**Recovery: 51cm**<br>**Coordinates: -34.801462 138.484042**<br>**Benthic observations: Bare sand** |  |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH8**<br>**Recovery: 72cm**<br>**Coordinates: -34.799262 138.483395**<br>**Benthic observations: Bare sand and floating seagrass** | <br>  |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: NH9**<br>**Recovery: 71.5cm**<br>**Coordinates: -34.798569 138.482954**<br>**Benthic observations: Bare sand** | <br> |

| Details | Core and benthic photos |
|---|---|
| **West Beach** | |
| **Sample ID: WB1**<br>**Recovery: 62cm**<br>**Coordinates: -34.95375 138.502761**<br>**Benthic observations: Not available** |  |
| **Sample ID: WB2**<br>**Recovery: 62cm**<br>**Coordinates: -34.952105 138.502126**<br>**Benthic observations: Not available** |  |
| **Sample ID: WB3**<br>**Recovery: 81cm**<br>**Coordinates: -34.95032 138.501269**<br>**Benthic observations: Not available** |  |

| Details | Core and benthic photos |
|---|---|

**Sample ID: WB4**

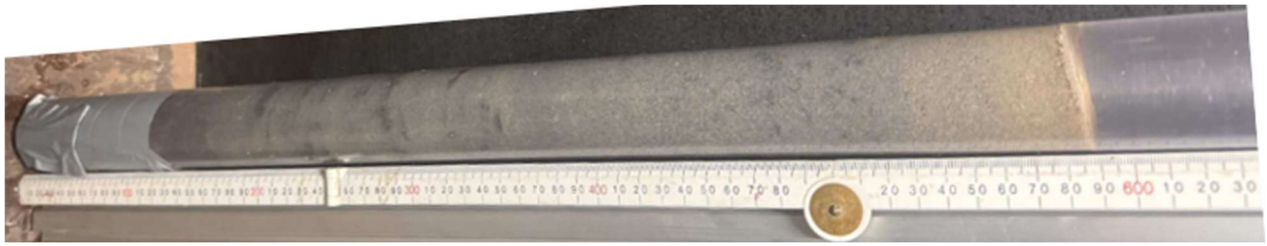
**Recovery: 75cm**

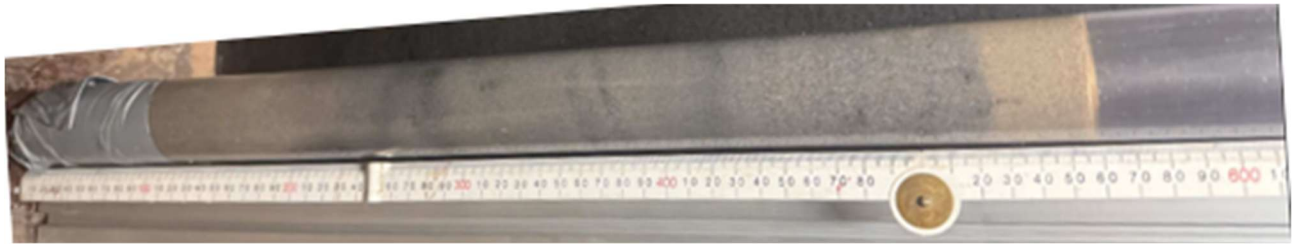
**Coordinates: -34.946932 138.499799**

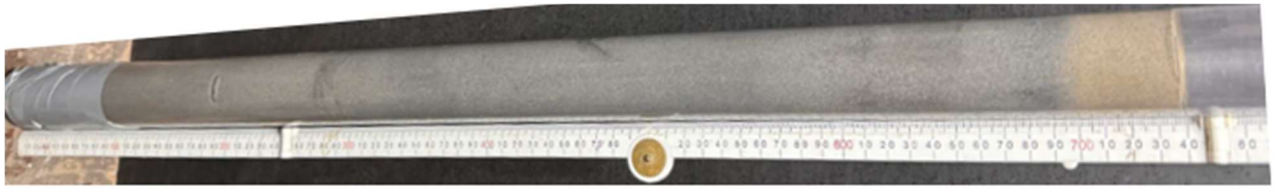
**Benthic observations: Bare sand and floating seagrass**

| Details | Core and benthic photos |
|---|---|
| **Sample ID: WB5**<br>**Recovery: 86.5cm**<br>**Coordinates: -34.943131 138.498258**<br>**Benthic observations: Bare sand** | <br> |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: WB6**<br>**Recovery: 45.5cm**<br>**Coordinates: -34.95533 138.50351**<br>**Benthic observations: Floating seagrass** | <br> |

| Details | Core and benthic photos |
|---|---|
| **Henley Beach South** | |
| **Sample ID: HS1**<br>**Recovery: 58.5cm**<br>**Coordinates: -34.92717 138.493527**<br>**Benthic observations: Bare sand and floating seagrass** |  <br> |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: HS2**<br>**Recovery: 55cm**<br>**Coordinates: -34.929717 138.494225**<br>**Benthic observations: Bare sand and floating seagrass** |  <br> |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: HS3**<br>**Recovery: 74cm**<br>**Coordinates: -34.932614 138.49449**<br>**Benthic observations: Bare sand and floating seagrass** |  <br> |

| Details | Core and benthic photos |
|---|---|
| **Sample ID: HS4**<br>**Recovery: 54.5cm**<br>**Coordinates -34.925408 138.492948**<br>**Benthic observations: Floating seagrass** | <br> |

# Appendix B: Laboratory results summary sheet

| | | | | Metals & metalloids | | | | | | | | | | | | | | | | TOC | PFAS | | | BTEXN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Aluminium | Antimony | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Selenium | Silver | Vanadium | Zinc | Total Organic Carbon in soil/solids | Total Positive PFHxS & PFOS | Total Positive PFOS & PFOA | Total Positive PFAS | Benzene | Toluene | Ethylbenzene |
| | | | Units | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | µg/kg | µg/kg | µg/kg | mg/kg | mg/kg | mg/kg |
| | | | PQL | 10 | 1 | 0.5 | 0.1 | 0.5 | 0.5 | 0.5 | 10 | 0.5 | 0.5 | 0.01 | 0.5 | 0.1 | 0.1 | 0.5 | 0.5 | 100 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 |
| | | | ANZG (2018) - Sediment Quality DGV | | 2 | 20 | 1.5 | 80 | | 65 | | 50 | | 0.15 | 21 | | 1 | | 200 | | | | | | | |
| | | | ANZG (2018) - Sediment Quality GV-high | | 25 | 70 | 10 | 370 | | 270 | | 220 | | 1 | 52 | | 4 | | 410 | | | | | | | |
| | | | NAGD 2009 ISQG | | **2** | **20** | **1.5** | **80** | | **65** | | **50** | | **0.15** | **21** | | **1** | | **200** | | | | | | | |
| | | | NAGD 2009 SQG-High | | 25 | 70 | 10 | 370 | | 270 | | 220 | | 1 | 52 | | 3.7 | | 410 | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | SA EPA Waste Fill | | | 20 | 3 | | | 60 | | 300 | | 1 | 60 | | | | 200 | | | | | 1 | 1.4 | 3.1 |
| | | | SA Intermediate Waste Soil | | | 200 | 30 | | | 2000 | | 1200 | | 30 | 600 | | | | 14000 | | | | | 5 | 50 | 100 |
| Replicate | Sample no. | Lab ref | Sample ID | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 411426 | WB1 | 470 | <0.5 | 2 | <0.1 | 2 | <0.5 | <0.5 | 1200 | 1 | 23 | <0.01 | 0.9 | 0.1 | <0.1 | 3 | 3 | 1100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 2 | 0 | 411426 | WB2 | 470 | <0.5 | 1 | <0.1 | 2 | <0.5 | <0.5 | 1100 | 1 | 25 | <0.01 | 0.7 | <0.1 | <0.1 | 3 | 8.6 | 1900 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 3 | 0 | 411426 | WB3 | 480 | <0.5 | 1 | <0.1 | 2 | <0.5 | <0.5 | 1200 | 1 | 24 | <0.01 | 0.7 | 0.1 | <0.1 | 3 | 4 | 400 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 4 | 0 | 411426 | WB4 | 650 | <0.5 | 3 | <0.1 | 3 | <0.5 | <0.5 | 1800 | 0.8 | 38 | <0.01 | 1 | 0.1 | <0.1 | 5.7 | 2 | 3000 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 5 | 0 | 411426 | WB5 | 720 | <0.5 | 2 | <0.1 | 3 | <0.5 | 0.6 | 1800 | 2 | 30 | <0.01 | 1 | 0.1 | <0.1 | 4 | 5 | <100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 6 | 0 | 411426 | WB6 | 670 | <0.5 | 1 | <0.1 | 3 | <0.5 | 0.6 | 1600 | 2 | 28 | <0.01 | 1 | 0.1 | <0.1 | 4 | 5.3 | 700 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 7 | 0 | 411426 | HS1 | 360 | <0.5 | 1 | <0.1 | 2 | <0.5 | <0.5 | 910 | 1 | 21 | <0.01 | 0.7 | <0.1 | <0.1 | 2 | 3 | <100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 8 | 0 | 411426 | HS2 | 410 | <0.5 | 1 | <0.1 | 2 | <0.5 | <0.5 | 1100 | 2 | 20 | <0.01 | 0.7 | <0.1 | <0.1 | 2 | 4 | <100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 9 | 0 | 411426 | HS3 | 580 | <0.5 | 2 | <0.1 | 3 | <0.5 | <0.5 | 1400 | 2 | 30 | <0.01 | 1 | <0.1 | <0.1 | 3 | 5 | 800 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 10 | 0 | 411426 | HS4 | 340 | <0.5 | 1 | <0.1 | 2 | <0.5 | <0.5 | 940 | 1 | 18 | <0.01 | 0.6 | <0.1 | <0.1 | 2 | 3 | <100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 11 | 0 | 411426 | NH3 | 1000 | <0.5 | 2 | <0.1 | 5 | <0.5 | 0.9 | 1900 | 3 | 39 | <0.01 | 2 | 0.2 | <0.1 | 5.5 | 7.5 | 2300 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 12 | 0 | 411426 | NH4 | 1100 | <0.5 | 2 | <0.1 | 5 | <0.5 | 0.8 | 2100 | 3 | 44 | <0.01 | 2 | 0.1 | <0.1 | 5.2 | 9 | 2100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 13 | 0 | 411426 | NH5 | 870 | <0.5 | 2 | <0.1 | 4 | <0.5 | 0.7 | 1600 | 2 | 34 | <0.01 | 1 | <0.1 | <0.1 | 4 | 5.2 | 2400 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 14 | 0 | 411426 | NH6 | 700 | <0.5 | 1 | <0.1 | 3 | <0.5 | 0.5 | 1300 | 2 | 35 | <0.01 | 1 | <0.1 | <0.1 | 3 | 7.5 | 600 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 15 | 0 | 411426 | NH7 | 680 | <0.5 | 1 | <0.1 | 3 | <0.5 | <0.5 | 1300 | 2 | 36 | <0.01 | 1 | <0.1 | <0.1 | 3 | 5 | <100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 16 | 0 | 411426 | NH13 | 1100 | <0.5 | 2 | <0.1 | 5 | <0.5 | 0.7 | 2000 | 3 | 45 | <0.01 | 1 | 0.1 | <0.1 | 5 | 18 | 2100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 17 | 0 | 411426 | NH14 | 1200 | <0.5 | 3 | <0.1 | 5.3 | <0.5 | 0.8 | 2300 | 3 | 49 | <0.01 | 2 | 0.1 | <0.1 | 6 | 7.6 | 2800 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 18 | 0 | 411426 | NH15 | 670 | <0.5 | 1 | <0.1 | 3 | <0.5 | <0.5 | 1300 | 2 | 35 | <0.01 | 1 | <0.1 | <0.1 | 3 | 4 | 200 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 19 | 0 | 411426 | NH16 | 740 | <0.5 | 1 | <0.1 | 3 | <0.5 | <0.5 | 1400 | 2 | 34 | <0.01 | 1 | <0.1 | <0.1 | 3 | 4 | 1500 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 1 | 0 | 411804 | NH1 | 990 | <0.5 | 2 | <0.1 | 4 | <0.5 | 1 | 1600 | 4 | 35 | <0.01 | 1 | 0.2 | <0.1 | 5.6 | 7.6 | 3500 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 2 | 0 | 411804 | NH2-A | 1000 | <0.5 | 2 | <0.1 | 4 | <0.5 | 1 | 1800 | 3 | 36 | <0.01 | 1 | 0.2 | <0.1 | 5.1 | 8.7 | 1500 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 3 | 0 | 411804 | NH2-B | 980 | <0.5 | 2 | <0.1 | 4 | <0.5 | 1 | 1700 | 4 | 35 | <0.01 | 1 | 0.2 | <0.1 | 5.4 | 11 | 1800 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 4 | 0 | 411804 | NH8 | 780 | <0.5 | 1 | <0.1 | 3 | <0.5 | <0.5 | 1400 | 2 | 34 | <0.01 | 0.9 | 0.2 | <0.1 | 3 | 8.4 | 200 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 5 | 0 | 411804 | NH9 | 810 | <0.5 | 2 | <0.1 | 4 | <0.5 | <0.5 | 1400 | 2 | 36 | <0.01 | 1 | 0.1 | <0.1 | 3 | 5.4 | 2600 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 6 | 0 | 411804 | NH10 | 680 | <0.5 | 1 | <0.1 | 3 | <0.5 | <0.5 | 1200 | 2 | 35 | <0.01 | 0.8 | 0.1 | <0.1 | 3 | 5.2 | 400 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 7 | 0 | 411804 | NH11 | 840 | <0.5 | 1 | <0.1 | 4 | <0.5 | 0.7 | 1400 | 3 | 38 | <0.01 | 1 | 0.1 | <0.1 | 4 | 6.8 | 1100 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| 8 | 0 | 411804 | NH12 | 1000 | <0.5 | 2 | <0.1 | 4 | <0.5 | 1 | 1700 | 4 | 39 | <0.01 | 1 | 0.2 | <0.1 | 4 | 10 | 1300 | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | <0.2 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 95% UCL for NH data | 981.1 | - | 1.916 | - | 4.283 | - | 0.936 | 1768 | 3.174 | 39.59 | - | 1.366 | 0.181 | - | 4.797 | 8.976 | 2288 | - | - | - | - | - | - |

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| | TRH | Organochlorine | | | | | | | | | Polychlorinated Biphenyls | Organotins | | | PAHs | | | | | Nutrients | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Xylene total | C6-C10 | 4,4-DDE | gamma - BHC | Dieldrin | Cis-chlordane | Trans-chlordane | 4,4-DDT | 4,4-DDD | Endrin | Heptachlor epoxide | Total PCBs | Monobutyltin as Sn | Dibutyltin as Sn | Tributyltin as Sn | Phenanthrene | Fluoranthene | Pyrene | Benz(a)anthracene | Benzo(a)pyrene | Ammonia as N in soil | Total Nitrogen in soil/solids | Phosphate as P in soil | Total Sulfur in soil/solids | Sulfide Sulfur by calculation* | TKN in soil (by Calculation) | pH kcl |
| mg/kg | mg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | µg/kg | | | | | µg/kg | mg/kg | mg/kg | mg/kg | %w/w | % | mg/kg | pH units |
| 0.6 | 25 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 20 | 0.5 | 0.5 | | | | | 5 | 0.5 | 10 | 0.5 | 0.01 | 0.01 | 10 | |
| | | 1.4 | 0.9 | 2.8 | | | 1.2 | | 2.7 | | 34 | | | | | | | | | | | | | | | |
| | | 7 | 1.4 | 7 | | | 5 | | 60 | | 280 | | | | | | | | | | | | | | | |
| | | | **0.32** | **280** | **0.5** | **0.5** | **1.6** | **2** | **10** | | **23** | | | **9** | | | | | | | | | | | | |
| | | 27 | 1 | 270 | 6 | 6 | 46 | | 120 | | | | | 70 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 14 | | | | | | | 2000 | | | 2000 | 2000 | | | | | | | | 1000 | | | | | | | |
| 180 | | | | | | | 2000 | | | 2000 | 2000 | | | | | | | | 2000 | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <40 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | 1.2 | 130 | <0.5 | 0.1 | 0.08 | 130 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <40 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | <0.5 | 60 | <0.5 | 0.04 | 0.03 | 60 | 9.7 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 80 | <0.5 | 0.04 | 0.01 | 80 | 9.7 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <100 | <2.5 | <2.5 | <5 | <5 | <5 | <5 | <5 | 1.3 | 230 | <0.5 | 0.12 | 0.093 | 230 | 9.5 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 100 | <0.5 | 0.05 | 0.02 | 100 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <40 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | 0.8 | 350 | <0.5 | 0.06 | 0.03 | 340 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 80 | <0.5 | 0.03 | <0.01 | 80 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <40 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | <0.5 | 530 | <0.5 | 0.04 | 0.02 | 530 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <40 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | 0.6 | 170 | <0.5 | 0.05 | 0.04 | 170 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 130 | <0.5 | 0.03 | 0.02 | 130 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <40 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | 1.5 | 300 | <0.5 | 0.1 | 0.07 | 300 | 9.5 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 2.2 | 340 | <0.5 | 0.11 | 0.07 | 340 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 0.8 | 320 | <0.5 | 0.05 | 0.03 | 320 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 1 | 130 | <0.5 | 0.03 | <0.01 | 130 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 0.9 | 160 | <0.5 | 0.04 | 0.02 | 160 | 9.5 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 2.4 | 270 | <0.5 | 0.06 | 0.03 | 270 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 1.3 | 320 | <0.5 | 0.1 | 0.06 | 320 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 0.9 | 250 | <0.5 | 0.06 | 0.03 | 250 | 9.7 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | 1 | 210 | <0.5 | 0.03 | <0.01 | 210 | 9.4 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <100 | <2.5 | <2.5 | <5 | <5 | <5 | <5 | <5 | 0.7 | 520 | <0.5 | 0.05 | 0.02 | 520 | 9.5 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <100 | <2.5 | <2.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 260 | <0.5 | 0.04 | <0.01 | 260 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <200 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 290 | <0.5 | 0.04 | <0.01 | 290 | 9.7 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 240 | <0.5 | 0.04 | 0.01 | 240 | 9.8 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <1 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 230 | <0.5 | 0.55 | 0.51 | 230 | 9.7 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <1 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 240 | <0.5 | 0.04 | 0.01 | 240 | 9.7 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <20 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | <0.5 | 290 | <0.5 | 0.06 | 0.01 | 280 | 9.6 |
| <0.2 | <25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <5 | <40 | <2 | <1 | <5 | <5 | <5 | <5 | <5 | <0.5 | 450 | <0.5 | 0.07 | 0.04 | 450 | 9.7 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1.644 | 354.4 | - | 0.2 | 0.219 | 353.9 | 9.646 |

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| SPOCAS | | | | | | | | | | | | | CRS | | AVS-SEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| s-TAA pH 6.5 | TAA pH 6.5 | a-SPOS | SPOS | SP | ANCBT | s-ANCBT | s-Net Acidity excluding ANC | a-Net Acidity excluding ANC | Liming rate excluding ANC | s-Net Acidity including ANC | a-Net Acidity including ANC | Liming rate including ANC | a-Chromium Reducible Sulfur | Chromium Reducible Sulfur | Acid Volatile Sulphide | Total SEM | SEM/AVS ratio |
| %w/w S | moles H+/t | moles H+/t | %w/w | %w/w | % CaCO3 | %w/w S | %w/w S | moles H+/t | kg CaCO3/t | %w/w S | moles H+/t | kg CaCO3/t | moles H+/t | %w/w | ole/g dry we | ole/g dry we | - |
| 0.01 | 5 | 5 | 0.005 | 0.005 | 0.05 | 0.05 | 0.005 | 5 | 0.75 | 0.005 | 5 | 0.75 | 3 | 0.005 | 0.5 | 0.13 | 0 |
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| <0.01 | <5 | 20 | 0.03 | 0.06 | 10 | 3.3 | 0.031 | 20 | 1.5 | <0.005 | <5 | <0.75 | 18 | 0.03 | 0.6 | 7.2 | 12 |
| <0.01 | <5 | <5 | <0.005 | 0.02 | 10 | 3.2 | <0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 10 | 0.02 | 1 | 6.3 | 5.7 |
| <0.01 | <5 | <5 | 0.005 | 0.02 | 9.8 | 3.2 | 0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 5 | 0.008 | 1 | 6.5 | 5.5 |
| <0.01 | <5 | 61 | 0.1 | 0.13 | 12 | 3.7 | 0.098 | 61 | 4.6 | <0.005 | <5 | <0.75 | 50 | 0.08 | <0.5 | 8.8 | NA |
| <0.01 | <5 | 14 | 0.02 | 0.05 | 14 | 4.5 | 0.022 | 14 | 1.1 | <0.005 | <5 | <0.75 | 18 | 0.03 | <0.5 | 7.8 | NA |
| <0.01 | <5 | 7 | 0.01 | 0.04 | 8.6 | 2.8 | 0.011 | 6.8 | <0.75 | <0.005 | <5 | <0.75 | 12 | 0.02 | 1 | 8.6 | 6.8 |
| <0.01 | <5 | <5 | <0.005 | 0.02 | 8.8 | 2.8 | <0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 10 | 0.02 | 0.5 | 5.6 | 11 |
| <0.01 | <5 | <5 | <0.005 | 0.02 | 9.6 | 3.1 | <0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 10 | 0.02 | <0.5 | 5.4 | NA |
| <0.01 | <5 | 8 | 0.01 | 0.03 | 10 | 3.3 | 0.013 | 8.2 | <0.75 | <0.005 | <5 | <0.75 | 22 | 0.04 | <0.5 | 4.2 | NA |
| <0.01 | <5 | <5 | <0.005 | 0.02 | 8.4 | 2.7 | <0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 8 | 0.01 | <0.5 | 5 | NA |
| <0.01 | <5 | 20 | 0.03 | 0.07 | 16 | 5 | 0.032 | 20 | 1.5 | <0.005 | <5 | <0.75 | 37 | 0.06 | 1 | 10 | 9.7 |
| <0.01 | <5 | 16 | 0.03 | 0.06 | 14 | 4.5 | 0.026 | 16 | 1.2 | <0.005 | <5 | <0.75 | 22 | 0.04 | <0.5 | 10 | NA |
| <0.01 | <5 | <5 | <0.005 | 0.03 | 13 | 4.2 | <0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 30 | 0.05 | <0.5 | 8.6 | NA |
| <0.01 | <5 | <5 | <0.005 | 0.03 | 12 | 3.8 | <0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 18 | 0.03 | 0.6 | 8.4 | 13 |
| <0.01 | <5 | 19 | 0.03 | 0.04 | 14 | 4.6 | 0.031 | 19 | 1.4 | <0.005 | <5 | <0.75 | 27 | 0.04 | 1 | 5.4 | 4.4 |
| <0.01 | <5 | 11 | 0.02 | 0.05 | 14 | 4.5 | 0.017 | 11 | 0.8 | <0.005 | <5 | <0.75 | 20 | 0.03 | <0.5 | 8.9 | NA |
| <0.01 | <5 | 23 | 0.04 | 0.08 | 15 | 4.7 | 0.036 | 23 | 1.7 | <0.005 | <5 | <0.75 | 27 | 0.04 | 0.7 | 12 | 17 |
| <0.01 | <5 | 12 | 0.02 | 0.04 | 13 | 4.2 | 0.019 | 12 | 0.91 | <0.005 | <5 | <0.75 | 22 | 0.04 | 0.8 | 6.9 | 8.9 |
| <0.01 | <5 | 11 | 0.02 | 0.04 | 14 | 4.6 | 0.018 | 11 | 0.82 | <0.005 | <5 | <0.75 | 15 | 0.02 | 0.7 | 6.3 | 8.6 |
| <0.01 | <5 | 58 | 0.09 | 0.12 | 15 | 4.8 | 0.093 | 58 | 4.3 | <0.005 | <5 | <0.75 | 47 | 0.08 | 0.5 | 12 | 39 |
| <0.01 | <5 | <5 | <0.005 | 0.07 | 17 | 5.4 | <0.005 | <5 | <0.75 | <0.005 | <5 | <0.75 | 40 | 0.06 | 0.6 | 13 | 5.6 |
| <0.01 | <5 | 46 | 0.07 | 0.11 | 14 | 4.4 | 0.073 | 46 | 3.4 | <0.005 | <5 | <0.75 | 37 | 0.06 | <0.5 | 9.7 | NA |
| <0.01 | <5 | 32 | 0.05 | 0.08 | 13 | 4.3 | 0.052 | 32 | 2.4 | <0.005 | <5 | <0.75 | <3 | <0.005 | 2 | 8.5 | 310 |
| <0.01 | <5 | 32 | 0.05 | 0.07 | 13 | 4.3 | 0.051 | 32 | 2.4 | <0.005 | <5 | <0.75 | <3 | <0.005 | <0.5 | 9.1 | NA |
| <0.01 | <5 | 32 | 0.05 | 0.07 | 14 | 4.4 | 0.051 | 32 | 2.4 | <0.005 | <5 | <0.75 | 20 | 0.03 | <0.5 | 9.1 | NA |
| <0.01 | <5 | 29 | 0.05 | 0.07 | 13 | 4.2 | 0.046 | 29 | 2.1 | <0.005 | <5 | <0.75 | 25 | 0.04 | <0.5 | 15 | NA |
| <0.01 | <5 | 35 | 0.06 | 0.09 | 14 | 4.6 | 0.056 | 35 | 2.6 | <0.005 | <5 | <0.75 | 32 | 0.05 | <0.5 | 10 | NA |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| - | - | 32.49 | 0.0518 | 0.0756 | 14.55 | 4.679 | 0.0519 | 32.47 | 2.412 | - | - | - | 32.08 | 0.0516 | 1.195 | 10.32 | 172.8 |

bluecoast
CONSULTING ENGINEERS

# Appendix C: Laboratory documentation

# CHAIN OF CUSTODY FORM - Client

[Copyright and Confidential]

**ENVIROLAB GROUP**
National phone number 1300 424 344


Sydney Lab.- Envirolab Services
12 Ashley St, Chatswood, NSW 2067
02 9910 6200 | sydney@envirolab.com.au

Perth Lab.- MPL Laboratories
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08 9317 2505 | lab@mpl.com.au

Melbourne Lab.- Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Adelaide Office - Envirolab Services
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Brisbane Office - Envirolab Services
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07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au


| | | | |
|---|---|---|---|
| Company: | Bluecoast Consulting Engineers | Client Project Name/Number/Site etc (to report title): | P24462 - PreTrialExtension |
| Contact Person: | Tom Fallon | | |
| Project Mgr: | Tom Fallon | PO No. (if applicable): | |
| Sampler: | Tom Fallon | Envirolab Quote No.: | 25SA131v3 |
| Address: | 2a, 41-45 Hunter St, Newcastle NSW 2300 | Date results required: Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day | |
| Phone: | Mob: 0405669537 | *Note: Inform lab in advance if urgent turnaround is required - surcharges apply* | |
| Email Results to: | tom@bcoast.com.au | Additional report format: ☐ Esdat ☐ Equis | |
| Email Invoice to: | Felicity.Beswick@sa.gov.au | Lab Comments: - PSD seiving to include seive sizes 9.5, 4.75, 2.36, 1.18, 0.60, 0.425, 0.30, 0.25, 0.212, 0.15, 0.125,0.075mm - Metals to include: Aluminium, Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Vanadium, Zinc - | |

| Envirolab Sample ID (Lab use only) | Client Sample ID or Information | Depth | Date Sampled | Type of Sample | Particle Size Distribution (PSD)– DEW Suite sieving + hydrometer | Carbon - Total Organic (TOC) Combustion (NAGD) | NAGD Level Recoverable Metals ICP-MS / CV-AAS | MBT, DBT, TBT as Sn | TRH (incl NEPM Fractions) – Low Level | BTEX – Low Level | Pesticides, Herbicides and Chlorinated Organics | PFAS Short Suite | AVS/SEM - Acid volatile Sulfide + Total SEM (NAGD 16 Metals) | Chromium Reducible Sulfur (SCR) Suite (AS 4969/ASSMAC) | Sulphide Sulphur by calculation | SPOCAS suite | Nutrient suite | | | | | Comments: Provide as much information about the sample as you can |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WB1 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | WB2 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | WB3 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | WB4 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | WB5 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | WB6 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | HS1 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | HS2 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | HS3 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | HS4 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 20 1 | NH1 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 21 2 | NH2 - A | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 22 3 | NH2 - B - | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 23 | NH3 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH4 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH5 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH6 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH7 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 23 4 | NH8 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 24 5 | NH9 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 25 6 | NH10 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 26 7 | NH11 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 27 8 | NH12 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH13 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH14 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH15 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| | NH16 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

| Relinquished by | Client | Interstate Office | Laboratory | Lab Use Only | |
|---|---|---|---|---|---|
| Print Name: | MAX SHAW | ECS ADC | KAZ | Job number: 411804 | Office Cooling: Ice / Ice pack / None |
| Date & Time: | 23/6/2026 16:00 | 23/6/26 4:30pm | 0920 24/6/26 | Temp Office: 7.6 Temp Lab: 2°C | Lab Cooling: Ice / Ice pack / None |
| Signature: | | | | TAT: SAME day / 1 / 2 / 3 / 4 / STD | Security seal: Intact / Broken / None |

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 411804

## Client Details

| | |
|---|---|
| **Client** | Bluecoast Consulting Engineers Pty Ltd |
| **Attention** | Tom Fallon |
| **Address** | Suite 2a, 41-45 Hunter Street,, NEWCASTLE, NSW, 2300 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P24462 - Pre Trial Extension** |
| **Number of Samples** | 8 Sediment |
| **Date samples received** | 24/06/2026 |
| **Date completed instructions received** | 24/06/2026 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 01/07/2026 |
| **Date of Issue** | 03/07/2026 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Results Approved By**
Dragana Tomas, Senior Chemist
Jenny He, Inorganic Team Leader
Larry Ye, Senior Chemist
Nick Sarlamis, Quality & Compliance Coordinator
Sean McAlary, Team Lead - LC
Stuart Chen, Asbestos Approved Identifier/Report coordinator
Tabitha Roberts, Senior Chemist
Timothy Toll, Senior Chemist

**Authorised By**
Nancy Zhang, Laboratory Manager

| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 79 | 76 | 77 | 79 | 83 |

| Volatile TRH and BTEX (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 81 | 81 | 81 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 95 | 90 | 95 | 87 | 100 |

| Semi-Volatile TRH (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 96 | 103 | 98 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 92 | 83 | 93 | 87 | 101 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 93 | 111 | 105 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 98 | 89 | 90 | 81 | 94 |

| Organochlorine Pesticides in Sediment | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 86 | 96 | 99 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 98 | 89 | 90 | 81 | 94 |

| Organophosphorus Pesticides in Sediment | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 86 | 96 | 99 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 68 | 69 | 66 | 71 | 71 |

| PCBs in Sediment (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 67 | 71 | 74 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Aluminium | mg/kg | 990 | 1,000 | 980 | 780 | 810 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 2 | 2 | 1 | 2 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 4 | 4 | 4 | 3 | 4 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 1 | 1 | 1 | <0.5 | <0.5 |
| Iron | mg/kg | 1,600 | 1,800 | 1,700 | 1,400 | 1,400 |
| Lead | mg/kg | 4 | 3 | 4 | 2 | 2 |
| Manganese | mg/kg | 35 | 36 | 35 | 34 | 36 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 1 | 1 | 1 | 0.9 | 1 |
| Selenium | mg/kg | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 5.6 | 5.1 | 5.4 | 3 | 3 |
| Zinc | mg/kg | 7.6 | 8.7 | 11 | 8.4 | 5.4 |

| NAGD Metals | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Aluminium | mg/kg | 680 | 840 | 1,000 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 1 | 1 | 2 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 3 | 4 | 4 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | <0.5 | 0.7 | 1 |
| Iron | mg/kg | 1,200 | 1,400 | 1,700 |
| Lead | mg/kg | 2 | 3 | 4 |
| Manganese | mg/kg | 35 | 38 | 39 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 0.8 | 1 | 1 |
| Selenium | mg/kg | 0.1 | 0.1 | 0.2 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 3 | 4 | 4 |
| Zinc | mg/kg | 5.2 | 6.8 | 10 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Phosphorus | mg/kg | 120 | 130 | 130 | 100 | 100 |

| Acid Extractable metals in soil | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Phosphorus | mg/kg | 100 | 120 | 120 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 95 | 101 | 99 | 95 | 99 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 98 | 100 | 97 | 91 | 100 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 84 | 84 | 88 | 82 | 86 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 91 | 89 | 85 | 87 | 89 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 90 | 89 | 93 | 90 | 92 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 81 | 89 | 87 | 82 | 83 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 81 | 85 | 84 | 81 | 82 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 77 | 83 | 85 | 78 | 79 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 93 | 97 | 94 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 98 | 97 | 100 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 89 | 88 | 94 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 97 | 91 | 95 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 99 | 98 | 105 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 93 | 94 | 97 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 93 | 91 | 93 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 85 | 87 | 91 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| Moisture | % | 36 | 31 | 33 | 23 | 24 |

| Moisture | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| Moisture | % | 24 | 26 | 28 |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 02/07/2026 | 02/07/2026 | 02/07/2026 | 02/07/2026 | 02/07/2026 |
| Date analysed | - | 03/07/2026 | 03/07/2026 | 03/07/2026 | 03/07/2026 | 03/07/2026 |
| Medium Gravel 4.75-9.5mm | % | <1 | <1 | <1 | <1 | <1 |
| Fine Gravel 2.36-4.75mm | % | 1 | 1 | <1 | <1 | <1 |
| Very Coarse Sand 1.18-2.36mm | % | 1 | <1 | <1 | <1 | <1 |
| Coarse Sand 0.6-1.18mm | % | 2 | 2 | 2 | <1 | <1 |
| Medium Sand 0.425-0.6mm | % | 1 | 2 | <1 | 2 | <1 |
| Medium Sand 0.3-0.425mm | % | 1 | <1 | 2 | <1 | <1 |
| Medium Sand 0.25-0.3mm | % | <1 | <1 | 1 | <1 | <1 |
| Medium Sand 0.212-0.25mm | % | <1 | <1 | <1 | <1 | <1 |
| Fine Sand 0.15-0.212mm | % | 5 | 4 | 4 | 2 | 3 |
| Fine Sand 0.125-0.15mm | % | 14 | 10 | 9 | 15 | 8 |
| Very Fine Sand 0.075-0.125mm | % | 62 | 67 | 64 | 72 | 79 |

| Particle Size Distribution in Soils | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 02/07/2026 | 02/07/2026 | 02/07/2026 |
| Date analysed | - | 03/07/2026 | 03/07/2026 | 03/07/2026 |
| Medium Gravel 4.75-9.5mm | % | <1 | <1 | <1 |
| Fine Gravel 2.36-4.75mm | % | <1 | <1 | <1 |
| Very Coarse Sand 1.18-2.36mm | % | <1 | <1 | <1 |
| Coarse Sand 0.6-1.18mm | % | <1 | <1 | <1 |
| Medium Sand 0.425-0.6mm | % | <1 | 1 | <1 |
| Medium Sand 0.3-0.425mm | % | <1 | <1 | <1 |
| Medium Sand 0.25-0.3mm | % | <1 | <1 | <1 |
| Medium Sand 0.212-0.25mm | % | <1 | <1 | <1 |
| Fine Sand 0.15-0.212mm | % | 5 | 3 | 4 |
| Fine Sand 0.125-0.15mm | % | 13 | 7 | 9 |
| Very Fine Sand 0.075-0.125mm | % | 75 | 72 | 68 |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 02/07/2026 | 02/07/2026 | 02/07/2026 | 02/07/2026 | 02/07/2026 |
| Date analysed | - | 03/07/2026 | 03/07/2026 | 03/07/2026 | 03/07/2026 | 03/07/2026 |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | 11 | 11 | 14 | 8 | 11 |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | <1 | <1 | <1 | <1 | <1 |
| Clay in soils <2µm | % (w/w) | <1 | <1 | <1 | <1 | <1 |

| Particle Size Analysis | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 02/07/2026 | 02/07/2026 | 02/07/2026 |
| Date analysed | - | 03/07/2026 | 03/07/2026 | 03/07/2026 |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | 4 | 15 | 17 |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | <1 | <1 | <1 |
| Clay in soils <2µm | % (w/w) | <1 | <1 | <1 |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 3,500 | 1,500 | 1,800 | 200 | 2,600 |
| Ammonia as N in soil | mg/kg | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 520 | 260 | 290 | 240 | 230 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 520 | 260 | 290 | 240 | 230 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.05 | 0.04 | 0.04 | 0.04 | 0.55 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 1,100 | 1,100 | 1,500 | 850 | 1,200 |
| Sulfide Sulfur by calculation* | % | 0.02 | <0.01 | <0.01 | 0.01 | 0.51 |

| TOC_NAGA | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 400 | 1,100 | 1,300 |
| Ammonia as N in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 240 | 290 | 450 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 230 | 280 | 450 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.04 | 0.06 | 0.07 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 900 | 1,300 | 1,200 |
| Sulfide Sulfur by calculation* | % | 0.01 | 0.01 | 0.04 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 520 | 260 | 290 | 240 | 230 |

| Total Kjeldahl Nitrogen (TKN) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 240 | 280 | 450 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| pH $_{kcl}$ | pH units | 9.5 | 9.6 | 9.7 | 9.8 | 9.7 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 58 | <5 | 46 | 32 | 32 |
| $S_{POS}$ | %w/w | 0.09 | <0.005 | 0.07 | 0.05 | 0.05 |
| $S_P$ | %w/w | 0.12 | 0.07 | 0.11 | 0.08 | 0.07 |
| $S_{KCl}$ | %w/w S | 0.029 | 0.067 | 0.033 | 0.033 | 0.023 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 15 | 17 | 14 | 13 | 13 |
| s-$ANC_{BT}$ | %w/w S | 4.8 | 5.4 | 4.4 | 4.3 | 4.3 |
| s-Net Acidity excluding ANC | %w/w S | 0.093 | <0.005 | 0.073 | 0.052 | 0.051 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 58 | <5 | 46 | 32 | 32 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 4.3 | <0.75 | 3.4 | 2.4 | 2.4 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| pH $_{kcl}$ | pH units | 9.7 | 9.6 | 9.7 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 32 | 29 | 35 |
| $S_{POS}$ | %w/w | 0.05 | 0.05 | 0.06 |
| $S_P$ | %w/w | 0.07 | 0.07 | 0.09 |
| $S_{KCl}$ | %w/w S | 0.018 | 0.027 | 0.036 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 14 | 13 | 14 |
| s-$ANC_{BT}$ | %w/w S | 4.4 | 4.2 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.051 | 0.046 | 0.056 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 32 | 29 | 35 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 2.4 | 2.1 | 2.6 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.5 | 0.6 | <0.5 | 2 | <0.5 |
| Aluminium | µmole/g dry weight | 4 | 5 | 5 | 3 | 3 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.36 | 0.04 | 0.06 | 0.04 | 0.08 |
| Cobalt | µmole/g dry weight | 0.42 | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | 0.03 | <0.02 | <0.02 | <0.02 | 0.04 |
| Iron | µmole/g dry weight | 7 | 7 | 4 | 5 | 5 |
| Lead | µmole/g dry weight | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| Manganese | µmole/g dry weight | 0.5 | 0.5 | 0.6 | 0.4 | 0.6 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | 0.26 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | 0.03 | <0.02 | <0.02 | 0.03 |
| Vanadium | µmole/g dry weight | 0.05 | 0.06 | 0.07 | 0.02 | 0.02 |
| Zinc | µmole/g dry weight | 0.07 | 0.09 | 0.14 | 0.08 | 0.07 |
| Total SEM | µmole/g dry weight | 12 | 13 | 9.7 | 8.5 | 9.1 |
| SEM/AVS ratio | - | 39 | 5.6 | NA | 310 | NA |

| AVS/SEM | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | <0.5 | <0.5 | <0.5 |
| Aluminium | µmole/g dry weight | 3 | 4 | 3 |
| Antimony | µmole/g dry weight | <0.05 | 0.1 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.04 | 5.5 | 0.11 |
| Cobalt | µmole/g dry weight | 0.23 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | 0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 5 | 5 | 5 |
| Lead | µmole/g dry weight | 0.010 | 0.010 | 0.020 |
| Manganese | µmole/g dry weight | 0.5 | 0.5 | 0.6 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | 0.03 |
| Vanadium | µmole/g dry weight | <0.02 | 0.02 | 0.04 |
| Zinc | µmole/g dry weight | 0.05 | 0.07 | 0.11 |
| Total SEM | µmole/g dry weight | 9.1 | 15 | 10 |
| SEM/AVS ratio | - | NA | NA | NA |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Monobutyltin as Sn | µg/kg | <100 | <100 | <200 | <20 | <20 |
| Dibutyltin as Sn | µg/kg | <2.5 | <2.5 | <5 | <0.5 | <1 |
| Tributyltin as Sn | µg/kg | <2.5 | <2.5 | <5 | <0.5 | <0.5 |
| Surrogate Triphenyltin | % | 102 | 113 | 98 | 101 | 102 |

| Organotin Compunds in Soil | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Monobutyltin as Sn | µg/kg | <20 | <20 | <40 |
| Dibutyltin as Sn | µg/kg | <1 | <0.5 | <2 |
| Tributyltin as Sn | µg/kg | <0.5 | <0.5 | <1 |
| Surrogate Triphenyltin | % | 96 | 102 | 79 |

| Method ID | Methodology Summary |
|---|---|
| **AVS-SEM** | Determination of Acid Volatile Sulfide (AVS) and Simultaneously Extractable Metals (SEM)/Bioavailable Metals in sediment - determined colourimetrically and using ICP-OES/ICP-MS and cold vapour-AAS. |
| **Ext-054** | Analysed by MPL Envirolab |
| **Inorg-008** | Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours. |
| **Inorg-055** | Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-055** | Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-057** | Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction. |
| **Inorg-060** | Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-062** | TKN - determined colourimetrically based on APHA latest edition 4500 Norg. Alternatively, TKN can be derived from calculation (Total N - NOx). |

| Method ID | Methodology Summary |
|---|---|
| **Inorg-068** | Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition.<br><br>Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation.<br><br>There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples.<br><br>Neutralising value (NV) of 100% is assumed for liming rate.<br><br>Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.<br><br>The recommendation that the SHCl concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCl results reported only.<br>However, Envirolab/MPL adhere to the following calculation of SNAS, where a misprint in the guideline has yet to be rectified.<br>SNAS (%) = (SHCl –SKCl) x 2.0 |
| **Inorg-081** | Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.<br>Alternatively determined by colourimetry/turbidity using Discrete Analyser. |
| **INORG-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. Clay fraction at <2µm reported. |
| **Inorg-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. |
| **INORG-124** | Sulfide is determined after distillation by titration and/or colourimetrically. |
| **INORG-137** | Total Carbon Nitrogen Sulfur by high temperature catalytic combustion with IR detection.<br><br>Total Nitrogen may also be determine from TKN+NOx by calculation. |
| **Metals-020** | Determination of various metals/elements by ICP-AES.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.<br><br>Where molecular anion forms are calculated from an element (e.g. SO4 from S or PO4 from P stoichiometrically), the assumption is that the element is only present in that molecular anion form.<br><br>Submission of low masses of sample e.g. for dust samples, may result in raised PQLs. |
| **Metals-021** | Determination of Mercury by Cold Vapour AAS. |
| **Metals-022** | Determination of various metals by ICP-MS.<br><br>Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation. |
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. |

| Method ID | Methodology Summary |
|---|---|
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br><br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.<br><br>Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40). |
| **Org-022/025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.<br>For soil results:-<br>1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present.<br>2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL.<br>3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above.<br><br>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.<br>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes. |
| **Org-025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MSMS. |

| Method ID | Methodology Summary |
|---|---|
| **Org-029** | Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.<br><br>Analysis is undertaken with LC-MS/MS.<br><br>PFAS results include the sum of branched and linear isomers where applicable.<br><br>Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.<br><br>Note, the Total +ve PFAS PQL is reflective of the lowest individual PQL and is therefore "Total +ve PFAS" is simply a sum of the positive individual PFASs (or a described sub-set).<br><br>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER. |

| QUALITY CONTROL: Volatile TRH and BTEX (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 103 | 87 |
| TRH $C_6$ - $C_{10}$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 103 | 87 |
| Benzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 104 | 88 |
| Toluene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 92 | 77 |
| Ethylbenzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 107 | 90 |
| m+p-xylene | mg/kg | 0.4 | Org-023 | <0.4 | 1 | <0.4 | <0.4 | 0 | 106 | 89 |
| o-Xylene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 109 | 93 |
| Naphthalene | mg/kg | 1 | Org-023 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| *Surrogate* aaa-Trifluorotoluene | % | | Org-023 | 92 | 1 | 79 | 71 | 11 | 93 | 79 |

| QUALITY CONTROL: Semi-Volatile TRH (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 27/06/2026 | 1 | 27/06/2026 | 27/06/2026 | | 27/06/2026 | 27/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 123 | 107 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 102 | 95 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 109 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 123 | 107 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 102 | 95 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 109 |
| *Surrogate* o-Terphenyl | % | | Org-020 | 99 | 1 | 95 | 107 | 12 | 102 | 98 |

| QUALITY CONTROL: Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Naphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 82 | 103 |
| 2-Methylnaphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 86 | 110 |
| Fluorene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 86 | 106 |
| Phenanthrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 88 | 112 |
| Anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Fluoranthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 90 | 119 |
| Pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 92 | 115 |
| Benz(a)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Chrysene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 88 | 114 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | 10 | Org-022/025 | <10 | 1 | <10 | <10 | 0 | [NT] | [NT] |
| Benzo(e)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(a)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 84 | 119 |
| Perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Indeno(1,2,3-cd)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Dibenz(a,h)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(g,h,i)perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Coronene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate p*-Terphenyl-d14 | % | | Org-022/025 | 108 | 1 | 92 | 113 | 20 | 94 | 109 |

| QUALITY CONTROL: Organochlorine Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| alpha-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 90 | 105 |
| Hexachlorobenzene | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| beta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 86 | 111 |
| gamma-BHC (Lindane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| delta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 84 | 107 |
| Aldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 88 | 109 |
| Oxychlordane | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor Epoxide | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 96 | 109 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| alpha-Chlordane (cis-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan I | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDE (p,p-DDE) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 103 |
| Dieldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 109 |
| Endrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 118 |
| 4,4'-DDD (p,p-DDD) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 100 | 112 |
| Endosulfan II | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDT (p,p-DDT) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan Sulphate | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 98 |
| Methoxychlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 122 | 1 | 98 | 123 | 23 | 105 | 107 |

| QUALITY CONTROL: Organophosphorus Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Dichlorvos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 82 | 103 |
| Dimethoate | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Diazinon | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyrifos-methyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ronnel | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 90 | 111 |
| Fenitrothion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 96 | 114 |
| Malathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 92 | 114 |
| Chlorpyriphos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 86 | 114 |
| Parathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 94 | 113 |
| Bromophos-ethyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ethion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 70 | 117 |
| Azinphos-methyl (Guthion) | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 122 | 1 | 98 | 123 | 23 | 105 | 107 |

| QUALITY CONTROL: PCBs in Sediment (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Total PCBs | µg/kg | 5 | Org-025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate* 2-Fluorobiphenyl | % | | Org-025 | 78 | 1 | 68 | 74 | 8 | 125 | 103 |

| QUALITY CONTROL: NAGD Metals | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-3 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Aluminium | mg/kg | 10 | Metals-020 | <10 | 1 | 990 | 1100 | 11 | 102 | # |
| Antimony - Low Level | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 102 | 94 |
| Arsenic | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 2 | 2 | 0 | 97 | 96 |
| Cadmium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 102 | 107 |
| Chromium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 4 | 4 | 0 | 100 | 90 |
| Cobalt | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 101 | 87 |
| Copper | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 1 | 1 | 0 | 101 | 107 |
| Iron | mg/kg | 10 | Metals-020 | <10 | 1 | 1600 | 1800 | 12 | 100 | # |
| Lead | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 4 | 4 | 0 | 100 | 88 |
| Manganese | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 35 | 40 | 13 | 105 | 93 |
| Mercury | mg/kg | 0.01 | Metals-021 | <0.01 | 1 | <0.01 | <0.01 | 0 | 120 | 100 |
| Nickel | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 1 | 1 | 0 | 101 | 86 |
| Selenium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | 0.2 | 0.2 | 0 | 98 | 94 |
| Silver | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 93 | 113 |
| Vanadium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 5.6 | 5.8 | 4 | 93 | 115 |
| Zinc | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 7.6 | 8.3 | 9 | 98 | 99 |

| QUALITY CONTROL: Acid Extractable metals in soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-3 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Phosphorus | mg/kg | 10 | Metals-020 | <10 | 1 | 120 | 130 | 8 | 104 | 90 |

| QUALITY CONTROL: PFAS in Soils Short | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | [NT] |
| Date analysed | - | | | 30/06/2026 | 1 | 30/06/2026 | 30/06/2026 | | 30/06/2026 | [NT] |
| Perfluorobutanesulfonic acid | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 94 | [NT] |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 103 | [NT] |
| Perfluorooctanesulfonic acid PFOS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 96 | [NT] |
| Perfluorooctanoic acid PFOA | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 90 | [NT] |
| 6:2 FTS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 91 | [NT] |
| 8:2 FTS | µg/kg | 0.2 | Org-029 | <0.2 | 1 | <0.2 | <0.2 | 0 | 92 | [NT] |
| *Surrogate* $^{13}C_8$ *PFOS* | % | | Org-029 | 97 | 1 | 95 | 99 | 4 | 94 | [NT] |
| *Surrogate* $^{13}C_2$ *PFOA* | % | | Org-029 | 102 | 1 | 98 | 102 | 4 | 101 | [NT] |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | | Org-029 | 101 | 1 | 84 | 84 | 0 | 99 | [NT] |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | | Org-029 | 100 | 1 | 91 | 87 | 4 | 100 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | | Org-029 | 105 | 1 | 90 | 91 | 1 | 105 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | | Org-029 | 97 | 1 | 81 | 81 | 0 | 93 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | | Org-029 | 103 | 1 | 81 | 86 | 6 | 100 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | | Org-029 | 95 | 1 | 77 | 75 | 3 | 98 | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | <100 | 1 | 3500 | 3300 | 6 | 100 | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | <0.5 | 1 | 0.7 | 0.7 | 0 | 105 | 88 |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 95 | 87 |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | <0.1 | 1 | <0.1 | <0.1 | 0 | 100 | 99 |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | <10 | 1 | 520 | 640 | 21 | 108 | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 95 | 87 |
| Organic Nitrogen as N | mg/kg | 10 | | <10 | 1 | 520 | 640 | 21 | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | <0.5 | 1 | <0.5 | <0.5 | 0 | 103 | 94 |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | <0.01 | 1 | 0.05 | 0.05 | 0 | 80 | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | <10 | 1 | 1100 | [NT] | | 106 | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | <0.01 | 1 | 0.02 | [NT] | | [NT] | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 6 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 6 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | [NT] | 6 | 400 | [NT] | | [NT] | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | [NT] | 6 | <0.1 | [NT] | | [NT] | [NT] |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | [NT] | 6 | 240 | [NT] | | [NT] | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Organic Nitrogen as N | mg/kg | 10 | | [NT] | 6 | 230 | [NT] | | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | [NT] | 6 | 0.04 | [NT] | | [NT] | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | [NT] | 6 | 900 | 870 | 3 | [NT] | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | [NT] | 6 | 0.01 | [NT] | | [NT] | [NT] |

| QUALITY CONTROL: Total Kjeldahl Nitrogen (TKN) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 26/06/2026 | 26/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 10 | Inorg-062 | <10 | 1 | 520 | 640 | 21 | [NT] | [NT] |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 24/06/2026 | [NT] | [NT] | [NT] | [NT] | 24/06/2026 | [NT] |
| Date analysed | - | | | 25/06/2026 | [NT] | [NT] | [NT] | [NT] | 25/06/2026 | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | [NT] | [NT] | [NT] | [NT] | 98.0 | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | <0.01 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | 102 | [NT] |
| a-$S_{POS}$ | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{POS}$ | %w/w | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_P$ | %w/w | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{KCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | <0.05 | [NT] | [NT] | [NT] | [NT] | 97 | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | <0.05 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |

| QUALITY CONTROL: AVS/SEM | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-2 |
| Date prepared | - | | | 24/06/2026 | [NT] | [NT] | [NT] | [NT] | 24/06/2026 | 24/06/2026 |
| Date analysed | - | | | 25/06/2026 | [NT] | [NT] | [NT] | [NT] | 25/06/2026 | 25/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.5 | AVS-SEM | <0.5 | [NT] | [NT] | [NT] | [NT] | 103 | 88 |
| Aluminium | µmole/g dry weight | 0.05 | Metals-020 | <0.05 | [NT] | [NT] | [NT] | [NT] | 126 | [NT] |
| Antimony | µmole/g dry weight | 0.05 | Metals-020 | <0.05 | [NT] | [NT] | [NT] | [NT] | 97 | 74 |
| Arsenic | µmole/g dry weight | 0.05 | AVS-SEM | <0.05 | [NT] | [NT] | [NT] | [NT] | 117 | 92 |
| Cadmium | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | [NT] | [NT] | [NT] | [NT] | 107 | 84 |
| Chromium | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | [NT] | [NT] | [NT] | [NT] | 115 | 83 |
| Cobalt | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | [NT] | [NT] | [NT] | [NT] | 117 | 94 |
| Copper | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | [NT] | [NT] | [NT] | [NT] | 116 | 90 |
| Iron | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | [NT] | [NT] | [NT] | [NT] | 127 | [NT] |
| Lead | µmole/g dry weight | 0.005 | AVS-SEM | <0.005 | [NT] | [NT] | [NT] | [NT] | 111 | 82 |
| Manganese | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | [NT] | [NT] | [NT] | [NT] | 115 | 93 |
| Mercury | µmole/g dry weight | 0.0005 | AVS-SEM | <0.0005 | [NT] | [NT] | [NT] | [NT] | 102 | 86 |
| Nickel | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | [NT] | [NT] | [NT] | [NT] | 116 | 90 |
| Selenium | µmole/g dry weight | 0.04 | AVS-SEM | <0.04 | [NT] | [NT] | [NT] | [NT] | 121 | 92 |
| Silver | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | [NT] | [NT] | [NT] | [NT] | 112 | 76 |
| Vanadium | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | [NT] | [NT] | [NT] | [NT] | 112 | 81 |
| Zinc | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | [NT] | [NT] | [NT] | [NT] | 117 | 73 |
| Total SEM | µmole/g dry weight | 0.13 | AVS-SEM | <0.13 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| SEM/AVS ratio | - | 0 | AVS-SEM | <0 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |

| QUALITY CONTROL: Organotin Compunds in Soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | [NT] |
| Date analysed | - | | | 30/06/2026 | 1 | 30/06/2026 | 30/06/2026 | | 30/06/2026 | [NT] |
| Monobutyltin as Sn | µg/kg | 20 | Ext-054 | <20 | 1 | <100 | <100 | 0 | [NT] | [NT] |
| Dibutyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <2.5 | <2.5 | 0 | 73 | [NT] |
| Tributyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <2.5 | <2.5 | 0 | 98 | [NT] |
| Surrogate Triphenyltin | % | | Ext-054 | 101 | 1 | 102 | 101 | 1 | 102 | [NT] |

## Result Definitions

| | |
|---|---|
| **NT** | Not tested |
| **NA** | Test not required |
| **INS** | Insufficient sample for this test |
| **PQL** | Practical Quantitation Limit |
| **<** | Less than |
| **>** | Greater than |
| **RPD** | Relative Percent Difference |
| **LCS** | Laboratory Control Sample |
| **NS** | Not specified |
| **NEPM** | National Environmental Protection Measure |
| **NR** | Not Reported |

## Quality Control Definitions

| | |
|---|---|
| **Blank** | This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. |
| **Duplicate** | This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable. |
| **Matrix Spike** | A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. |
| **LCS (Laboratory Control Sample)** | This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample. |
| **Surrogate Spike** | Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples. |

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field).

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

## Report Comments

8 metals in soil - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Organotins analysed by MPL Laboratories. Report no. PHF1945.
-PQL(s) has/have been raised due to interferences from analytes (other than those being tested) in sample.
-PQL(s) has/have been raised due to suppression of the extracted internal standard.

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# CERTIFICATE OF ANALYSIS 411804-A

## Client Details

| | |
|---|---|
| **Client** | Bluecoast Consulting Engineers Pty Ltd |
| **Attention** | Tom Fallon |
| **Address** | Suite 2a, 41-45 Hunter Street,, NEWCASTLE, NSW, 2300 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P24462 - Pre Trial Extension** |
| **Number of Samples** | 8 Sediment |
| **Date samples received** | 24/06/2026 |
| **Date completed instructions received** | 24/06/2026 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

## Report Details

| | |
|---|---|
| **Date results requested by** | 01/07/2026 |
| **Date of Issue** | 01/07/2026 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Results Approved By**
Jenny He, Inorganic Team Leader

**Authorised By**
Nancy Zhang, Laboratory Manager

| SCr | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-A-1 | 411804-A-2 | 411804-A-3 | 411804-A-4 | 411804-A-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Chromium Reducible Sulfur | %w/w | 0.08 | 0.06 | 0.06 | <0.005 | <0.005 |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 47 | 40 | 37 | <3 | <3 |

| SCr | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-A-6 | 411804-A-7 | 411804-A-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Chromium Reducible Sulfur | %w/w | 0.03 | 0.04 | 0.05 |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 20 | 25 | 32 |

| Method ID | Methodology Summary |
|---|---|
| **Inorg-068** | Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition.<br><br>Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation.<br><br>There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples.<br><br>Neutralising value (NV) of 100% is assumed for liming rate.<br><br>Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.<br><br>The recommendation that the SHCl concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCl results reported only.<br>However, Envirolab/MPL adhere to the following calculation of SNAS, where a misprint in the guideline has yet to be rectified.<br>SNAS (%) = (SHCl –SKCl) x 2.0 |

| QUALITY CONTROL: SCr | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 24/06/2026 | [NT] | [NT] | [NT] | [NT] | 24/06/2026 | [NT] |
| Date analysed | - | | | 25/06/2026 | [NT] | [NT] | [NT] | [NT] | 25/06/2026 | [NT] |
| Chromium Reducible Sulfur | %w/w | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | 90 | [NT] |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 3 | Inorg-068 | <3 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |

## Result Definitions

| | |
|---|---|
| **NT** | Not tested |
| **NA** | Test not required |
| **INS** | Insufficient sample for this test |
| **PQL** | Practical Quantitation Limit |
| **<** | Less than |
| **>** | Greater than |
| **RPD** | Relative Percent Difference |
| **LCS** | Laboratory Control Sample |
| **NS** | Not specified |
| **NEPM** | National Environmental Protection Measure |
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| | |
|---|---|
| **Blank** | This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. |
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| **LCS (Laboratory Control Sample)** | This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample. |
| **Surrogate Spike** | Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples. |

## Laboratory Acceptance Criteria

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Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field).

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

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# INTERIM REPORT 411804

## Client Details

| | |
|---|---|
| **Client** | Bluecoast Consulting Engineers Pty Ltd |
| **Attention** | Tom Fallon |
| **Address** | Suite 2a, 41-45 Hunter Street,, NEWCASTLE, NSW, 2300 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P24462 - Pre Trial Extension** |
| **Number of Samples** | 8 Sediment |
| **Date samples received** | 24/06/2026 |
| **Date completed instructions received** | 24/06/2026 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 01/07/2026 |
| **Interim Report Date** | 01/07/2026 |

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| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 79 | 76 | 77 | 79 | 83 |

| Volatile TRH and BTEX (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 81 | 81 | 81 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 95 | 90 | 95 | 87 | 100 |

| Semi-Volatile TRH (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 96 | 103 | 98 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 92 | 83 | 93 | 87 | 101 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 93 | 111 | 105 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 98 | 89 | 90 | 81 | 94 |

| Organochlorine Pesticides in Sediment | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 86 | 96 | 99 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 98 | 89 | 90 | 81 | 94 |

| Organophosphorus Pesticides in Sediment | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 86 | 96 | 99 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 68 | 69 | 66 | 71 | 71 |

| PCBs in Sediment (NAGD) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date extracted | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 67 | 71 | 74 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Aluminium | mg/kg | 990 | 1,000 | 980 | 780 | 810 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 2 | 2 | 1 | 2 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 4 | 4 | 4 | 3 | 4 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 1 | 1 | 1 | <0.5 | <0.5 |
| Iron | mg/kg | 1,600 | 1,800 | 1,700 | 1,400 | 1,400 |
| Lead | mg/kg | 4 | 3 | 4 | 2 | 2 |
| Manganese | mg/kg | 35 | 36 | 35 | 34 | 36 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 1 | 1 | 1 | 0.9 | 1 |
| Selenium | mg/kg | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 5.6 | 5.1 | 5.4 | 3 | 3 |
| Zinc | mg/kg | 7.6 | 8.7 | 11 | 8.4 | 5.4 |

| NAGD Metals | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Aluminium | mg/kg | 680 | 840 | 1,000 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 1 | 1 | 2 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 3 | 4 | 4 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | <0.5 | 0.7 | 1 |
| Iron | mg/kg | 1,200 | 1,400 | 1,700 |
| Lead | mg/kg | 2 | 3 | 4 |
| Manganese | mg/kg | 35 | 38 | 39 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 0.8 | 1 | 1 |
| Selenium | mg/kg | 0.1 | 0.1 | 0.2 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 3 | 4 | 4 |
| Zinc | mg/kg | 5.2 | 6.8 | 10 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Phosphorus | mg/kg | 120 | 130 | 130 | 100 | 100 |

| Acid Extractable metals in soil | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Phosphorus | mg/kg | 100 | 120 | 120 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 95 | 101 | 99 | 95 | 99 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 98 | 100 | 97 | 91 | 100 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 84 | 84 | 88 | 82 | 86 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 91 | 89 | 85 | 87 | 89 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 90 | 89 | 93 | 90 | 92 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 81 | 89 | 87 | 82 | 83 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 81 | 85 | 84 | 81 | 82 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 77 | 83 | 85 | 78 | 79 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 93 | 97 | 94 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 98 | 97 | 100 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 89 | 88 | 94 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 97 | 91 | 95 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 99 | 98 | 105 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 93 | 94 | 97 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 93 | 91 | 93 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 85 | 87 | 91 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| Moisture | % | 36 | 31 | 33 | 23 | 24 |

| Moisture | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 27/06/2026 | 27/06/2026 | 27/06/2026 |
| Moisture | % | 24 | 26 | 28 |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Medium Gravel 4.75-9.5mm | % | | | | | |
| Fine Gravel 2.36-4.75mm | % | | | | | |
| Very Coarse Sand 1.18-2.36mm | % | | | | | |
| Coarse Sand 0.6-1.18mm | % | | | | | |
| Medium Sand 0.425-0.6mm | % | | | | | |
| Medium Sand 0.3-0.425mm | % | | | | | |
| Medium Sand 0.25-0.3mm | % | | | | | |
| Medium Sand 0.212-0.25mm | % | | | | | |
| Fine Sand 0.15-0.212mm | % | | | | | |
| Fine Sand 0.125-0.15mm | % | | | | | |
| Very Fine Sand 0.075-0.125mm | % | | | | | |

| Particle Size Distribution in Soils | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | | | |
| Date analysed | - | | | |
| Medium Gravel 4.75-9.5mm | % | | | |
| Fine Gravel 2.36-4.75mm | % | | | |
| Very Coarse Sand 1.18-2.36mm | % | | | |
| Coarse Sand 0.6-1.18mm | % | | | |
| Medium Sand 0.425-0.6mm | % | | | |
| Medium Sand 0.3-0.425mm | % | | | |
| Medium Sand 0.25-0.3mm | % | | | |
| Medium Sand 0.212-0.25mm | % | | | |
| Fine Sand 0.15-0.212mm | % | | | |
| Fine Sand 0.125-0.15mm | % | | | |
| Very Fine Sand 0.075-0.125mm | % | | | |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | | | | | |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | | | | | |
| Clay in soils <2µm | % (w/w) | | | | | |

| Particle Size Analysis | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | | | |
| Date analysed | - | | | |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | | | |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | | | |
| Clay in soils <2µm | % (w/w) | | | |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 3,500 | 1,500 | 1,800 | 200 | 2,600 |
| Ammonia as N in soil | mg/kg | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 520 | 260 | 290 | 240 | 230 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 520 | 260 | 290 | 240 | 230 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.05 | 0.04 | 0.04 | 0.04 | 0.55 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 1,100 | 1,100 | 1,500 | 850 | 1,200 |
| Sulfide Sulfur by calculation* | % | 0.02 | <0.01 | <0.01 | 0.01 | 0.51 |

| TOC_NAGA | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 400 | 1,100 | 1,300 |
| Ammonia as N in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 240 | 290 | 450 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 230 | 280 | 450 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.04 | 0.06 | 0.07 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 900 | 1,300 | 1,200 |
| Sulfide Sulfur by calculation* | % | 0.01 | 0.01 | 0.04 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 520 | 260 | 290 | 240 | 230 |

| Total Kjeldahl Nitrogen (TKN) | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 240 | 280 | 450 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| pH $_{kcl}$ | pH units | 9.5 | 9.6 | 9.7 | 9.8 | 9.7 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 58 | <5 | 46 | 32 | 32 |
| $S_{POS}$ | %w/w | 0.09 | <0.005 | 0.07 | 0.05 | 0.05 |
| $S_P$ | %w/w | 0.12 | 0.07 | 0.11 | 0.08 | 0.07 |
| $S_{KCl}$ | %w/w S | 0.029 | 0.067 | 0.033 | 0.033 | 0.023 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 15 | 17 | 14 | 13 | 13 |
| s-$ANC_{BT}$ | %w/w S | 4.8 | 5.4 | 4.4 | 4.3 | 4.3 |
| s-Net Acidity excluding ANC | %w/w S | 0.093 | <0.005 | 0.073 | 0.052 | 0.051 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 58 | <5 | 46 | 32 | 32 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 4.3 | <0.75 | 3.4 | 2.4 | 2.4 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| pH $_{kcl}$ | pH units | 9.7 | 9.6 | 9.7 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 32 | 29 | 35 |
| $S_{POS}$ | %w/w | 0.05 | 0.05 | 0.06 |
| $S_P$ | %w/w | 0.07 | 0.07 | 0.09 |
| $S_{KCl}$ | %w/w S | 0.018 | 0.027 | 0.036 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 14 | 13 | 14 |
| s-$ANC_{BT}$ | %w/w S | 4.4 | 4.2 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.051 | 0.046 | 0.056 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 32 | 29 | 35 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 2.4 | 2.1 | 2.6 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Acid Volatile Sulphide | µmole/g dry weight | | | | | |
| Aluminium | µmole/g dry weight | | 1,000 | | | 810 |
| Antimony | µmole/g dry weight | 0.2 | 0.1 | 0.2 | <0.05 | 0.05 |
| Arsenic | µmole/g dry weight | | | | | |
| Cadmium | µmole/g dry weight | | | | | |
| Chromium | µmole/g dry weight | | | | | |
| Cobalt | µmole/g dry weight | | | | | |
| Copper | µmole/g dry weight | | | | | |
| Iron | µmole/g dry weight | | | | | |
| Lead | µmole/g dry weight | | | | | |
| Manganese | µmole/g dry weight | | | | | |
| Mercury | µmole/g dry weight | | | | | |
| Nickel | µmole/g dry weight | | | | | |
| Selenium | µmole/g dry weight | | | | | |
| Silver | µmole/g dry weight | | 0.03 | | | 0.03 |
| Vanadium | µmole/g dry weight | 6 | 5 | 5 | 3 | 3 |
| Zinc | µmole/g dry weight | | | | | |
| Total SEM | µmole/g dry weight | | | | | |
| SEM/AVS ratio | - | | | | | |

| AVS/SEM | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | | | |
| Date analysed | - | | | |
| Acid Volatile Sulphide | µmole/g dry weight | | | |
| Aluminium | µmole/g dry weight | | | 1,000 |
| Antimony | µmole/g dry weight | <0.05 | 0.07 | 0.1 |
| Arsenic | µmole/g dry weight | | | |
| Cadmium | µmole/g dry weight | | | |
| Chromium | µmole/g dry weight | | | |
| Cobalt | µmole/g dry weight | | | |
| Copper | µmole/g dry weight | | | |
| Iron | µmole/g dry weight | | | |
| Lead | µmole/g dry weight | | | |
| Manganese | µmole/g dry weight | | | |
| Mercury | µmole/g dry weight | | | |
| Nickel | µmole/g dry weight | | | |
| Selenium | µmole/g dry weight | | | |
| Silver | µmole/g dry weight | | | 0.03 |
| Vanadium | µmole/g dry weight | 3 | 4 | 4 |
| Zinc | µmole/g dry weight | | | |
| Total SEM | µmole/g dry weight | | | |
| SEM/AVS ratio | - | | | |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411804-1 | 411804-2 | 411804-3 | 411804-4 | 411804-5 |
| Your Reference | UNITS | NH1 | NH2-A | NH2-B | NH8 | NH9 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Monobutyltin as Sn | µg/kg | <100 | <100 | <200 | <20 | <20 |
| Dibutyltin as Sn | µg/kg | <2.5 | <2.5 | <5 | <0.5 | <1 |
| Tributyltin as Sn | µg/kg | <2.5 | <2.5 | <5 | <0.5 | <0.5 |
| Surrogate Triphenyltin | % | 102 | 113 | 98 | 101 | 102 |

| Organotin Compunds in Soil | | | | |
|---|---|---|---|---|
| Our Reference | | 411804-6 | 411804-7 | 411804-8 |
| Your Reference | UNITS | NH10 | NH11 | NH12 |
| Type of sample | | Sediment | Sediment | Sediment |
| Date prepared | - | 29/06/2026 | 29/06/2026 | 29/06/2026 |
| Date analysed | - | 30/06/2026 | 30/06/2026 | 30/06/2026 |
| Monobutyltin as Sn | µg/kg | <20 | <20 | <40 |
| Dibutyltin as Sn | µg/kg | <1 | <0.5 | <2 |
| Tributyltin as Sn | µg/kg | <0.5 | <0.5 | <1 |
| Surrogate Triphenyltin | % | 96 | 102 | 79 |

| Method ID | Methodology Summary |
|---|---|
| **AVS-SEM** | Determination of Acid Volatile Sulfide (AVS) and Simultaneously Extractable Metals (SEM)/Bioavailable Metals in sediment - determined colourimetrically and using ICP-OES/ICP-MS and cold vapour-AAS. |
| **Ext-054** | Analysed by MPL Envirolab |
| **Inorg-008** | Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours. |
| **Inorg-055** | Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-055** | Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-057** | Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction. |
| **Inorg-060** | Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-062** | TKN - determined colourimetrically based on APHA latest edition 4500 Norg. Alternatively, TKN can be derived from calculation (Total N - NOx). |

| Method ID | Methodology Summary |
|---|---|
| **Inorg-068** | Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition.<br><br>Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation.<br><br>There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples.<br><br>Neutralising value (NV) of 100% is assumed for liming rate.<br><br>Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.<br><br>The recommendation that the SHCl concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCl results reported only.<br>However, Envirolab/MPL adhere to the following calculation of SNAS, where a misprint in the guideline has yet to be rectified.<br>SNAS (%) = (SHCl –SKCl) x 2.0 |
| **Inorg-081** | Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.<br>Alternatively determined by colourimetry/turbidity using Discrete Analyser. |
| **INORG-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. Clay fraction at <2µm reported. |
| **Inorg-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. |
| **INORG-124** | Sulfide is determined after distillation by titration and/or colourimetrically. |
| **INORG-137** | Total Carbon Nitrogen Sulfur by high temperature catalytic combustion with IR detection.<br><br>Total Nitrogen may also be determine from TKN+NOx by calculation. |
| **Metals-020** | Determination of various metals/elements by ICP-AES.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.<br><br>Where molecular anion forms are calculated from an element (e.g. SO4 from S or PO4 from P stoichiometrically), the assumption is that the element is only present in that molecular anion form.<br><br>Submission of low masses of sample e.g. for dust samples, may result in raised PQLs. |
| **Metals-021** | Determination of Mercury by Cold Vapour AAS. |
| **Metals-022** | Determination of various metals by ICP-MS.<br><br>Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation. |
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. |

| Method ID | Methodology Summary |
|---|---|
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br><br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.<br><br>Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40). |
| **Org-022/025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.<br>For soil results:-<br>1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present.<br>2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL.<br>3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above.<br><br>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.<br>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes. |
| **Org-025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MSMS. |

| Method ID | Methodology Summary |
|---|---|
| **Org-029** | Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.<br><br>Analysis is undertaken with LC-MS/MS.<br><br>PFAS results include the sum of branched and linear isomers where applicable.<br><br>Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.<br><br>Note, the Total +ve PFAS PQL is reflective of the lowest individual PQL and is therefore "Total +ve PFAS" is simply a sum of the positive individual PFASs (or a described sub-set).<br><br>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER. |

| QUALITY CONTROL: Volatile TRH and BTEX (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 103 | 87 |
| TRH $C_6$ - $C_{10}$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 103 | 87 |
| Benzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 104 | 88 |
| Toluene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 92 | 77 |
| Ethylbenzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 107 | 90 |
| m+p-xylene | mg/kg | 0.4 | Org-023 | <0.4 | 1 | <0.4 | <0.4 | 0 | 106 | 89 |
| o-Xylene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 109 | 93 |
| Naphthalene | mg/kg | 1 | Org-023 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| *Surrogate* aaa-Trifluorotoluene | % | | Org-023 | 92 | 1 | 79 | 71 | 11 | 93 | 79 |

| QUALITY CONTROL: Semi-Volatile TRH (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 27/06/2026 | 1 | 27/06/2026 | 27/06/2026 | | 27/06/2026 | 27/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 123 | 107 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 102 | 95 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 109 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 123 | 107 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 102 | 95 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 109 |
| *Surrogate* o-Terphenyl | % | | Org-020 | 99 | 1 | 95 | 107 | 12 | 102 | 98 |

| QUALITY CONTROL: Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Naphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 82 | 103 |
| 2-Methylnaphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 86 | 110 |
| Fluorene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 86 | 106 |
| Phenanthrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 88 | 112 |
| Anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Fluoranthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 90 | 119 |
| Pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 92 | 115 |
| Benz(a)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Chrysene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 88 | 114 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | 10 | Org-022/025 | <10 | 1 | <10 | <10 | 0 | [NT] | [NT] |
| Benzo(e)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(a)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 84 | 119 |
| Perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Indeno(1,2,3-cd)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Dibenz(a,h)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(g,h,i)perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Coronene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate p*-Terphenyl-d14 | % | | Org-022/025 | 108 | 1 | 92 | 113 | 20 | 94 | 109 |

| QUALITY CONTROL: Organochlorine Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| alpha-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 90 | 105 |
| Hexachlorobenzene | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| beta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 86 | 111 |
| gamma-BHC (Lindane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| delta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 84 | 107 |
| Aldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 88 | 109 |
| Oxychlordane | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor Epoxide | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 96 | 109 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| alpha-Chlordane (cis-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan I | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDE (p,p-DDE) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 103 |
| Dieldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 109 |
| Endrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 118 |
| 4,4'-DDD (p,p-DDD) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 100 | 112 |
| Endosulfan II | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDT (p,p-DDT) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan Sulphate | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 92 | 98 |
| Methoxychlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 122 | 1 | 98 | 123 | 23 | 105 | 107 |

| QUALITY CONTROL: Organophosphorus Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Dichlorvos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 82 | 103 |
| Dimethoate | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Diazinon | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyrifos-methyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ronnel | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 90 | 111 |
| Fenitrothion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 96 | 114 |
| Malathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 92 | 114 |
| Chlorpyriphos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 86 | 114 |
| Parathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 94 | 113 |
| Bromophos-ethyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ethion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 70 | 117 |
| Azinphos-methyl (Guthion) | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 122 | 1 | 98 | 123 | 23 | 105 | 107 |

| QUALITY CONTROL: PCBs in Sediment (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-3 | 411804-3 |
| Date extracted | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Total PCBs | µg/kg | 5 | Org-025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate* 2-Fluorobiphenyl | % | | Org-025 | 78 | 1 | 68 | 74 | 8 | 125 | 103 |

| QUALITY CONTROL: NAGD Metals | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-3 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Aluminium | mg/kg | 10 | Metals-020 | <10 | 1 | 990 | 1100 | 11 | 102 | # |
| Antimony - Low Level | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 102 | 94 |
| Arsenic | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 2 | 2 | 0 | 97 | 96 |
| Cadmium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 102 | 107 |
| Chromium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 4 | 4 | 0 | 100 | 90 |
| Cobalt | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 101 | 87 |
| Copper | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 1 | 1 | 0 | 101 | 107 |
| Iron | mg/kg | 10 | Metals-020 | <10 | 1 | 1600 | 1800 | 12 | 100 | # |
| Lead | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 4 | 4 | 0 | 100 | 88 |
| Manganese | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 35 | 40 | 13 | 105 | 93 |
| Mercury | mg/kg | 0.01 | Metals-021 | <0.01 | 1 | <0.01 | <0.01 | 0 | 120 | 100 |
| Nickel | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 1 | 1 | 0 | 101 | 86 |
| Selenium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | 0.2 | 0.2 | 0 | 98 | 94 |
| Silver | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 93 | 113 |
| Vanadium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 5.6 | 5.8 | 4 | 93 | 115 |
| Zinc | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 7.6 | 8.3 | 9 | 98 | 99 |

| QUALITY CONTROL: Acid Extractable metals in soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-3 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | 29/06/2026 |
| Phosphorus | mg/kg | 10 | Metals-020 | <10 | 1 | 120 | 130 | 8 | 104 | 90 |

| QUALITY CONTROL: PFAS in Soils Short | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | [NT] |
| Date analysed | - | | | 30/06/2026 | 1 | 30/06/2026 | 30/06/2026 | | 30/06/2026 | [NT] |
| Perfluorobutanesulfonic acid | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 94 | [NT] |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 103 | [NT] |
| Perfluorooctanesulfonic acid PFOS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 96 | [NT] |
| Perfluorooctanoic acid PFOA | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 90 | [NT] |
| 6:2 FTS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 91 | [NT] |
| 8:2 FTS | µg/kg | 0.2 | Org-029 | <0.2 | 1 | <0.2 | <0.2 | 0 | 92 | [NT] |
| *Surrogate* $^{13}C_8$ *PFOS* | % | | Org-029 | 97 | 1 | 95 | 99 | 4 | 94 | [NT] |
| *Surrogate* $^{13}C_2$ *PFOA* | % | | Org-029 | 102 | 1 | 98 | 102 | 4 | 101 | [NT] |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | | Org-029 | 101 | 1 | 84 | 84 | 0 | 99 | [NT] |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | | Org-029 | 100 | 1 | 91 | 87 | 4 | 100 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | | Org-029 | 105 | 1 | 90 | 91 | 1 | 105 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | | Org-029 | 97 | 1 | 81 | 81 | 0 | 93 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | | Org-029 | 103 | 1 | 81 | 86 | 6 | 100 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | | Org-029 | 95 | 1 | 77 | 75 | 3 | 98 | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | <100 | 1 | 3500 | 3300 | 6 | 100 | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | <0.5 | 1 | 0.7 | 0.7 | 0 | 105 | 88 |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 95 | 87 |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | <0.1 | 1 | <0.1 | <0.1 | 0 | 100 | 99 |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | <10 | 1 | 520 | 640 | 21 | 108 | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 95 | 87 |
| Organic Nitrogen as N | mg/kg | 10 | | <10 | 1 | 520 | 640 | 21 | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | <0.5 | 1 | <0.5 | <0.5 | 0 | 103 | 94 |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | <0.01 | 1 | 0.05 | 0.05 | 0 | 80 | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | <10 | 1 | 1100 | [NT] | | 106 | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | <0.01 | 1 | 0.02 | [NT] | | [NT] | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 6 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 6 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | [NT] | 6 | 400 | [NT] | | [NT] | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | [NT] | 6 | <0.1 | [NT] | | [NT] | [NT] |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | [NT] | 6 | 240 | [NT] | | [NT] | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Organic Nitrogen as N | mg/kg | 10 | | [NT] | 6 | 230 | [NT] | | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | [NT] | 6 | <0.5 | [NT] | | [NT] | [NT] |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | [NT] | 6 | 0.04 | [NT] | | [NT] | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | [NT] | 6 | 900 | 870 | 3 | [NT] | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | [NT] | 6 | 0.01 | [NT] | | [NT] | [NT] |

| QUALITY CONTROL: Total Kjeldahl Nitrogen (TKN) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411804-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 26/06/2026 | 26/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 10 | Inorg-062 | <10 | 1 | 520 | 640 | 21 | [NT] | [NT] |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 24/06/2026 | [NT] | [NT] | [NT] | [NT] | 24/06/2026 | [NT] |
| Date analysed | - | | | 25/06/2026 | [NT] | [NT] | [NT] | [NT] | 25/06/2026 | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | [NT] | [NT] | [NT] | [NT] | 98 | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | <0.01 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | 102 | [NT] |
| a-$S_{POS}$ | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{POS}$ | %w/w | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_P$ | %w/w | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{KCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | <0.05 | [NT] | [NT] | [NT] | [NT] | 97 | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | <0.05 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | [NT] | [NT] | [NT] | [NT] | [NT] | [NT] |

| QUALITY CONTROL: Organotin Compunds in Soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 29/06/2026 | 1 | 29/06/2026 | 29/06/2026 | | 29/06/2026 | [NT] |
| Date analysed | - | | | 30/06/2026 | 1 | 30/06/2026 | 30/06/2026 | | 30/06/2026 | [NT] |
| Monobutyltin as Sn | µg/kg | 20 | Ext-054 | <20 | 1 | <100 | <100 | 0 | [NT] | [NT] |
| Dibutyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <2.5 | <2.5 | 0 | 73 | [NT] |
| Tributyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <2.5 | <2.5 | 0 | 98 | [NT] |
| Surrogate Triphenyltin | % | | Ext-054 | 101 | 1 | 102 | 101 | 1 | 102 | [NT] |

## Result Definitions

| | |
|---|---|
| **NT** | Not tested |
| **NA** | Test not required |
| **INS** | Insufficient sample for this test |
| **PQL** | Practical Quantitation Limit |
| **<** | Less than |
| **>** | Greater than |
| **RPD** | Relative Percent Difference |
| **LCS** | Laboratory Control Sample |
| **NS** | Not specified |
| **NEPM** | National Environmental Protection Measure |
| **NR** | Not Reported |

## Quality Control Definitions

| | |
|---|---|
| **Blank** | This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. |
| **Duplicate** | This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable. |
| **Matrix Spike** | A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. |
| **LCS (Laboratory Control Sample)** | This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample. |
| **Surrogate Spike** | Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples. |

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field).

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

## Report Comments

8 metals in soil - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Organotins analysed by MPL Laboratories. Report no. PHF1945.
-PQL(s) has/have been raised due to interferences from analytes (other than those being tested) in sample.
-PQL(s) has/have been raised due to suppression of the extracted internal standard.

# CHAIN OF CUSTODY FORM - Client

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**ENVIROLAB GROUP**
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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au


| | | | |
|---|---|---|---|
| Company: | Bluecoast Consulting Engineers | Client Project Name/Number/Site etc (ie report title): | P24462 - PreTrialExtension |
| Contact Person: | Tom Fallon | | |
| Project Mgr: | Tom Fallon | PO No. (if applicable): | |
| Sampler: | Tom Fallon | Envirolab Quote No.: | 25SA131v3 |
| Address: | 2a, 41-45 Hunter St, Newcastle NSW 2300 | Date results required: Or choose: | ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day |
| Phone: | Mob: 0405669537 | Note: Inform lab in advance if urgent turnaround is required - surcharges apply | |
| Email Results to: | tom@bcoast.com.au | Additional report format: | ☐ Esdat ☐ Equis |
| Email Invoice to: | Felicity.Beswick@sa.gov.au | Lab Comments: - PSD seiving to include seive sizes 9.5, 4.75, 2.36, 1.18, 0.60, 0.425, 0.30, 0.25, 0.212, 0.15, 0.125,0.075mm - Metals to include: Aluminium, Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Vanadium, Zinc | |

| Sample Information | | | | | Tests Required | | | | | | | | | | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Envirolab Sample ID (Lab use only) | Client Sample ID or Information | Depth | Date Sampled | Type of Sample | Particle Size Distribution (PSD)– DEW Suite sieving + hydrometer | Carbon - Total Organic (TOC) Combustion (NAGD) | NAGD Level Recoverable Metals ICP-MS / CV-AAS | MBT, DBT, TBT-as Sn | TRH (Incl NEPM Fractions) – Low Level | BTEX – Low Level | Pesticides, Herbicides and Chlorinated Organics | PFAS Short Suite | AVS/SEM - Acid Volatile Sulfide + Total SEM (NAGD 16 Metals) | Chromium Reducible Sulfur (SCR) Suite (AS 4969/ASSMAC) | Sulphide Sulphur by calculation | SPOCAS suite | Nutrient suite | | | | | Provide as much information about the sample as you can |
| 1 | WB1 | | 17.6.26 | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 2 | WB2 | | ↓ | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 3 | WB3 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 4 | WB4 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 5 | WB5 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 6 | WB6 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 7 | HS1 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 8 | HS2 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 9 | HS3 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 10 | HS4 | | ↓ | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

| Relinquished by | Client | Interstate Office | Laboratory | Lab Use Only | |
|---|---|---|---|---|---|
| Print Name: | LUKE JONES | ELS ADL | ELS SYD Anna. V6 | Job number: 411426 | Office Cooling: Ice / Ice pack / None |
| Date & Time: | 180626 | 18/6/26 12pm | 19/6/26 0910 | Temp Office: 3-4°C Temp Lab: 10 | Lab Cooling: Ice / Ice pack / None |
| Signature: | | OD | | TAT: SAME day / 1 / 2 / 3 / 4 STD | Security seal: Intact / Broken / None |

# CHAIN OF CUSTODY FORM - Client

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| | |
|---|---|
| Company: | Bluecoast Consulting Engineers |
| Contact Person: | Tom Fallon |
| Project Mgr: | Tom Fallon |
| Sampler: | Tom Fallon |
| Address: | 2a, 41-45 Hunter St, Newcastle NSW 2300 |
| Phone: | Mob: 0405669537 |
| Email Results to: | tom@bcoast.com.au |
| Email Invoice to: | Felicity.Beswick@sa.gov.au |

Client Project Name/Number/Site etc (ie report title): P24462 - PreTrialExtension

PO No. (if applicable):

Envirolab Quote No.: 25SA131v3

Date results required: Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*

Additional report format: ☐ Esdat ☐ Equis

Lab Comments:
- PSD seiving to include seive sizes 9.5, 4.75, 2.36, 1.18, 0.60, 0.425, 0.30, 0.25, 0.212, 0.15, 0.125,0.075mm
- Metals to include: Aluminium, Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Vanadium, Zinc
-


**ENVIROLAB GROUP**
National phone number 1300 424 344

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16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

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25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au


| Envirolab Sample ID (Lab use only) | Client Sample ID or Information | Depth | Date Sampled | Type of Sample | Particle Size Distribution (PSD)– DEW Suite sieving + hydrometer | Carbon - Total Organic (TOC) Combustion (NAGD) | NAGD Level Recoverable Metals ICP-MS / CV-AAS | MBT, DBT, TBT as Sn | TRH (Incl NEPM Fractions) – Low Level | BTEX – Low Level | Pesticides, Herbicides and Chlorinated Organics | PFAS Short Suite | AVS/SEM - Acid Volatile Sulfide + Total SEM (NAGD 16 Metals) | Chromium Reducible Sulfur (SCR) Suite (AS 4969/ASSMAC) | Sulphide Sulphur by calculation | SPOCAS suite | Nutrient suite | | | | | Comments: Provide as much information about the sample as you can |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~11~~ NR | NH1 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~12~~ NR | NH2 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~13~~ 11 | NH3 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~14~~ 12 | NH4 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~15~~ 13 | NH5 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~16~~ 14 | NH6 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~17~~ 15 | NH7 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~18~~ NR | NH8 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~19~~ NR | NH9 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~20~~ NR | NH10 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| ~~21~~ NR | NH11 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| NR | NH12 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 16 | NH13 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 17 | NH14 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 18 | NH15 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |
| 19 | NH16 | | | Sediment | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | marine sediment sample |

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

| Relinquished by | Client | Interstate Office | Laboratory |
|---|---|---|---|
| Print Name: | | ELS ADL | Anna Vo |
| Date & Time: | | 18/06/26 4.40pm | 19/6/26 0910 |
| Signature: | | OD. | |

*Lab Use Only*

| | |
|---|---|
| Job number: 411426 | Office Cooling: Ice / Ice pack / None |
| Temp Office: 8°C Temp Lab: 10 | Lab Cooling: Ice / Ice pack / None |
| TAT: SAME day / 1 / 2 / 3 / 4 / STD | Security seal: Intact / Broken / None |

**Envirolab Services Pty Ltd**
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# CERTIFICATE OF ANALYSIS 411426

## Client Details

| | |
|---|---|
| **Client** | Bluecoast Consulting Engineers Pty Ltd |
| **Attention** | Tom Fallon |
| **Address** | Suite 2a, 41-45 Hunter Street,, NEWCASTLE, NSW, 2300 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P24462 - Pre Trial Extension** |
| **Number of Samples** | 19 Sediment |
| **Date samples received** | 19/06/2026 |
| **Date completed instructions received** | 19/06/2026 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 26/06/2026 |
| **Date of Issue** | 03/07/2026 |

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**Results Approved By**
Dragana Tomas, Senior Chemist
Jack Wallis, Senior Chemist
Jenny He, Inorganic Team Leader
Larry Ye, Senior Chemist
Nick Sarlamis, Quality & Compliance Coordinator
Sally Chen, Metals prep team leader
Sean McAlary, Team Lead - LC
Steven Luong, Senior Chemist
Timothy Toll, Senior Chemist

**Authorised By**
Nancy Zhang, Laboratory Manager

| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 96 | 97 | 83 | 98 | 98 |

| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 104 | 91 | 84 | 87 | 100 |

| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 96 | 95 | 94 | 86 | 97 |

| Volatile TRH and BTEX (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 93 | 101 | 100 | 100 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 90 | 88 | 92 | 90 | 102 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 89 | 93 | 93 | 100 | 92 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 95 | 96 | 91 | 96 | 93 |

| Semi-Volatile TRH (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 93 | 97 | 90 | 92 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 81 | 86 | 82 | 80 | 85 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 78 | 81 | 82 | 95 | 83 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 81 | 96 | 93 | 105 | 85 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 84 | 89 | 80 | 84 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 95 | 80 | 105 | 98 | 101 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 99 | 91 | 90 | 110 | 91 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 89 | 103 | 86 | 104 | 83 |

| Organochlorine Pesticides in Sediment | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 87 | 94 | 81 | 81 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 95 | 80 | 105 | 98 | 101 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 99 | 91 | 90 | 110 | 91 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 89 | 103 | 86 | 104 | 83 |

| Organophosphorus Pesticides in Sediment | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 87 | 94 | 81 | 81 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 68 | 64 | 70 | 69 | 75 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 70 | 71 | 69 | 76 | 71 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 68 | 65 | 70 | 67 | 73 |

| PCBs in Sediment (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 62 | 78 | 69 | 61 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 470 | 470 | 480 | 650 | 720 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 1 | 1 | 3 | 2 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 2 | 2 | 2 | 3 | 3 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 |
| Iron | mg/kg | 1,200 | 1,100 | 1,200 | 1,800 | 1,800 |
| Lead | mg/kg | 1 | 1 | 1 | 0.8 | 2 |
| Manganese | mg/kg | 23 | 25 | 24 | 38 | 30 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 0.9 | 0.7 | 0.7 | 1 | 1 |
| Selenium | mg/kg | 0.1 | <0.1 | 0.1 | 0.1 | 0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 3 | 3 | 3 | 5.7 | 4 |
| Zinc | mg/kg | 3 | 8.6 | 4 | 2 | 5 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 670 | 360 | 410 | 580 | 340 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 1 | 1 | 1 | 2 | 1 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 3 | 2 | 2 | 3 | 2 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 |
| Iron | mg/kg | 1,600 | 910 | 1,100 | 1,400 | 940 |
| Lead | mg/kg | 2 | 1 | 2 | 2 | 1 |
| Manganese | mg/kg | 28 | 21 | 20 | 30 | 18 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 1 | 0.7 | 0.7 | 1 | 0.6 |
| Selenium | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 4 | 2 | 2 | 3 | 2 |
| Zinc | mg/kg | 5.3 | 3 | 4 | 5 | 3 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 1,000 | 1,100 | 870 | 700 | 680 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 2 | 2 | 1 | 1 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 5 | 5 | 4 | 3 | 3 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 0.9 | 0.8 | 0.7 | 0.5 | <0.5 |
| Iron | mg/kg | 1,900 | 2,100 | 1,600 | 1,300 | 1,300 |
| Lead | mg/kg | 3 | 3 | 2 | 2 | 2 |
| Manganese | mg/kg | 39 | 44 | 34 | 35 | 36 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 2 | 2 | 1 | 1 | 1 |
| Selenium | mg/kg | 0.2 | 0.1 | <0.1 | <0.1 | <0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 5.5 | 5.2 | 4 | 3 | 3 |
| Zinc | mg/kg | 7.5 | 9.0 | 5.2 | 7.5 | 5 |

| NAGD Metals | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 1,100 | 1,200 | 670 | 740 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 3 | 1 | 1 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 5 | 5.3 | 3 | 3 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 0.7 | 0.8 | <0.5 | <0.5 |
| Iron | mg/kg | 2,000 | 2,300 | 1,300 | 1,400 |
| Lead | mg/kg | 3 | 3 | 2 | 2 |
| Manganese | mg/kg | 45 | 49 | 35 | 34 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 1 | 2 | 1 | 1 |
| Selenium | mg/kg | 0.1 | 0.1 | <0.1 | <0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 5 | 6.0 | 3 | 3 |
| Zinc | mg/kg | 18 | 7.6 | 4 | 4 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 70 | 60 | 60 | 70 | 90 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 90 | 50 | 60 | 80 | 60 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 140 | 140 | 110 | 100 | 100 |

| Acid Extractable metals in soil | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 150 | 170 | 110 | 100 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 95 | 103 | 96 | 101 | 97 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 99 | 106 | 100 | 110 | 116 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 92 | 98 | 94 | 91 | 96 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 85 | 88 | 88 | 84 | 87 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 86 | 87 | 90 | 85 | 89 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 86 | 86 | 88 | 81 | 76 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 59 | 63 | 59 | 62 | 59 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 69 | 81 | 69 | 70 | 70 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 98 | 102 | 100 | 98 | 94 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 104 | 108 | 104 | 99 | 105 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 95 | 95 | 101 | 96 | 97 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 86 | 87 | 87 | 87 | 90 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 89 | 87 | 91 | 88 | 90 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 87 | 88 | 85 | 91 | 87 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 62 | 60 | 62 | 61 | 65 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 75 | 73 | 83 | 75 | 78 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 98 | 99 | 102 | 102 | 103 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 112 | 104 | 105 | 107 | 102 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 96 | 96 | 98 | 92 | 97 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 88 | 87 | 83 | 92 | 89 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 90 | 87 | 86 | 87 | 87 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 82 | 85 | 90 | 91 | 93 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 58 | 60 | 62 | 63 | 71 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 74 | 72 | 75 | 70 | 83 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 96 | 105 | 99 | 104 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 103 | 108 | 98 | 105 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 99 | 93 | 99 | 105 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 88 | 82 | 91 | 96 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 89 | 85 | 92 | 93 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 87 | 80 | 93 | 95 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 72 | 67 | 71 | 73 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 86 | 80 | 85 | 87 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 19 | 18 | 21 | 12 | 22 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 28 | 20 | 19 | 24 | 20 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 28 | 26 | 21 | 22 | 21 |

| Moisture | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 28 | 29 | 21 | 19 |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Medium Gravel 4.75-9.5mm | % | <1 | <1 | <1 | 6 | <1 |
| Fine Gravel 2.36-4.75mm | % | 1 | <1 | <1 | 6 | 4 |
| Very Coarse Sand 1.18-2.36mm | % | 2 | <1 | 5 | 6 | 5 |
| Coarse Sand 0.6-1.18mm | % | 2 | <1 | <1 | 6 | 5 |
| Medium Sand 0.425-0.6mm | % | 2 | <1 | <1 | 6 | 4 |
| Medium Sand 0.3-0.425mm | % | 8 | 1 | 2 | <1 | <1 |
| Medium Sand 0.25-0.3mm | % | 8 | 6 | 8 | 3 | 3 |
| Medium Sand 0.212-0.25mm | % | 14 | 13 | 15 | 7 | 5 |
| Fine Sand 0.15-0.212mm | % | 16 | 2 | 15 | 10 | 8 |
| Fine Sand 0.125-0.15mm | % | 14 | 49 | 12 | 17 | 8 |
| Very Fine Sand 0.075-0.125mm | % | 25 | 22 | 39 | 20 | 52 |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Medium Gravel 4.75-9.5mm | % | <1 | <1 | <1 | <1 | <1 |
| Fine Gravel 2.36-4.75mm | % | 5 | 1 | <1 | <1 | <1 |
| Very Coarse Sand 1.18-2.36mm | % | 5 | <1 | <1 | <1 | <1 |
| Coarse Sand 0.6-1.18mm | % | 5 | 1 | 1 | <1 | 2 |
| Medium Sand 0.425-0.6mm | % | 5 | 6 | 2 | <1 | <1 |
| Medium Sand 0.3-0.425mm | % | <1 | 4 | 4 | 3 | <1 |
| Medium Sand 0.25-0.3mm | % | 2 | 5 | 4 | 2 | 5 |
| Medium Sand 0.212-0.25mm | % | 5 | 12 | 10 | 2 | 12 |
| Fine Sand 0.15-0.212mm | % | 14 | 17 | 12 | 12 | 16 |
| Fine Sand 0.125-0.15mm | % | 23 | 29 | 22 | 20 | 18 |
| Very Fine Sand 0.075-0.125mm | % | 31 | 23 | 38 | 51 | 39 |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Medium Gravel 4.75-9.5mm | % | <1 | <1 | <1 | <1 | <1 |
| Fine Gravel 2.36-4.75mm | % | <1 | <1 | <1 | <1 | <1 |
| Very Coarse Sand 1.18-2.36mm | % | <1 | <1 | <1 | <1 | <1 |
| Coarse Sand 0.6-1.18mm | % | <1 | <1 | <1 | <1 | <1 |
| Medium Sand 0.425-0.6mm | % | <1 | <1 | <1 | <1 | <1 |
| Medium Sand 0.3-0.425mm | % | 1 | <1 | <1 | <1 | <1 |
| Medium Sand 0.25-0.3mm | % | <1 | 2 | <1 | 2 | <1 |
| Medium Sand 0.212-0.25mm | % | 8 | 6 | 5 | 5 | 1 |
| Fine Sand 0.15-0.212mm | % | 6 | 10 | 5 | 6 | 9 |
| Fine Sand 0.125-0.15mm | % | 14 | 20 | 25 | 5 | 10 |
| Very Fine Sand 0.075-0.125mm | % | 64 | 51 | 60 | 76 | 70 |

| Particle Size Distribution in Soils | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Medium Gravel 4.75-9.5mm | % | <1 | <1 | <1 | <1 |
| Fine Gravel 2.36-4.75mm | % | <1 | <1 | <1 | <1 |
| Very Coarse Sand 1.18-2.36mm | % | <1 | <1 | <1 | <1 |
| Coarse Sand 0.6-1.18mm | % | <1 | <1 | <1 | <1 |
| Medium Sand 0.425-0.6mm | % | <1 | <1 | <1 | <1 |
| Medium Sand 0.3-0.425mm | % | <1 | <1 | <1 | <1 |
| Medium Sand 0.25-0.3mm | % | <1 | <1 | 1 | <1 |
| Medium Sand 0.212-0.25mm | % | 4 | 2 | 6 | 2 |
| Fine Sand 0.15-0.212mm | % | 6 | 11 | 4 | 5 |
| Fine Sand 0.125-0.15mm | % | 13 | 12 | 24 | 22 |
| Very Fine Sand 0.075-0.125mm | % | 63 | 63 | 60 | 63 |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | 6 | 5 | 5 | 9 | 6 |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | <1 | <1 | <1 | <1 | <1 |
| Clay in soils <2µm | % (w/w) | <1 | <1 | <1 | <1 | <1 |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | 4 | 2 | 6 | 9 | 8 |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | <1 | <1 | <1 | <1 | <1 |
| Clay in soils <2µm | % (w/w) | <1 | <1 | <1 | <1 | <1 |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | 4 | 9 | 5 | 4 | 8 |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | <1 | <1 | <1 | <1 | <1 |
| Clay in soils <2µm | % (w/w) | <1 | <1 | <1 | <1 | <1 |

| Particle Size Analysis | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 01/07/2026 | 01/07/2026 | 01/07/2026 | 01/07/2026 |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | 11 | 11 | 4 | 6 |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | <1 | <1 | <1 | <1 |
| Clay in soils <2µm | % (w/w) | <1 | <1 | <1 | <1 |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 1,100 | 1,900 | 400 | 3,000 | <100 |
| Ammonia as N in soil | mg/kg | 1.2 | <0.5 | <0.5 | 1.3 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 130 | 60 | 80 | 230 | 100 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 130 | 60 | 80 | 230 | 100 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.1 | 0.04 | 0.04 | 0.12 | 0.05 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 470 | 320 | 620 | 810 | 840 |
| Sulfide Sulfur by calculation* | % | 0.08 | 0.03 | 0.01 | 0.093 | 0.02 |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 700 | <100 | <100 | 800 | <100 |
| Ammonia as N in soil | mg/kg | 0.8 | <0.5 | <0.5 | 0.6 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 350 | 80 | 530 | 170 | 130 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 340 | 80 | 530 | 170 | 130 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.06 | 0.03 | 0.04 | 0.05 | 0.03 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 820 | 1,100 | 500 | 450 | 260 |
| Sulfide Sulfur by calculation* | % | 0.03 | <0.01 | 0.02 | 0.04 | 0.02 |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 2,300 | 2,100 | 2,400 | 600 | <100 |
| Ammonia as N in soil | mg/kg | 1.5 | 2.2 | 0.8 | 1.0 | 0.9 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 300 | 340 | 320 | 130 | 160 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 300 | 340 | 320 | 130 | 160 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.10 | 0.11 | 0.05 | 0.03 | 0.04 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 800 | 990 | 500 | 760 | 500 |
| Sulfide Sulfur by calculation* | % | 0.07 | 0.07 | 0.03 | <0.01 | 0.02 |

| TOC_NAGA | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 2,100 | 2,800 | 200 | 1,500 |
| Ammonia as N in soil | mg/kg | 2.4 | 1.3 | 0.9 | 1.0 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 270 | 320 | 250 | 210 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 270 | 320 | 250 | 210 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.06 | 0.1 | 0.06 | 0.03 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 790 | 1,100 | 700 | 620 |
| Sulfide Sulfur by calculation* | % | 0.03 | 0.06 | 0.03 | <0.01 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 130 | 60 | 80 | 230 | 100 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 340 | 80 | 530 | 170 | 130 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 300 | 340 | 320 | 130 | 160 |

| Total Kjeldahl Nitrogen (TKN) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 270 | 320 | 250 | 210 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.7 | 9.7 | 9.5 | 9.6 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 20 | <5 | <5 | 61 | 14 |
| $S_{POS}$ | %w/w | 0.03 | <0.005 | 0.005 | 0.1 | 0.02 |
| $S_P$ | %w/w | 0.06 | 0.02 | 0.02 | 0.13 | 0.05 |
| $S_{KCl}$ | %w/w S | 0.024 | 0.023 | 0.018 | 0.031 | 0.029 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 10 | 10 | 9.8 | 12 | 14 |
| s-$ANC_{BT}$ | %w/w S | 3.3 | 3.2 | 3.2 | 3.7 | 4.5 |
| s-Net Acidity excluding ANC | %w/w S | 0.031 | <0.005 | 0.0050 | 0.098 | 0.022 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 20 | <5 | <5 | 61 | 14 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 1.5 | <0.75 | <0.75 | 4.6 | 1.1 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 7 | <5 | <5 | 8 | <5 |
| $S_{POS}$ | %w/w | 0.01 | <0.005 | <0.005 | 0.01 | <0.005 |
| $S_P$ | %w/w | 0.04 | 0.02 | 0.02 | 0.03 | 0.02 |
| $S_{KCl}$ | %w/w S | 0.029 | 0.019 | 0.013 | 0.017 | 0.019 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 8.6 | 8.8 | 9.6 | 10 | 8.4 |
| s-$ANC_{BT}$ | %w/w S | 2.8 | 2.8 | 3.1 | 3.3 | 2.7 |
| s-Net Acidity excluding ANC | %w/w S | 0.011 | <0.005 | <0.005 | 0.013 | <0.005 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 6.8 | <5 | <5 | 8.2 | <5 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.5 | 9.6 | 9.6 | 9.6 | 9.5 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 20 | 16 | <5 | <5 | 19 |
| $S_{POS}$ | %w/w | 0.03 | 0.03 | <0.005 | <0.005 | 0.03 |
| $S_P$ | %w/w | 0.07 | 0.06 | 0.03 | 0.03 | 0.04 |
| $S_{KCl}$ | %w/w S | 0.036 | 0.032 | 0.032 | 0.024 | 0.007 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 16 | 14 | 13 | 12 | 14 |
| s-$ANC_{BT}$ | %w/w S | 5.0 | 4.5 | 4.2 | 3.8 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.032 | 0.026 | <0.005 | <0.005 | 0.031 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 20 | 16 | <5 | <5 | 19 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 1.5 | 1.2 | <0.75 | <0.75 | 1.4 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.6 | 9.7 | 9.4 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 11 | 23 | 12 | 11 |
| $S_{POS}$ | %w/w | 0.02 | 0.04 | 0.02 | 0.02 |
| $S_P$ | %w/w | 0.05 | 0.08 | 0.04 | 0.04 |
| $S_{KCl}$ | %w/w S | 0.035 | 0.039 | 0.018 | 0.018 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 14 | 15 | 13 | 14 |
| s-$ANC_{BT}$ | %w/w S | 4.5 | 4.7 | 4.2 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.017 | 0.036 | 0.019 | 0.018 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 11 | 23 | 12 | 11 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.80 | 1.7 | 0.91 | 0.82 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.6 | 1 | 1 | <0.5 | <0.5 |
| Aluminium | µmole/g dry weight | 3 | 2 | 3 | 5 | 3 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.04 | 0.02 | 0.02 | 0.08 | 0.04 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 3 | 3 | 3 | 3 | 4 |
| Lead | µmole/g dry weight | 0.005 | 0.006 | 0.005 | <0.005 | 0.009 |
| Manganese | µmole/g dry weight | 0.3 | 0.4 | 0.3 | 0.5 | 0.4 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.05 | <0.02 | <0.02 | 0.1 | 0.03 |
| Zinc | µmole/g dry weight | 0.05 | 0.12 | 0.05 | 0.03 | 0.12 |
| Total SEM | µmole/g dry weight | 7.2 | 6.3 | 6.5 | 8.8 | 7.8 |
| SEM/AVS ratio | - | 12 | 5.7 | 5.5 | NA | NA |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 1 | 0.5 | <0.5 | <0.5 | <0.5 |
| Aluminium | µmole/g dry weight | 3 | 2 | 2 | 2 | 2 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.04 | 0.03 | 0.07 | 0.02 | 0.02 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 5 | 3 | 3 | 2 | 3 |
| Lead | µmole/g dry weight | 0.007 | 0.006 | 0.006 | 0.005 | <0.005 |
| Manganese | µmole/g dry weight | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.03 | <0.02 | <0.02 | <0.02 | <0.02 |
| Zinc | µmole/g dry weight | 0.12 | 0.08 | 0.11 | 0.04 | 0.04 |
| Total SEM | µmole/g dry weight | 8.6 | 5.6 | 5.4 | 4.2 | 5.0 |
| SEM/AVS ratio | - | 6.8 | 11 | NA | NA | NA |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 1 | <0.5 | <0.5 | 0.6 | 1 |
| Aluminium | µmole/g dry weight | 5 | 4 | 4 | 4 | 2 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.04 | 0.05 | 0.04 | 0.04 | 0.03 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 5 | 5 | 4 | 4 | 3 |
| Lead | µmole/g dry weight | 0.016 | 0.012 | 0.012 | 0.009 | 0.006 |
| Manganese | µmole/g dry weight | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.05 | 0.04 | 0.04 | 0.03 | <0.02 |
| Zinc | µmole/g dry weight | 0.09 | 0.12 | 0.06 | 0.12 | 0.05 |
| Total SEM | µmole/g dry weight | 10 | 10 | 8.6 | 8.4 | 5.4 |
| SEM/AVS ratio | - | 9.7 | NA | NA | 13 | 4.4 |

| AVS/SEM | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | <0.5 | 0.7 | 0.8 | 0.7 |
| Aluminium | µmole/g dry weight | 3 | 5 | 3 | 3 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.05 | 0.05 | 0.03 | 0.03 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 5 | 6 | 3 | 3 |
| Lead | µmole/g dry weight | 0.011 | 0.014 | 0.006 | 0.008 |
| Manganese | µmole/g dry weight | 0.5 | 0.6 | 0.4 | 0.4 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.03 | 0.04 | <0.02 | 0.02 |
| Zinc | µmole/g dry weight | 0.12 | 0.07 | 0.04 | 0.04 |
| Total SEM | µmole/g dry weight | 8.9 | 12 | 6.9 | 6.3 |
| SEM/AVS ratio | - | NA | 17 | 8.9 | 8.6 |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <40 | <40 | <20 | <100 | <20 |
| Dibutyltin as Sn | µg/kg | <1 | <1 | <0.5 | <2.5 | <0.5 |
| Tributyltin as Sn | µg/kg | <1 | <1 | <0.5 | <2.5 | <0.5 |
| Surrogate Triphenyltin | % | 95 | 95 | 96 | 92 | 97 |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <40 | <20 | <40 | <40 | <20 |
| Dibutyltin as Sn | µg/kg | <1 | <0.5 | <1 | <1 | <0.5 |
| Tributyltin as Sn | µg/kg | <1 | <0.5 | <1 | <1 | <0.5 |
| Surrogate Triphenyltin | % | 96 | 98 | 96 | 95 | 95 |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <40 | <20 | <20 | <20 | <20 |
| Dibutyltin as Sn | µg/kg | <1 | <0.5 | <0.5 | <0.5 | <0.5 |
| Tributyltin as Sn | µg/kg | <1 | <0.5 | <0.5 | <0.5 | <0.5 |
| Surrogate Triphenyltin | % | 93 | 93 | 98 | 99 | 97 |

| Organotin Compunds in Soil | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <20 | <20 | <20 | <20 |
| Dibutyltin as Sn | µg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Tributyltin as Sn | µg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Surrogate Triphenyltin | % | 99 | 95 | 96 | 97 |

| Method ID | Methodology Summary |
|---|---|
| **AVS-SEM** | Determination of Acid Volatile Sulfide (AVS) and Simultaneously Extractable Metals (SEM)/Bioavailable Metals in sediment - determined colourimetrically and using ICP-OES/ICP-MS and cold vapour-AAS. |
| **Ext-054** | Analysed by MPL Envirolab |
| **Inorg-008** | Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours. |
| **Inorg-055** | Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-055** | Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-057** | Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction. |
| **Inorg-060** | Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-062** | TKN - determined colourimetrically based on APHA latest edition 4500 Norg. Alternatively, TKN can be derived from calculation (Total N - NOx). |

| Method ID | Methodology Summary |
|---|---|
| **Inorg-068** | Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition.<br><br>Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation.<br><br>There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples.<br><br>Neutralising value (NV) of 100% is assumed for liming rate.<br><br>Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.<br><br>The recommendation that the SHCl concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCl results reported only.<br>However, Envirolab/MPL adhere to the following calculation of SNAS, where a misprint in the guideline has yet to be rectified.<br>SNAS (%) = (SHCl –SKCl) x 2.0 |
| **Inorg-081** | Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.<br>Alternatively determined by colourimetry/turbidity using Discrete Analyser. |
| **INORG-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. Clay fraction at <2µm reported. |
| **Inorg-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. |
| **INORG-124** | Sulfide is determined after distillation by titration and/or colourimetrically. |
| **INORG-137** | Total Carbon Nitrogen Sulfur by high temperature catalytic combustion with IR detection.<br><br>Total Nitrogen may also be determine from TKN+NOx by calculation. |
| **Metals-020** | Determination of various metals/elements by ICP-AES.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.<br><br>Where molecular anion forms are calculated from an element (e.g. SO4 from S or PO4 from P stoichiometrically), the assumption is that the element is only present in that molecular anion form.<br><br>Submission of low masses of sample e.g. for dust samples, may result in raised PQLs. |
| **Metals-021** | Determination of Mercury by Cold Vapour AAS. |
| **Metals-022** | Determination of various metals by ICP-MS.<br><br>Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation. |
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. |

| Method ID | Methodology Summary |
|---|---|
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br><br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.<br><br>Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40). |
| **Org-022/025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.<br>For soil results:-<br>1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present.<br>2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL.<br>3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above.<br><br>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.<br>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes. |
| **Org-025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MSMS. |

| Method ID | Methodology Summary |
|---|---|
| **Org-029** | Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.<br><br>Analysis is undertaken with LC-MS/MS.<br><br>PFAS results include the sum of branched and linear isomers where applicable.<br><br>Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.<br><br>Note, the Total +ve PFAS PQL is reflective of the lowest individual PQL and is therefore "Total +ve PFAS" is simply a sum of the positive individual PFASs (or a described sub-set).<br><br>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER. |

| QUALITY CONTROL: Volatile TRH and BTEX (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 25/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 117 | 99 |
| TRH $C_6$ - $C_{10}$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 117 | 99 |
| Benzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 119 | 86 |
| Toluene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 108 | 94 |
| Ethylbenzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 116 | 102 |
| m+p-xylene | mg/kg | 0.4 | Org-023 | <0.4 | 1 | <0.4 | <0.4 | 0 | 121 | 106 |
| o-Xylene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 119 | 100 |
| Naphthalene | mg/kg | 1 | Org-023 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| *Surrogate* aaa-Trifluorotoluene | % | | Org-023 | 98 | 1 | 96 | 85 | 12 | 103 | 90 |

| QUALITY CONTROL: Volatile TRH and BTEX (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 25/06/2026 | 25/06/2026 | | [NT] | [NT] |
| TRH $C_6$ - $C_9$ | mg/kg | 25 | Org-023 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH $C_6$ - $C_{10}$ | mg/kg | 25 | Org-023 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| Benzene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| Toluene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| Ethylbenzene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| m+p-xylene | mg/kg | 0.4 | Org-023 | [NT] | 11 | <0.4 | <0.4 | 0 | [NT] | [NT] |
| o-Xylene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| Naphthalene | mg/kg | 1 | Org-023 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| *Surrogate* aaa-Trifluorotoluene | % | | Org-023 | [NT] | 11 | 96 | 92 | 4 | [NT] | [NT] |

| QUALITY CONTROL: Semi-Volatile TRH (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 24/06/2026 | 24/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 122 | 135 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 94 | 93 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 108 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 122 | 135 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 94 | 93 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 108 |
| *Surrogate* o-Terphenyl | % | | Org-020 | 87 | 1 | 90 | 89 | 1 | 90 | 92 |

| QUALITY CONTROL: Semi-Volatile TRH (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 25/06/2026 | 25/06/2026 | | [NT] | [NT] |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| *Surrogate* o-Terphenyl | % | | Org-020 | [NT] | 11 | 95 | 90 | 5 | [NT] | [NT] |

| QUALITY CONTROL: Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Naphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 86 | 92 |
| 2-Methylnaphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 90 | 95 |
| Fluorene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 90 | 89 |
| Phenanthrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 96 | 88 |
| Anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Fluoranthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 96 | 88 |
| Pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 94 | 88 |
| Benz(a)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Chrysene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 96 | 100 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | 10 | Org-022/025 | <10 | 1 | <10 | <10 | 0 | [NT] | [NT] |
| Benzo(e)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(a)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 98 | 104 |
| Perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Indeno(1,2,3-cd)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Dibenz(a,h)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(g,h,i)perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Coronene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate p*-Terphenyl-d14 | % | | Org-022/025 | 84 | 1 | 81 | 83 | 2 | 91 | 82 |

| QUALITY CONTROL: Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Naphthalene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| 2-Methylnaphthalene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthylene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Fluorene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Phenanthrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Anthracene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Fluoranthene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benz(a)anthracene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Chrysene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(b,j)&(k)fluoranthene | µg/kg | 10 | Org-022/025 | [NT] | 11 | <10 | <10 | 0 | [NT] | [NT] |
| Benzo(e)pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(a)pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Perylene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Indeno(1,2,3-cd)pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Dibenz(a,h)anthracene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(g,h,i)perylene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Coronene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate p*-Terphenyl-d14 | % | | Org-022/025 | [NT] | 11 | 81 | 90 | 11 | [NT] | [NT] |

| QUALITY CONTROL: Organochlorine Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| alpha-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 90 | 92 |
| Hexachlorobenzene | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| beta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 86 | 83 |
| gamma-BHC (Lindane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| delta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 80 | 64 |
| Aldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 98 | 70 |
| Oxychlordane | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor Epoxide | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 106 | 88 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| alpha-Chlordane (cis-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan I | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDE (p,p-DDE) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 96 | 86 |
| Dieldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 98 | 83 |
| Endrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 96 | 74 |
| 4,4'-DDD (p,p-DDD) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 130 | 118 |
| Endosulfan II | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDT (p,p-DDT) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan Sulphate | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 94 | 83 |
| Methoxychlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 86 | 1 | 95 | 100 | 5 | 102 | 99 |

| QUALITY CONTROL: Organochlorine Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| alpha-BHC | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Hexachlorobenzene | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| beta-BHC | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| gamma-BHC (Lindane) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| delta-BHC | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Aldrin | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Oxychlordane | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor Epoxide | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| gamma-Chlordane (trans-Chlordane) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| alpha-Chlordane (cis-Chlordane) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan I | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDE (p,p-DDE) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Dieldrin | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endrin | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDD (p,p-DDD) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan II | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDT (p,p-DDT) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan Sulphate | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Methoxychlor | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | [NT] | 11 | 89 | 92 | 3 | [NT] | [NT] |

| QUALITY CONTROL: Organophosphorus Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Dichlorvos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 88 | 74 |
| Dimethoate | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Diazinon | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyrifos-methyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ronnel | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 98 | 92 |
| Fenitrothion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 104 | 60 |
| Malathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 94 | 88 |
| Chlorpyriphos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 92 | 89 |
| Parathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 94 | 62 |
| Bromophos-ethyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ethion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 76 | 62 |
| Azinphos-methyl (Guthion) | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 86 | 1 | 95 | 100 | 5 | 102 | 99 |

| QUALITY CONTROL: Organophosphorus Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Dichlorvos | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Dimethoate | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Diazinon | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyrifos-methyl | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Ronnel | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Fenitrothion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Malathion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyriphos | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Parathion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Bromophos-ethyl | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Ethion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Azinphos-methyl (Guthion) | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | [NT] | 11 | 89 | 92 | 3 | [NT] | [NT] |

| QUALITY CONTROL: PCBs in Sediment (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Total PCBs | µg/kg | 5 | Org-025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate* 2-Fluorobiphenyl | % | | Org-025 | 85 | 1 | 68 | 70 | 3 | 93 | 82 |

| QUALITY CONTROL: PCBs in Sediment (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Total PCBs | µg/kg | 5 | Org-025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate* 2-Fluorobiphenyl | % | | Org-025 | [NT] | 11 | 68 | 63 | 8 | [NT] | [NT] |

| QUALITY CONTROL: NAGD Metals | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 10 | Metals-020 | <10 | 1 | 470 | 480 | 2 | 89 | 115 |
| Antimony - Low Level | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 80 | 95 |
| Arsenic | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 2 | 1 | 67 | 96 | 109 |
| Cadmium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 92 | 93 |
| Chromium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 2 | 2 | 0 | 93 | 100 |
| Cobalt | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 93 | 98 |
| Copper | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 92 | 108 |
| Iron | mg/kg | 10 | Metals-020 | <10 | 1 | 1200 | 1300 | 8 | 89 | 110 |
| Lead | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 1 | 1 | 0 | 91 | 96 |
| Manganese | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 23 | 23 | 0 | 100 | 105 |
| Mercury | mg/kg | 0.01 | Metals-021 | <0.01 | 1 | <0.01 | <0.01 | 0 | 101 | 101 |
| Nickel | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 0.9 | 0.9 | 0 | 92 | 95 |
| Selenium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | 0.1 | <0.1 | 0 | 93 | 103 |
| Silver | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 94 | 124 |
| Vanadium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 3 | 4 | 29 | 94 | 108 |
| Zinc | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 3 | 3 | 0 | 93 | 93 |

| QUALITY CONTROL: NAGD Metals | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Aluminium | mg/kg | 10 | Metals-020 | [NT] | 11 | 1000 | 1100 | 10 | [NT] | [NT] |
| Antimony - Low Level | mg/kg | 0.5 | Metals-022 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Arsenic | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 2 | 2 | 0 | [NT] | [NT] |
| Cadmium | mg/kg | 0.1 | Metals-022 | [NT] | 11 | <0.1 | <0.1 | 0 | [NT] | [NT] |
| Chromium | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 5 | 5 | 0 | [NT] | [NT] |
| Cobalt | mg/kg | 0.5 | Metals-022 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Copper | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 0.9 | 1 | 11 | [NT] | [NT] |
| Iron | mg/kg | 10 | Metals-020 | [NT] | 11 | 1900 | 2000 | 5 | [NT] | [NT] |
| Lead | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 3 | 4 | 29 | [NT] | [NT] |
| Manganese | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 39 | 41 | 5 | [NT] | [NT] |
| Mercury | mg/kg | 0.01 | Metals-021 | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| Nickel | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 2 | 2 | 0 | [NT] | [NT] |
| Selenium | mg/kg | 0.1 | Metals-022 | [NT] | 11 | 0.2 | 0.2 | 0 | [NT] | [NT] |
| Silver | mg/kg | 0.1 | Metals-022 | [NT] | 11 | <0.1 | <0.1 | 0 | [NT] | [NT] |
| Vanadium | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 5.5 | 5.6 | 2 | [NT] | [NT] |
| Zinc | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 7.5 | 7.5 | 0 | [NT] | [NT] |

| QUALITY CONTROL: Acid Extractable metals in soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 10 | Metals-020 | <10 | 1 | 70 | 90 | 25 | 107 | 103 |

| QUALITY CONTROL: Acid Extractable metals in soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Phosphorus | mg/kg | 10 | Metals-020 | [NT] | 11 | 140 | 140 | 0 | [NT] | [NT] |

| QUALITY CONTROL: PFAS in Soils Short | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 23/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 23/06/2026 | 23/06/2026 | | 23/06/2026 | 23/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 97 | 99 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 100 | 103 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 96 | 97 |
| Perfluorooctanoic acid PFOA | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 101 | 106 |
| 6:2 FTS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 99 | 99 |
| 8:2 FTS | µg/kg | 0.2 | Org-029 | <0.2 | 1 | <0.2 | <0.2 | 0 | 93 | 94 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | | Org-029 | 97 | 1 | 95 | 101 | 6 | 97 | 102 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | | Org-029 | 100 | 1 | 99 | 109 | 10 | 100 | 104 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | | Org-029 | 100 | 1 | 92 | 92 | 0 | 99 | 96 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | | Org-029 | 95 | 1 | 85 | 83 | 2 | 94 | 88 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | | Org-029 | 94 | 1 | 86 | 83 | 4 | 96 | 87 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | | Org-029 | 98 | 1 | 86 | 82 | 5 | 99 | 83 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | | Org-029 | 95 | 1 | 59 | 58 | 2 | 95 | 63 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | | Org-029 | 100 | 1 | 69 | 73 | 6 | 95 | 72 |

| QUALITY CONTROL: PFAS in Soils Short | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-4 | [NT] |
| Date prepared | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | 23/06/2026 | [NT] |
| Date analysed | - | | | [NT] | 11 | 23/06/2026 | 23/06/2026 | | 24/06/2026 | [NT] |
| Perfluorobutanesulfonic acid | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 98 | [NT] |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 101 | [NT] |
| Perfluorooctanesulfonic acid PFOS | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 100 | [NT] |
| Perfluorooctanoic acid PFOA | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 95 | [NT] |
| 6:2 FTS | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 109 | [NT] |
| 8:2 FTS | µg/kg | 0.2 | Org-029 | [NT] | 11 | <0.2 | <0.2 | 0 | 96 | [NT] |
| *Surrogate* $^{13}C_8$ *PFOS* | % | | Org-029 | [NT] | 11 | 98 | 96 | 2 | 103 | [NT] |
| *Surrogate* $^{13}C_2$ *PFOA* | % | | Org-029 | [NT] | 11 | 112 | 113 | 1 | 102 | [NT] |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | | Org-029 | [NT] | 11 | 96 | 96 | 0 | 120 | [NT] |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | | Org-029 | [NT] | 11 | 88 | 86 | 2 | 110 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | | Org-029 | [NT] | 11 | 90 | 92 | 2 | 97 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | | Org-029 | [NT] | 11 | 82 | 88 | 7 | 109 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | | Org-029 | [NT] | 11 | 58 | 59 | 2 | 110 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | | Org-029 | [NT] | 11 | 74 | 73 | 1 | 99 | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | <100 | 1 | 1100 | 1300 | 17 | 106 | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | <0.5 | 1 | 1.2 | 1.2 | 0 | 93 | 87 |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 98 | 85 |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | <0.1 | 1 | <0.1 | <0.1 | 0 | 99 | 92 |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | <10 | 1 | 130 | 170 | 27 | 101 | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 98 | 85 |
| Organic Nitrogen as N | mg/kg | 10 | | <10 | 1 | 130 | 170 | 27 | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | <0.5 | 1 | <0.5 | <0.5 | 0 | 110 | 91 |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | <0.01 | 1 | 0.1 | 0.08 | 22 | 80 | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | <10 | 1 | 470 | 470 | 0 | 110 | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | <0.01 | 1 | 0.08 | 0.07 | 13 | [NT] | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | [NT] | 11 | 2300 | 3500 | 41 | [NT] | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | [NT] | 11 | 1.5 | 1.6 | 6 | [NT] | [NT] |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | [NT] | 11 | <0.1 | <0.1 | 0 | [NT] | [NT] |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | [NT] | 11 | 300 | 210 | 35 | [NT] | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Organic Nitrogen as N | mg/kg | 10 | | [NT] | 11 | 300 | 210 | 35 | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | [NT] | 11 | 0.10 | 0.09 | 11 | [NT] | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | [NT] | 11 | 800 | 830 | 4 | [NT] | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | [NT] | 11 | 0.07 | 0.06 | 15 | [NT] | [NT] |

| QUALITY CONTROL: Total Kjeldahl Nitrogen (TKN) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 10 | Inorg-062 | <10 | 1 | 130 | 170 | 27 | [NT] | [NT] |

| QUALITY CONTROL: Total Kjeldahl Nitrogen (TKN) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| TKN in soil (by Calculation) | mg/kg | 10 | Inorg-062 | [NT] | 11 | 300 | 210 | 35 | [NT] | [NT] |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 19/06/2026 | 1 | 19/06/2026 | 19/06/2026 | | 19/06/2026 | [NT] |
| Date analysed | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | 1 | 9.6 | 9.6 | 0 | 97 | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | <0.01 | 1 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | <5 | <5 | 0 | 96 | [NT] |
| a-$S_{POS}$ | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | 20 | 19 | 5 | [NT] | [NT] |
| $S_{POS}$ | %w/w | 0.005 | Inorg-068 | <0.005 | 1 | 0.03 | 0.03 | 0 | [NT] | [NT] |
| $S_P$ | %w/w | 0.005 | Inorg-068 | <0.005 | 1 | 0.06 | 0.05 | 18 | [NT] | [NT] |
| $S_{KCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | 0.024 | 0.024 | 0 | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | [NT] | [NT] | | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | [NT] | [NT] | | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | <0.05 | 1 | 10 | 10 | 0 | 99 | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | <0.05 | 1 | 3.3 | 3.3 | 0 | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | 0.031 | 0.030 | 3 | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | 20 | 19 | 5 | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | 1 | 1.5 | 1.4 | 7 | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | <0.005 | <0.005 | 0 | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | 1 | <0.75 | <0.75 | 0 | [NT] | [NT] |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 19/06/2026 | 19/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | 11 | 9.5 | 9.5 | 0 | [NT] | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| a-$S_{POS}$ | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | 20 | 20 | 0 | [NT] | [NT] |
| $S_{POS}$ | %w/w | 0.005 | Inorg-068 | [NT] | 11 | 0.03 | 0.03 | 0 | [NT] | [NT] |
| $S_P$ | %w/w | 0.005 | Inorg-068 | [NT] | 11 | 0.07 | 0.07 | 0 | [NT] | [NT] |
| $S_{KCl}$ | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | 0.036 | 0.037 | 3 | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | [NT] | 11 | 16 | 15 | 6 | [NT] | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | [NT] | 11 | 5.0 | 5.0 | 0 | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | 0.032 | 0.032 | 0 | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | 20 | 20 | 0 | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | [NT] | 11 | 1.5 | 1.5 | 0 | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | <0.005 | <0.005 | 0 | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | [NT] | 11 | <0.75 | <0.75 | 0 | [NT] | [NT] |

| QUALITY CONTROL: AVS/SEM | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 19/06/2026 | 1 | 19/06/2026 | 19/06/2026 | | 19/06/2026 | 19/06/2026 |
| Date analysed | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.5 | AVS-SEM | <0.5 | 1 | 0.6 | 0.7 | 15 | 97 | [NT] |
| Aluminium | µmole/g dry weight | 0.05 | Metals-020 | <0.05 | 1 | 3 | 4 | 29 | 106 | # |
| Antimony | µmole/g dry weight | 0.05 | Metals-020 | <0.05 | 1 | <0.05 | <0.05 | 0 | 94 | 93 |
| Arsenic | µmole/g dry weight | 0.05 | AVS-SEM | <0.05 | 1 | <0.05 | <0.05 | 0 | 101 | 103 |
| Cadmium | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | 1 | <0.01 | <0.01 | 0 | 94 | 87 |
| Chromium | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | 1 | 0.04 | 0.04 | 0 | 96 | 93 |
| Cobalt | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | 1 | <0.01 | <0.01 | 0 | 96 | 92 |
| Copper | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | <0.02 | <0.02 | 0 | 94 | 103 |
| Iron | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | 1 | 3 | 3 | 0 | 103 | ## |
| Lead | µmole/g dry weight | 0.005 | AVS-SEM | <0.005 | 1 | 0.005 | 0.006 | 18 | 94 | 90 |
| Manganese | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | 0.3 | 0.3 | 0 | 101 | 90 |
| Mercury | µmole/g dry weight | 0.0005 | AVS-SEM | <0.0005 | 1 | <0.0005 | <0.0005 | 0 | [NT] | [NT] |
| Nickel | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | <0.02 | <0.02 | 0 | 95 | 88 |
| Selenium | µmole/g dry weight | 0.04 | AVS-SEM | <0.04 | 1 | <0.04 | <0.04 | 0 | 105 | 100 |
| Silver | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | 1 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Vanadium | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | 1 | 0.05 | 0.05 | 0 | 95 | 96 |
| Zinc | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | 0.05 | 0.05 | 0 | 103 | # |
| Total SEM | µmole/g dry weight | 0.13 | AVS-SEM | <0.13 | 1 | 7.2 | 7.5 | 4 | [NT] | [NT] |
| SEM/AVS ratio | - | 0 | AVS-SEM | <0 | 1 | 12 | 11 | 9 | [NT] | [NT] |

| QUALITY CONTROL: AVS/SEM | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | 411426-5 |
| Date prepared | - | | | [NT] | 11 | 19/06/2026 | 19/06/2026 | | [NT] | 19/06/2026 |
| Date analysed | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.5 | AVS-SEM | [NT] | 11 | 1 | 0.9 | 11 | [NT] | 100 |
| Aluminium | µmole/g dry weight | 0.05 | Metals-020 | [NT] | 11 | 5 | 4 | 22 | [NT] | [NT] |
| Antimony | µmole/g dry weight | 0.05 | Metals-020 | [NT] | 11 | <0.05 | <0.05 | 0 | [NT] | [NT] |
| Arsenic | µmole/g dry weight | 0.05 | AVS-SEM | [NT] | 11 | <0.05 | <0.05 | 0 | [NT] | [NT] |
| Cadmium | µmole/g dry weight | 0.01 | AVS-SEM | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| Chromium | µmole/g dry weight | 0.01 | AVS-SEM | [NT] | 11 | 0.04 | 0.04 | 0 | [NT] | [NT] |
| Cobalt | µmole/g dry weight | 0.01 | AVS-SEM | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| Copper | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Iron | µmole/g dry weight | 0.02 | Metals-020 | [NT] | 11 | 5 | 4 | 22 | [NT] | [NT] |
| Lead | µmole/g dry weight | 0.005 | AVS-SEM | [NT] | 11 | 0.016 | 0.015 | 6 | [NT] | [NT] |
| Manganese | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | 0.4 | 0.4 | 0 | [NT] | [NT] |
| Mercury | µmole/g dry weight | 0.0005 | AVS-SEM | [NT] | 11 | <0.0005 | <0.0005 | 0 | [NT] | [NT] |
| Nickel | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Selenium | µmole/g dry weight | 0.04 | AVS-SEM | [NT] | 11 | <0.04 | <0.04 | 0 | [NT] | [NT] |
| Silver | µmole/g dry weight | 0.02 | Metals-020 | [NT] | 11 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Vanadium | µmole/g dry weight | 0.02 | Metals-020 | [NT] | 11 | 0.05 | 0.04 | 22 | [NT] | [NT] |
| Zinc | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | 0.09 | 0.08 | 12 | [NT] | [NT] |
| Total SEM | µmole/g dry weight | 0.13 | AVS-SEM | [NT] | 11 | 10 | 9.2 | 8 | [NT] | [NT] |
| SEM/AVS ratio | - | 0 | AVS-SEM | [NT] | 11 | 9.7 | 9.8 | 1 | [NT] | [NT] |

| QUALITY CONTROL: Organotin Compunds in Soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Date analysed | - | | | 25/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | 20 | Ext-054 | <20 | 1 | <40 | <40 | 0 | [NT] | [NT] |
| Dibutyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <1 | <1 | 0 | 96 | 103 |
| Tributyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <1 | <1 | 0 | 90 | 105 |
| Surrogate Triphenyltin | % | | Ext-054 | 97 | 1 | 95 | 96 | 1 | 98 | 92 |

| QUALITY CONTROL: Organotin Compunds in Soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 10 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 10 | 25/06/2026 | 25/06/2026 | | [NT] | [NT] |
| Monobutyltin as Sn | µg/kg | 20 | Ext-054 | [NT] | 10 | <20 | <20 | 0 | [NT] | [NT] |
| Dibutyltin as Sn | µg/kg | 0.5 | Ext-054 | [NT] | 10 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Tributyltin as Sn | µg/kg | 0.5 | Ext-054 | [NT] | 10 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Surrogate Triphenyltin | % | | Ext-054 | [NT] | 10 | 95 | 98 | 3 | [NT] | [NT] |

## Result Definitions

| | |
|---|---|
| **NT** | Not tested |
| **NA** | Test not required |
| **INS** | Insufficient sample for this test |
| **PQL** | Practical Quantitation Limit |
| **<** | Less than |
| **>** | Greater than |
| **RPD** | Relative Percent Difference |
| **LCS** | Laboratory Control Sample |
| **NS** | Not specified |
| **NEPM** | National Environmental Protection Measure |
| **NR** | Not Reported |

## Quality Control Definitions

| | |
|---|---|
| **Blank** | This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. |
| **Duplicate** | This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable. |
| **Matrix Spike** | A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. |
| **LCS (Laboratory Control Sample)** | This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample. |
| **Surrogate Spike** | Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples. |

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field).

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

## Report Comments

Organotin Compunds in Soil analysed by MPL Laboratories, report no. PHF1622.
PQLs for samples 411426-1,2,4,6,8,9 and 11 have been raised due to suppression of the extracted internal standard.

MISC_INORG_S: TOTAL NITROGEN IN SOILS/TOTAL ORGANIC CARBON IN SOILS - The duplicate result is greater than the acceptable RPD. Re-analysis indicates possible sample heterogeneity. 411426-11,11D

AVS/SEM
## Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.
# Low spike recovery was obtained for this sample. This is due to matrix interferences. However, an acceptable recovery was obtained for the LCS.

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# CERTIFICATE OF ANALYSIS 411426-A

## Client Details

| | |
|---|---|
| **Client** | Bluecoast Consulting Engineers Pty Ltd |
| **Attention** | Tom Fallon |
| **Address** | Suite 2a, 41-45 Hunter Street,, NEWCASTLE, NSW, 2300 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P24462 - Pre Trial Extension** |
| **Number of Samples** | Split report for SCr testing |
| **Date samples received** | 19/06/2026 |
| **Date completed instructions received** | 19/06/2026 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

## Report Details

| | |
|---|---|
| **Date results requested by** | 26/06/2026 |
| **Date of Issue** | 26/06/2026 |

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**Results Approved By**
Jenny He, Inorganic Team Leader

**Authorised By**
Nancy Zhang, Laboratory Manager

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-A-1 | 411426-A-2 | 411426-A-3 | 411426-A-4 | 411426-A-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.7 | 9.7 | 9.5 | 9.6 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 18 | 10 | 5 | 50 | 18 |
| Chromium Reducible Sulfur | %w/w | 0.03 | 0.02 | 0.008 | 0.08 | 0.03 |
| $S_{KCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 10 | 10 | 9.8 | 12 | 14 |
| s-$ANC_{BT}$ | %w/w S | 3.3 | 3.2 | 3.2 | 3.7 | 4.5 |
| s-Net Acidity excluding ANC | %w/w S | 0.028 | 0.016 | 0.0080 | 0.080 | 0.028 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 18 | 10 | 5.0 | 50 | 18 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 1.3 | 0.75 | <0.75 | 3.8 | 1.3 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-A-6 | 411426-A-7 | 411426-A-8 | 411426-A-9 | 411426-A-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 12 | 10 | 10 | 22 | 8 |
| Chromium Reducible Sulfur | %w/w | 0.02 | 0.02 | 0.02 | 0.04 | 0.01 |
| $S_{KCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 8.6 | 8.8 | 9.6 | 10 | 8.4 |
| s-$ANC_{BT}$ | %w/w S | 2.8 | 2.8 | 3.1 | 3.3 | 2.7 |
| s-Net Acidity excluding ANC | %w/w S | 0.020 | 0.016 | 0.016 | 0.036 | 0.012 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 12 | 10 | 10 | 22 | 7.5 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.94 | 0.75 | 0.75 | 1.7 | <0.75 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-A-11 | 411426-A-12 | 411426-A-13 | 411426-A-14 | 411426-A-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| $pH_{kcl}$ | pH units | 9.5 | 9.6 | 9.6 | 9.6 | 9.5 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 37 | 22 | 30 | 18 | 27 |
| Chromium Reducible Sulfur | %w/w | 0.06 | 0.04 | 0.05 | 0.03 | 0.04 |
| $S_{KCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 16 | 14 | 13 | 12 | 14 |
| s-$ANC_{BT}$ | %w/w S | 5.0 | 4.5 | 4.2 | 3.8 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.060 | 0.036 | 0.048 | 0.028 | 0.044 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 37 | 22 | 30 | 18 | 27 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 2.8 | 1.7 | 2.3 | 1.3 | 2.1 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-A-16 | 411426-A-17 | 411426-A-18 | 411426-A-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.6 | 9.7 | 9.4 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 20 | 27 | 22 | 15 |
| Chromium Reducible Sulfur | %w/w | 0.03 | 0.04 | 0.04 | 0.02 |
| $S_{KCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 14 | 15 | 13 | 14 |
| s-$ANC_{BT}$ | %w/w S | 4.5 | 4.7 | 4.2 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.032 | 0.044 | 0.036 | 0.024 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 20 | 27 | 22 | 15 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 1.5 | 2.1 | 1.7 | 1.1 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 |

| Method ID | Methodology Summary |
|---|---|
| **Inorg-068** | Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition.<br><br>Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation.<br><br>There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples.<br><br>Neutralising value (NV) of 100% is assumed for liming rate.<br><br>Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.<br><br>The recommendation that the SHCl concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCl results reported only.<br>However, Envirolab/MPL adhere to the following calculation of SNAS, where a misprint in the guideline has yet to be rectified.<br>SNAS (%) = (SHCl –SKCl) x 2.0 |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | [NT] |
| Date analysed | - | | | 23/06/2026 | 1 | 23/06/2026 | 23/06/2026 | | 23/06/2026 | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | 1 | 9.6 | 9.6 | 0 | 98.0 | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | <0.01 | 1 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | <5 | <5 | 0 | 101 | [NT] |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 3 | Inorg-068 | <3 | 1 | 18 | 12 | 40 | [NT] | [NT] |
| Chromium Reducible Sulfur | %w/w | 0.005 | Inorg-068 | <0.005 | 1 | 0.03 | 0.02 | 40 | 96 | [NT] |
| $S_{KCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | [NT] | [NT] | | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | [NT] | [NT] | | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | [NT] | [NT] | | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | <0.05 | 1 | 10 | 10 | 0 | 99 | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | <0.05 | 1 | 3.3 | 3.3 | 0 | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | 0.028 | 0.020 | 33 | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | 18 | 12 | 40 | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | 1 | 1.3 | 0.94 | 32 | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | <0.005 | <0.005 | 0 | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | 1 | <0.75 | <0.75 | 0 | [NT] | [NT] |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 23/06/2026 | 23/06/2026 | | [NT] | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | 11 | 9.5 | 9.5 | 0 | [NT] | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| a-Chromium Reducible Sulfur | moles $H^+$ /t | 3 | Inorg-068 | [NT] | 11 | 37 | 32 | 14 | [NT] | [NT] |
| Chromium Reducible Sulfur | %w/w | 0.005 | Inorg-068 | [NT] | 11 | 0.06 | 0.05 | 18 | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | [NT] | 11 | 16 | 15 | 6 | [NT] | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | [NT] | 11 | 5.0 | 5.0 | 0 | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | 0.060 | 0.052 | 14 | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | 37 | 32 | 14 | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | [NT] | 11 | 2.8 | 2.4 | 15 | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | <0.005 | <0.005 | 0 | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | [NT] | 11 | <0.75 | <0.75 | 0 | [NT] | [NT] |

## Result Definitions

| | |
|---|---|
| **NT** | Not tested |
| **NA** | Test not required |
| **INS** | Insufficient sample for this test |
| **PQL** | Practical Quantitation Limit |
| **<** | Less than |
| **>** | Greater than |
| **RPD** | Relative Percent Difference |
| **LCS** | Laboratory Control Sample |
| **NS** | Not specified |
| **NEPM** | National Environmental Protection Measure |
| **NR** | Not Reported |

## Quality Control Definitions

| | |
|---|---|
| **Blank** | This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. |
| **Duplicate** | This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable. |
| **Matrix Spike** | A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. |
| **LCS (Laboratory Control Sample)** | This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample. |
| **Surrogate Spike** | Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples. |

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field).

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

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# INTERIM REPORT 411426

## Client Details

| | |
|---|---|
| **Client** | Bluecoast Consulting Engineers Pty Ltd |
| **Attention** | Tom Fallon |
| **Address** | Suite 2a, 41-45 Hunter Street,, NEWCASTLE, NSW, 2300 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P24462 - Pre Trial Extension** |
| **Number of Samples** | 19 Sediment |
| **Date samples received** | 19/06/2026 |
| **Date completed instructions received** | 19/06/2026 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 26/06/2026 |
| **Interim Report Date** | 28/06/2026 |

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| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 96 | 97 | 83 | 98 | 98 |

| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 104 | 91 | 84 | 87 | 100 |

| Volatile TRH and BTEX (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 96 | 95 | 94 | 86 | 97 |

| Volatile TRH and BTEX (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH $C_6$ - $C_{10}$ | mg/kg | <25 | <25 | <25 | <25 |
| vTRH $C_6$ - $C_{10}$ less BTEX (F1) | mg/kg | <25 | <25 | <25 | <25 |
| Benzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Ethylbenzene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| m+p-xylene | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 |
| o-Xylene | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve Xylenes | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Total +ve BTEX | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 93 | 101 | 100 | 100 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$-$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$-$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$-$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$-$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 90 | 88 | 92 | 90 | 102 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$-$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$-$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$-$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$-$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 89 | 93 | 93 | 100 | 92 |

| Semi-Volatile TRH (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 95 | 96 | 91 | 96 | 93 |

| Semi-Volatile TRH (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | <25 | <25 | <25 | <25 |
| Total +ve TRH (C10-C36) | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{10}$ -$C_{16}$ less Naphthalene (F2) | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | <25 | <25 | <25 | <25 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | <25 | <25 | <25 | <25 |
| Total +ve TRH (>C10-C40) | mg/kg | <25 | <25 | <25 | <25 |
| *Surrogate* o-Terphenyl | % | 93 | 97 | 90 | 92 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 81 | 86 | 82 | 80 | 85 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 78 | 81 | 82 | 95 | 83 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 81 | 96 | 93 | 105 | 85 |

| Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Naphthalene | µg/kg | <5 | <5 | <5 | <5 |
| 2-Methylnaphthalene | µg/kg | <5 | <5 | <5 | <5 |
| Acenaphthylene | µg/kg | <5 | <5 | <5 | <5 |
| Acenaphthene | µg/kg | <5 | <5 | <5 | <5 |
| Fluorene | µg/kg | <5 | <5 | <5 | <5 |
| Phenanthrene | µg/kg | <5 | <5 | <5 | <5 |
| Anthracene | µg/kg | <5 | <5 | <5 | <5 |
| Fluoranthene | µg/kg | <5 | <5 | <5 | <5 |
| Pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Benz(a)anthracene | µg/kg | <5 | <5 | <5 | <5 |
| Chrysene | µg/kg | <5 | <5 | <5 | <5 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | <10 | <10 | <10 | <10 |
| Benzo(e)pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Perylene | µg/kg | <5 | <5 | <5 | <5 |
| Indeno(1,2,3-cd)pyrene | µg/kg | <5 | <5 | <5 | <5 |
| Dibenz(a,h)anthracene | µg/kg | <5 | <5 | <5 | <5 |
| Benzo(g,h,i)perylene | µg/kg | <5 | <5 | <5 | <5 |
| Coronene | µg/kg | <5 | <5 | <5 | <5 |
| *Surrogate p*-Terphenyl-d14 | % | 84 | 89 | 80 | 84 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 95 | 80 | 105 | 98 | 101 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 99 | 91 | 90 | 110 | 91 |

| Organochlorine Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 89 | 103 | 86 | 104 | 83 |

| Organochlorine Pesticides in Sediment | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| alpha-BHC | µg/kg | <1 | <1 | <1 | <1 |
| Hexachlorobenzene | µg/kg | <1 | <1 | <1 | <1 |
| beta-BHC | µg/kg | <1 | <1 | <1 | <1 |
| gamma-BHC (Lindane) | µg/kg | <1 | <1 | <1 | <1 |
| delta-BHC | µg/kg | <1 | <1 | <1 | <1 |
| Heptachlor | µg/kg | <1 | <1 | <1 | <1 |
| Aldrin | µg/kg | <1 | <1 | <1 | <1 |
| Oxychlordane | µg/kg | <1 | <1 | <1 | <1 |
| Heptachlor Epoxide | µg/kg | <1 | <1 | <1 | <1 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | <1 | <1 | <1 | <1 |
| alpha-Chlordane (cis-Chlordane) | µg/kg | <1 | <1 | <1 | <1 |
| Endosulfan I | µg/kg | <1 | <1 | <1 | <1 |
| 4,4'-DDE (p,p-DDE) | µg/kg | <1 | <1 | <1 | <1 |
| Dieldrin | µg/kg | <1 | <1 | <1 | <1 |
| Endrin | µg/kg | <1 | <1 | <1 | <1 |
| 4,4'-DDD (p,p-DDD) | µg/kg | <1 | <1 | <1 | <1 |
| Endosulfan II | µg/kg | <1 | <1 | <1 | <1 |
| 4,4'-DDT (p,p-DDT) | µg/kg | <1 | <1 | <1 | <1 |
| Endosulfan Sulphate | µg/kg | <1 | <1 | <1 | <1 |
| Methoxychlor | µg/kg | <1 | <1 | <1 | <1 |
| Surrogate 4-Chloro-3-NBTF | % | 87 | 94 | 81 | 81 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 95 | 80 | 105 | 98 | 101 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 99 | 91 | 90 | 110 | 91 |

| Organophosphorus Pesticides in Sediment | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 89 | 103 | 86 | 104 | 83 |

| Organophosphorus Pesticides in Sediment | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Dichlorvos | µg/kg | <50 | <50 | <50 | <50 |
| Dimethoate | µg/kg | <50 | <50 | <50 | <50 |
| Diazinon | µg/kg | <50 | <50 | <50 | <50 |
| Chlorpyrifos-methyl | µg/kg | <50 | <50 | <50 | <50 |
| Ronnel | µg/kg | <50 | <50 | <50 | <50 |
| Fenitrothion | µg/kg | <50 | <50 | <50 | <50 |
| Malathion | µg/kg | <50 | <50 | <50 | <50 |
| Chlorpyriphos | µg/kg | <50 | <50 | <50 | <50 |
| Parathion | µg/kg | <50 | <50 | <50 | <50 |
| Bromophos-ethyl | µg/kg | <50 | <50 | <50 | <50 |
| Ethion | µg/kg | <50 | <50 | <50 | <50 |
| Azinphos-methyl (Guthion) | µg/kg | <50 | <50 | <50 | <50 |
| Surrogate 4-Chloro-3-NBTF | % | 87 | 94 | 81 | 81 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 68 | 64 | 70 | 69 | 75 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 70 | 71 | 69 | 76 | 71 |

| PCBs in Sediment (NAGD) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 24/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 68 | 65 | 70 | 67 | 73 |

| PCBs in Sediment (NAGD) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date extracted | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Total PCBs | µg/kg | <5 | <5 | <5 | <5 |
| *Surrogate* 2-Fluorobiphenyl | % | 62 | 78 | 69 | 61 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 470 | 470 | 480 | 650 | 720 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 1 | 1 | 3 | 2 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 2 | 2 | 2 | 3 | 3 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 |
| Iron | mg/kg | 1,200 | 1,100 | 1,200 | 1,800 | 1,800 |
| Lead | mg/kg | 1 | 1 | 1 | 0.8 | 2 |
| Manganese | mg/kg | 23 | 25 | 24 | 38 | 30 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 0.9 | 0.7 | 0.7 | 1 | 1 |
| Selenium | mg/kg | 0.1 | <0.1 | 0.1 | 0.1 | 0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 3 | 3 | 3 | 5.7 | 4 |
| Zinc | mg/kg | 3 | 8.6 | 4 | 2 | 5 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 670 | 360 | 410 | 580 | 340 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 1 | 1 | 1 | 2 | 1 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 3 | 2 | 2 | 3 | 2 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 |
| Iron | mg/kg | 1,600 | 910 | 1,100 | 1,400 | 940 |
| Lead | mg/kg | 2 | 1 | 2 | 2 | 1 |
| Manganese | mg/kg | 28 | 21 | 20 | 30 | 18 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 1 | 0.7 | 0.7 | 1 | 0.6 |
| Selenium | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 4 | 2 | 2 | 3 | 2 |
| Zinc | mg/kg | 5.3 | 3 | 4 | 5 | 3 |

| NAGD Metals | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 1,000 | 1,100 | 870 | 700 | 680 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 2 | 2 | 1 | 1 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 5 | 5 | 4 | 3 | 3 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 0.9 | 0.8 | 0.7 | 0.5 | <0.5 |
| Iron | mg/kg | 1,900 | 2,100 | 1,600 | 1,300 | 1,300 |
| Lead | mg/kg | 3 | 3 | 2 | 2 | 2 |
| Manganese | mg/kg | 39 | 44 | 34 | 35 | 36 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 2 | 2 | 1 | 1 | 1 |
| Selenium | mg/kg | 0.2 | 0.1 | <0.1 | <0.1 | <0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 5.5 | 5.2 | 4 | 3 | 3 |
| Zinc | mg/kg | 7.5 | 9.0 | 5.2 | 7.5 | 5 |

| NAGD Metals | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 1,100 | 1,200 | 670 | 740 |
| Antimony - Low Level | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Arsenic | mg/kg | 2 | 3 | 1 | 1 |
| Cadmium | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg/kg | 5 | 5.3 | 3 | 3 |
| Cobalt | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Copper | mg/kg | 0.7 | 0.8 | <0.5 | <0.5 |
| Iron | mg/kg | 2,000 | 2,300 | 1,300 | 1,400 |
| Lead | mg/kg | 3 | 3 | 2 | 2 |
| Manganese | mg/kg | 45 | 49 | 35 | 34 |
| Mercury | mg/kg | <0.01 | <0.01 | <0.01 | <0.01 |
| Nickel | mg/kg | 1 | 2 | 1 | 1 |
| Selenium | mg/kg | 0.1 | 0.1 | <0.1 | <0.1 |
| Silver | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Vanadium | mg/kg | 5 | 6.0 | 3 | 3 |
| Zinc | mg/kg | 18 | 7.6 | 4 | 4 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 70 | 60 | 60 | 70 | 90 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 90 | 50 | 60 | 80 | 60 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 140 | 140 | 110 | 100 | 100 |

| Acid Extractable metals in soil | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Date analysed | - | 26/06/2026 | 26/06/2026 | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 150 | 170 | 110 | 100 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 95 | 103 | 96 | 101 | 97 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 99 | 106 | 100 | 110 | 116 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 92 | 98 | 94 | 91 | 96 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 85 | 88 | 88 | 84 | 87 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 86 | 87 | 90 | 85 | 89 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 86 | 86 | 88 | 81 | 76 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 59 | 63 | 59 | 62 | 59 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 69 | 81 | 69 | 70 | 70 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 98 | 102 | 100 | 98 | 94 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 104 | 108 | 104 | 99 | 105 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 95 | 95 | 101 | 96 | 97 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 86 | 87 | 87 | 87 | 90 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 89 | 87 | 91 | 88 | 90 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 87 | 88 | 85 | 91 | 87 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 62 | 60 | 62 | 61 | 65 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 75 | 73 | 83 | 75 | 78 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 98 | 99 | 102 | 102 | 103 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 112 | 104 | 105 | 107 | 102 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 96 | 96 | 98 | 92 | 97 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 88 | 87 | 83 | 92 | 89 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 90 | 87 | 86 | 87 | 87 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 82 | 85 | 90 | 91 | 93 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 58 | 60 | 62 | 63 | 71 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 74 | 72 | 75 | 70 | 83 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

| PFAS in Soils Short | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Perfluorooctanoic acid PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| 6:2 FTS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| 8:2 FTS | µg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | 96 | 105 | 99 | 104 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | 103 | 108 | 98 | 105 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | 99 | 93 | 99 | 105 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | 88 | 82 | 91 | 96 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | 89 | 85 | 92 | 93 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | 87 | 80 | 93 | 95 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | 72 | 67 | 71 | 73 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | 86 | 80 | 85 | 87 |
| Total Positive PFHxS & PFOS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFOS & PFOA | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Positive PFAS | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 19 | 18 | 21 | 12 | 22 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 28 | 20 | 19 | 24 | 20 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 28 | 26 | 21 | 22 | 21 |

| Moisture | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Date analysed | - | 23/06/2026 | 23/06/2026 | 23/06/2026 | 23/06/2026 |
| Moisture | % | 28 | 29 | 21 | 19 |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Medium Gravel 4.75-9.5mm | % | | | | | |
| Fine Gravel 2.36-4.75mm | % | | | | | |
| Very Coarse Sand 1.18-2.36mm | % | | | | | |
| Coarse Sand 0.6-1.18mm | % | | | | | |
| Medium Sand 0.425-0.6mm | % | | | | | |
| Medium Sand 0.3-0.425mm | % | | | | | |
| Medium Sand 0.25-0.3mm | % | | | | | |
| Medium Sand 0.212-0.25mm | % | | | | | |
| Fine Sand 0.15-0.212mm | % | | | | | |
| Fine Sand 0.125-0.15mm | % | | | | | |
| Very Fine Sand 0.075-0.125mm | % | | | | | |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Medium Gravel 4.75-9.5mm | % | | | | | |
| Fine Gravel 2.36-4.75mm | % | | | | | |
| Very Coarse Sand 1.18-2.36mm | % | | | | | |
| Coarse Sand 0.6-1.18mm | % | | | | | |
| Medium Sand 0.425-0.6mm | % | | | | | |
| Medium Sand 0.3-0.425mm | % | | | | | |
| Medium Sand 0.25-0.3mm | % | | | | | |
| Medium Sand 0.212-0.25mm | % | | | | | |
| Fine Sand 0.15-0.212mm | % | | | | | |
| Fine Sand 0.125-0.15mm | % | | | | | |
| Very Fine Sand 0.075-0.125mm | % | | | | | |

| Particle Size Distribution in Soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Medium Gravel 4.75-9.5mm | % | | | | | |
| Fine Gravel 2.36-4.75mm | % | | | | | |
| Very Coarse Sand 1.18-2.36mm | % | | | | | |
| Coarse Sand 0.6-1.18mm | % | | | | | |
| Medium Sand 0.425-0.6mm | % | | | | | |
| Medium Sand 0.3-0.425mm | % | | | | | |
| Medium Sand 0.25-0.3mm | % | | | | | |
| Medium Sand 0.212-0.25mm | % | | | | | |
| Fine Sand 0.15-0.212mm | % | | | | | |
| Fine Sand 0.125-0.15mm | % | | | | | |
| Very Fine Sand 0.075-0.125mm | % | | | | | |

| Particle Size Distribution in Soils | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | |
| Date analysed | - | | | | |
| Medium Gravel 4.75-9.5mm | % | | | | |
| Fine Gravel 2.36-4.75mm | % | | | | |
| Very Coarse Sand 1.18-2.36mm | % | | | | |
| Coarse Sand 0.6-1.18mm | % | | | | |
| Medium Sand 0.425-0.6mm | % | | | | |
| Medium Sand 0.3-0.425mm | % | | | | |
| Medium Sand 0.25-0.3mm | % | | | | |
| Medium Sand 0.212-0.25mm | % | | | | |
| Fine Sand 0.15-0.212mm | % | | | | |
| Fine Sand 0.125-0.15mm | % | | | | |
| Very Fine Sand 0.075-0.125mm | % | | | | |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | | | | | |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | | | | | |
| Clay in soils <2µm | % (w/w) | | | | | |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | | | | | |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | | | | | |
| Clay in soils <2µm | % (w/w) | | | | | |

| Particle Size Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | | |
| Date analysed | - | | | | | |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | | | | | |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | | | | | |
| Clay in soils <2µm | % (w/w) | | | | | |

| Particle Size Analysis | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | | | | |
| Date analysed | - | | | | |
| Coarse Silt >0.020mm - 0.075mm | % (w/w) | | | | |
| Fine Silt >0.002mm - 0.020mm | % (w/w) | | | | |
| Clay in soils <2µm | % (w/w) | | | | |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 1,100 | 1,900 | 400 | 3,000 | <100 |
| Ammonia as N in soil | mg/kg | 1.2 | <0.5 | <0.5 | 1.3 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 130 | 60 | 80 | 230 | 100 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 130 | 60 | 80 | 230 | 100 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.1 | 0.04 | 0.04 | 0.12 | 0.05 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 470 | 320 | 620 | 810 | 840 |
| Sulfide Sulfur by calculation* | % | 0.08 | 0.03 | 0.01 | 0.093 | 0.02 |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 700 | <100 | <100 | 800 | <100 |
| Ammonia as N in soil | mg/kg | 0.8 | <0.5 | <0.5 | 0.6 | <0.5 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 350 | 80 | 530 | 170 | 130 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 340 | 80 | 530 | 170 | 130 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.06 | 0.03 | 0.04 | 0.05 | 0.03 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 820 | 1,100 | 500 | 450 | 260 |
| Sulfide Sulfur by calculation* | % | 0.03 | <0.01 | 0.02 | 0.04 | 0.02 |

| TOC_NAGA | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 2,300 | 2,100 | 2,400 | 600 | <100 |
| Ammonia as N in soil | mg/kg | 1.5 | 2.2 | 0.8 | 1.0 | 0.9 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 300 | 340 | 320 | 130 | 160 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 300 | 340 | 320 | 130 | 160 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.10 | 0.11 | 0.05 | 0.03 | 0.04 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 800 | 990 | 500 | 760 | 500 |
| Sulfide Sulfur by calculation* | % | 0.07 | 0.07 | 0.03 | <0.01 | 0.02 |

| TOC_NAGA | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 2,100 | 2,800 | 200 | 1,500 |
| Ammonia as N in soil | mg/kg | 2.4 | 1.3 | 0.9 | 1.0 |
| Nitrate as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Nitrite as N in soil | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Nitrogen in soil/solids | mg/kg | 270 | 320 | 250 | 210 |
| NOx as N in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Organic Nitrogen as N | mg/kg | 270 | 320 | 250 | 210 |
| Phosphate as P in soil | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Sulfur in soil/solids | %w/w | 0.06 | 0.1 | 0.06 | 0.03 |
| Sulphate, SO4 1:5 soil:water | mg/kg | 790 | 1,100 | 700 | 620 |
| Sulfide Sulfur by calculation* | % | 0.03 | 0.06 | 0.03 | <0.01 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 130 | 60 | 80 | 230 | 100 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 340 | 80 | 530 | 170 | 130 |

| Total Kjeldahl Nitrogen (TKN) | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 300 | 340 | 320 | 130 | 160 |

| Total Kjeldahl Nitrogen (TKN) | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 270 | 320 | 250 | 210 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.7 | 9.7 | 9.5 | 9.6 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 20 | <5 | <5 | 61 | 14 |
| $S_{POS}$ | %w/w | 0.03 | <0.005 | 0.005 | 0.1 | 0.02 |
| $S_P$ | %w/w | 0.06 | 0.02 | 0.02 | 0.13 | 0.05 |
| $S_{KCl}$ | %w/w S | 0.024 | 0.023 | 0.018 | 0.031 | 0.029 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 10 | 10 | 9.8 | 12 | 14 |
| s-$ANC_{BT}$ | %w/w S | 3.3 | 3.2 | 3.2 | 3.7 | 4.5 |
| s-Net Acidity excluding ANC | %w/w S | 0.031 | <0.005 | 0.0050 | 0.098 | 0.022 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 20 | <5 | <5 | 61 | 14 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 1.5 | <0.75 | <0.75 | 4.6 | 1.1 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 7 | <5 | <5 | 8 | <5 |
| $S_{POS}$ | %w/w | 0.01 | <0.005 | <0.005 | 0.01 | <0.005 |
| $S_P$ | %w/w | 0.04 | 0.02 | 0.02 | 0.03 | 0.02 |
| $S_{KCl}$ | %w/w S | 0.029 | 0.019 | 0.013 | 0.017 | 0.019 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 8.6 | 8.8 | 9.6 | 10 | 8.4 |
| s-$ANC_{BT}$ | %w/w S | 2.8 | 2.8 | 3.1 | 3.3 | 2.7 |
| s-Net Acidity excluding ANC | %w/w S | 0.011 | <0.005 | <0.005 | 0.013 | <0.005 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 6.8 | <5 | <5 | 8.2 | <5 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.5 | 9.6 | 9.6 | 9.6 | 9.5 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 20 | 16 | <5 | <5 | 19 |
| $S_{POS}$ | %w/w | 0.03 | 0.03 | <0.005 | <0.005 | 0.03 |
| $S_P$ | %w/w | 0.07 | 0.06 | 0.03 | 0.03 | 0.04 |
| $S_{KCl}$ | %w/w S | 0.036 | 0.032 | 0.032 | 0.024 | 0.007 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 16 | 14 | 13 | 12 | 14 |
| s-$ANC_{BT}$ | %w/w S | 5.0 | 4.5 | 4.2 | 3.8 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.032 | 0.026 | <0.005 | <0.005 | 0.031 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 20 | 16 | <5 | <5 | 19 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 1.5 | 1.2 | <0.75 | <0.75 | 1.4 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 | <0.75 |

| Acid Sulphate Soil Suite | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| pH $_{kcl}$ | pH units | 9.6 | 9.6 | 9.7 | 9.4 |
| s-TAA pH 6.5 | %w/w S | <0.01 | <0.01 | <0.01 | <0.01 |
| TAA pH 6.5 | moles $H^+$ /t | <5 | <5 | <5 | <5 |
| a-$S_{POS}$ | moles $H^+$ /t | 11 | 23 | 12 | 11 |
| $S_{POS}$ | %w/w | 0.02 | 0.04 | 0.02 | 0.02 |
| $S_P$ | %w/w | 0.05 | 0.08 | 0.04 | 0.04 |
| $S_{KCl}$ | %w/w S | 0.035 | 0.039 | 0.018 | 0.018 |
| $S_{HCl}$ | %w/w S | [NT] | [NT] | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | [NT] | [NT] | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 14 | 15 | 13 | 14 |
| s-$ANC_{BT}$ | %w/w S | 4.5 | 4.7 | 4.2 | 4.6 |
| s-Net Acidity excluding ANC | %w/w S | 0.017 | 0.036 | 0.019 | 0.018 |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 11 | 23 | 12 | 11 |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.80 | 1.7 | 0.91 | 0.82 |
| s-Net Acidity including ANC | %w/w S | <0.005 | <0.005 | <0.005 | <0.005 |
| a-Net Acidity including ANC | moles $H^+$ /t | <5 | <5 | <5 | <5 |
| Liming rate including ANC | kg $CaCO_3$ /t | <0.75 | <0.75 | <0.75 | <0.75 |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.6 | 1 | 1 | <0.5 | <0.5 |
| Aluminium | µmole/g dry weight | 3 | 2 | 3 | 5 | 3 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.04 | 0.02 | 0.02 | 0.08 | 0.04 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 3 | 3 | 3 | 3 | 4 |
| Lead | µmole/g dry weight | 0.005 | 0.006 | 0.005 | <0.005 | 0.009 |
| Manganese | µmole/g dry weight | 0.3 | 0.4 | 0.3 | 0.5 | 0.4 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.05 | <0.02 | <0.02 | 0.1 | 0.03 |
| Zinc | µmole/g dry weight | 0.05 | 0.12 | 0.05 | 0.03 | 0.12 |
| Total SEM | µmole/g dry weight | 7.2 | 6.3 | 6.5 | 8.8 | 7.8 |
| SEM/AVS ratio | - | 12 | 5.7 | 5.5 | NA | NA |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 1 | 0.5 | <0.5 | <0.5 | <0.5 |
| Aluminium | µmole/g dry weight | 3 | 2 | 2 | 2 | 2 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.04 | 0.03 | 0.07 | 0.02 | 0.02 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 5 | 3 | 3 | 2 | 3 |
| Lead | µmole/g dry weight | 0.007 | 0.006 | 0.006 | 0.005 | <0.005 |
| Manganese | µmole/g dry weight | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.03 | <0.02 | <0.02 | <0.02 | <0.02 |
| Zinc | µmole/g dry weight | 0.12 | 0.08 | 0.11 | 0.04 | 0.04 |
| Total SEM | µmole/g dry weight | 8.6 | 5.6 | 5.4 | 4.2 | 5.0 |
| SEM/AVS ratio | - | 6.8 | 11 | NA | NA | NA |

| AVS/SEM | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 1 | <0.5 | <0.5 | 0.6 | 1 |
| Aluminium | µmole/g dry weight | 5 | 4 | 4 | 4 | 2 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.04 | 0.05 | 0.04 | 0.04 | 0.03 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 5 | 5 | 4 | 4 | 3 |
| Lead | µmole/g dry weight | 0.016 | 0.012 | 0.012 | 0.009 | 0.006 |
| Manganese | µmole/g dry weight | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.05 | 0.04 | 0.04 | 0.03 | <0.02 |
| Zinc | µmole/g dry weight | 0.09 | 0.12 | 0.06 | 0.12 | 0.05 |
| Total SEM | µmole/g dry weight | 10 | 10 | 8.6 | 8.4 | 5.4 |
| SEM/AVS ratio | - | 9.7 | NA | NA | 13 | 4.4 |

| AVS/SEM | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 19/06/2026 | 19/06/2026 | 19/06/2026 | 19/06/2026 |
| Date analysed | - | 22/06/2026 | 22/06/2026 | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | <0.5 | 0.7 | 0.8 | 0.7 |
| Aluminium | µmole/g dry weight | 3 | 5 | 3 | 3 |
| Antimony | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 |
| Arsenic | µmole/g dry weight | <0.05 | <0.05 | <0.05 | <0.05 |
| Cadmium | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 |
| Chromium | µmole/g dry weight | 0.05 | 0.05 | 0.03 | 0.03 |
| Cobalt | µmole/g dry weight | <0.01 | <0.01 | <0.01 | <0.01 |
| Copper | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 |
| Iron | µmole/g dry weight | 5 | 6 | 3 | 3 |
| Lead | µmole/g dry weight | 0.011 | 0.014 | 0.006 | 0.008 |
| Manganese | µmole/g dry weight | 0.5 | 0.6 | 0.4 | 0.4 |
| Mercury | µmole/g dry weight | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nickel | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | µmole/g dry weight | <0.04 | <0.04 | <0.04 | <0.04 |
| Silver | µmole/g dry weight | <0.02 | <0.02 | <0.02 | <0.02 |
| Vanadium | µmole/g dry weight | 0.03 | 0.04 | <0.02 | 0.02 |
| Zinc | µmole/g dry weight | 0.12 | 0.07 | 0.04 | 0.04 |
| Total SEM | µmole/g dry weight | 8.9 | 12 | 6.9 | 6.3 |
| SEM/AVS ratio | - | NA | 17 | 8.9 | 8.6 |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-1 | 411426-2 | 411426-3 | 411426-4 | 411426-5 |
| Your Reference | UNITS | WB1 | WB2 | WB3 | WB4 | WB5 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <40 | <40 | <20 | <100 | <20 |
| Dibutyltin as Sn | µg/kg | <1 | <1 | <0.5 | <2.5 | <0.5 |
| Tributyltin as Sn | µg/kg | <1 | <1 | <0.5 | <2.5 | <0.5 |
| Surrogate Triphenyltin | % | 95 | 95 | 96 | 92 | 97 |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-6 | 411426-7 | 411426-8 | 411426-9 | 411426-10 |
| Your Reference | UNITS | WB6 | HS1 | HS2 | HS3 | HS4 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <40 | <20 | <40 | <40 | <20 |
| Dibutyltin as Sn | µg/kg | <1 | <0.5 | <1 | <1 | <0.5 |
| Tributyltin as Sn | µg/kg | <1 | <0.5 | <1 | <1 | <0.5 |
| Surrogate Triphenyltin | % | 96 | 98 | 96 | 95 | 95 |

| Organotin Compunds in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 411426-11 | 411426-12 | 411426-13 | 411426-14 | 411426-15 |
| Your Reference | UNITS | NH3 | NH4 | NH5 | NH6 | NH7 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <40 | <20 | <20 | <20 | <20 |
| Dibutyltin as Sn | µg/kg | <1 | <0.5 | <0.5 | <0.5 | <0.5 |
| Tributyltin as Sn | µg/kg | <1 | <0.5 | <0.5 | <0.5 | <0.5 |
| Surrogate Triphenyltin | % | 93 | 93 | 98 | 99 | 97 |

| Organotin Compunds in Soil | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 411426-16 | 411426-17 | 411426-18 | 411426-19 |
| Your Reference | UNITS | NH13 | NH14 | NH15 | NH16 |
| Date Sampled | | 17/06/2026 | 17/06/2026 | 17/06/2026 | 17/06/2026 |
| Type of sample | | Sediment | Sediment | Sediment | Sediment |
| Date prepared | - | 24/06/2026 | 24/06/2026 | 24/06/2026 | 24/06/2026 |
| Date analysed | - | 25/06/2026 | 25/06/2026 | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | <20 | <20 | <20 | <20 |
| Dibutyltin as Sn | µg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Tributyltin as Sn | µg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Surrogate Triphenyltin | % | 99 | 95 | 96 | 97 |

| Method ID | Methodology Summary |
|---|---|
| **AVS-SEM** | Determination of Acid Volatile Sulfide (AVS) and Simultaneously Extractable Metals (SEM)/Bioavailable Metals in sediment - determined colourimetrically and using ICP-OES/ICP-MS and cold vapour-AAS. |
| **Ext-054** | Analysed by MPL Envirolab |
| **Inorg-008** | Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours. |
| **Inorg-055** | Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-055** | Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-057** | Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction. |
| **Inorg-060** | Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction. |
| **Inorg-062** | TKN - determined colourimetrically based on APHA latest edition 4500 Norg. Alternatively, TKN can be derived from calculation (Total N - NOx). |

| Method ID | Methodology Summary |
|---|---|
| **Inorg-068** | Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition.<br><br>Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation.<br><br>There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples.<br><br>Neutralising value (NV) of 100% is assumed for liming rate.<br><br>Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.<br><br>The recommendation that the SHCl concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCl results reported only.<br>However, Envirolab/MPL adhere to the following calculation of SNAS, where a misprint in the guideline has yet to be rectified.<br>SNAS (%) = (SHCl –SKCl) x 2.0 |
| **Inorg-081** | Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis.<br>Alternatively determined by colourimetry/turbidity using Discrete Analyser. |
| **INORG-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. Clay fraction at <2µm reported. |
| **Inorg-107** | Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. |
| **INORG-124** | Sulfide is determined after distillation by titration and/or colourimetrically. |
| **INORG-137** | Total Carbon Nitrogen Sulfur by high temperature catalytic combustion with IR detection.<br><br>Total Nitrogen may also be determine from TKN+NOx by calculation. |
| **Metals-020** | Determination of various metals/elements by ICP-AES.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.<br><br>Where molecular anion forms are calculated from an element (e.g. SO4 from S or PO4 from P stoichiometrically), the assumption is that the element is only present in that molecular anion form.<br><br>Submission of low masses of sample e.g. for dust samples, may result in raised PQLs. |
| **Metals-021** | Determination of Mercury by Cold Vapour AAS. |
| **Metals-022** | Determination of various metals by ICP-MS.<br><br>Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.<br><br>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation. |
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. |

| Method ID | Methodology Summary |
|---|---|
| **Org-020** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br><br>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.<br><br>Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40). |
| **Org-022/025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.<br>For soil results:-<br>1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present.<br>2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL.<br>3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above.<br><br>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. |
| **Org-023** | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.<br>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes. |
| **Org-025** | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MSMS. |

| Method ID | Methodology Summary |
|---|---|
| **Org-029** | Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.<br><br>Analysis is undertaken with LC-MS/MS.<br><br>PFAS results include the sum of branched and linear isomers where applicable.<br><br>Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.<br><br>Note, the Total +ve PFAS PQL is reflective of the lowest individual PQL and is therefore "Total +ve PFAS" is simply a sum of the positive individual PFASs (or a described sub-set).<br><br>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER. |

| QUALITY CONTROL: Volatile TRH and BTEX (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 25/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 25/06/2026 | 25/06/2026 |
| TRH $C_6$ - $C_9$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 117 | 99 |
| TRH $C_6$ - $C_{10}$ | mg/kg | 25 | Org-023 | <25 | 1 | <25 | <25 | 0 | 117 | 99 |
| Benzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 119 | 86 |
| Toluene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 108 | 94 |
| Ethylbenzene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 116 | 102 |
| m+p-xylene | mg/kg | 0.4 | Org-023 | <0.4 | 1 | <0.4 | <0.4 | 0 | 121 | 106 |
| o-Xylene | mg/kg | 0.2 | Org-023 | <0.2 | 1 | <0.2 | <0.2 | 0 | 119 | 100 |
| Naphthalene | mg/kg | 1 | Org-023 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| *Surrogate* aaa-Trifluorotoluene | % | | Org-023 | 98 | 1 | 96 | 85 | 12 | 103 | 90 |

| QUALITY CONTROL: Volatile TRH and BTEX (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 25/06/2026 | 25/06/2026 | | [NT] | [NT] |
| TRH $C_6$ - $C_9$ | mg/kg | 25 | Org-023 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH $C_6$ - $C_{10}$ | mg/kg | 25 | Org-023 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| Benzene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| Toluene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| Ethylbenzene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| m+p-xylene | mg/kg | 0.4 | Org-023 | [NT] | 11 | <0.4 | <0.4 | 0 | [NT] | [NT] |
| o-Xylene | mg/kg | 0.2 | Org-023 | [NT] | 11 | <0.2 | <0.2 | 0 | [NT] | [NT] |
| Naphthalene | mg/kg | 1 | Org-023 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| *Surrogate* aaa-Trifluorotoluene | % | | Org-023 | [NT] | 11 | 96 | 92 | 4 | [NT] | [NT] |

| QUALITY CONTROL: Semi-Volatile TRH (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 24/06/2026 | 24/06/2026 |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 122 | 135 |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 94 | 93 |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 108 |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 122 | 135 |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 94 | 93 |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | 25 | Org-020 | <25 | 1 | <25 | <25 | 0 | 129 | 108 |
| *Surrogate* o-Terphenyl | % | | Org-020 | 87 | 1 | 90 | 89 | 1 | 90 | 92 |

| QUALITY CONTROL: Semi-Volatile TRH (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 25/06/2026 | 25/06/2026 | | [NT] | [NT] |
| TRH $C_{10}$ - $C_{14}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH $C_{15}$ - $C_{28}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH $C_{29}$ - $C_{36}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH >$C_{10}$ -$C_{16}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH >$C_{16}$ -$C_{34}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| TRH >$C_{34}$ -$C_{40}$ | mg/kg | 25 | Org-020 | [NT] | 11 | <25 | <25 | 0 | [NT] | [NT] |
| *Surrogate* o-Terphenyl | % | | Org-020 | [NT] | 11 | 95 | 90 | 5 | [NT] | [NT] |

| QUALITY CONTROL: Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Naphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 86 | 92 |
| 2-Methylnaphthalene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 90 | 95 |
| Fluorene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 90 | 89 |
| Phenanthrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 96 | 88 |
| Anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Fluoranthene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 96 | 88 |
| Pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 94 | 88 |
| Benz(a)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Chrysene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 96 | 100 |
| Benzo(b,j)&(k)fluoranthene | µg/kg | 10 | Org-022/025 | <10 | 1 | <10 | <10 | 0 | [NT] | [NT] |
| Benzo(e)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(a)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | 98 | 104 |
| Perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Indeno(1,2,3-cd)pyrene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Dibenz(a,h)anthracene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(g,h,i)perylene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Coronene | µg/kg | 5 | Org-022/025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate p*-Terphenyl-d14 | % | | Org-022/025 | 84 | 1 | 81 | 83 | 2 | 91 | 82 |

| QUALITY CONTROL: Polycyclic Aromatic Hydrocarbons (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Naphthalene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| 2-Methylnaphthalene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthylene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Acenaphthene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Fluorene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Phenanthrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Anthracene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Fluoranthene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benz(a)anthracene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Chrysene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(b,j)&(k)fluoranthene | µg/kg | 10 | Org-022/025 | [NT] | 11 | <10 | <10 | 0 | [NT] | [NT] |
| Benzo(e)pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(a)pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Perylene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Indeno(1,2,3-cd)pyrene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Dibenz(a,h)anthracene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Benzo(g,h,i)perylene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Coronene | µg/kg | 5 | Org-022/025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate p*-Terphenyl-d14 | % | | Org-022/025 | [NT] | 11 | 81 | 90 | 11 | [NT] | [NT] |

| QUALITY CONTROL: Organochlorine Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| alpha-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 90 | 92 |
| Hexachlorobenzene | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| beta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 86 | 83 |
| gamma-BHC (Lindane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| delta-BHC | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 80 | 64 |
| Aldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 98 | 70 |
| Oxychlordane | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor Epoxide | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 106 | 88 |
| gamma-Chlordane (trans-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| alpha-Chlordane (cis-Chlordane) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan I | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDE (p,p-DDE) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 96 | 86 |
| Dieldrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 98 | 83 |
| Endrin | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 96 | 74 |
| 4,4'-DDD (p,p-DDD) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 130 | 118 |
| Endosulfan II | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDT (p,p-DDT) | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan Sulphate | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | 94 | 83 |
| Methoxychlor | µg/kg | 1 | Org-025 | <1 | 1 | <1 | <1 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 86 | 1 | 95 | 100 | 5 | 102 | 99 |

| QUALITY CONTROL: Organochlorine Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| alpha-BHC | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Hexachlorobenzene | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| beta-BHC | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| gamma-BHC (Lindane) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| delta-BHC | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Aldrin | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Oxychlordane | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Heptachlor Epoxide | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| gamma-Chlordane (trans-Chlordane) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| alpha-Chlordane (cis-Chlordane) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan I | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDE (p,p-DDE) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Dieldrin | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endrin | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDD (p,p-DDD) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan II | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| 4,4'-DDT (p,p-DDT) | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Endosulfan Sulphate | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Methoxychlor | µg/kg | 1 | Org-025 | [NT] | 11 | <1 | <1 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | [NT] | 11 | 89 | 92 | 3 | [NT] | [NT] |

| QUALITY CONTROL: Organophosphorus Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Dichlorvos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 88 | 74 |
| Dimethoate | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Diazinon | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyrifos-methyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ronnel | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 98 | 92 |
| Fenitrothion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 104 | 60 |
| Malathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 94 | 88 |
| Chlorpyriphos | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 92 | 89 |
| Parathion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 94 | 62 |
| Bromophos-ethyl | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Ethion | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | 76 | 62 |
| Azinphos-methyl (Guthion) | µg/kg | 50 | Org-025 | <50 | 1 | <50 | <50 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | 86 | 1 | 95 | 100 | 5 | 102 | 99 |

| QUALITY CONTROL: Organophosphorus Pesticides in Sediment | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Dichlorvos | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Dimethoate | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Diazinon | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyrifos-methyl | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Ronnel | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Fenitrothion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Malathion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Chlorpyriphos | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Parathion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Bromophos-ethyl | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Ethion | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Azinphos-methyl (Guthion) | µg/kg | 50 | Org-025 | [NT] | 11 | <50 | <50 | 0 | [NT] | [NT] |
| Surrogate 4-Chloro-3-NBTF | % | | Org-025 | [NT] | 11 | 89 | 92 | 3 | [NT] | [NT] |

| QUALITY CONTROL: PCBs in Sediment (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date extracted | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Total PCBs | µg/kg | 5 | Org-025 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate* 2-Fluorobiphenyl | % | | Org-025 | 85 | 1 | 68 | 70 | 3 | 93 | 82 |

| QUALITY CONTROL: PCBs in Sediment (NAGD) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date extracted | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Total PCBs | µg/kg | 5 | Org-025 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| *Surrogate* 2-Fluorobiphenyl | % | | Org-025 | [NT] | 11 | 68 | 63 | 8 | [NT] | [NT] |

| QUALITY CONTROL: NAGD Metals | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Aluminium | mg/kg | 10 | Metals-020 | <10 | 1 | 470 | 480 | 2 | 89 | 115 |
| Antimony - Low Level | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 80 | 95 |
| Arsenic | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 2 | 1 | 67 | 96 | 109 |
| Cadmium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 92 | 93 |
| Chromium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 2 | 2 | 0 | 93 | 100 |
| Cobalt | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 93 | 98 |
| Copper | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | <0.5 | <0.5 | 0 | 92 | 108 |
| Iron | mg/kg | 10 | Metals-020 | <10 | 1 | 1200 | 1300 | 8 | 89 | 110 |
| Lead | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 1 | 1 | 0 | 91 | 96 |
| Manganese | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 23 | 23 | 0 | 100 | 105 |
| Mercury | mg/kg | 0.01 | Metals-021 | <0.01 | 1 | <0.01 | <0.01 | 0 | 101 | 101 |
| Nickel | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 0.9 | 0.9 | 0 | 92 | 95 |
| Selenium | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | 0.1 | <0.1 | 0 | 93 | 103 |
| Silver | mg/kg | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 94 | 124 |
| Vanadium | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 3 | 4 | 29 | 94 | 108 |
| Zinc | mg/kg | 0.5 | Metals-022 | <0.5 | 1 | 3 | 3 | 0 | 93 | 93 |

| QUALITY CONTROL: NAGD Metals | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Aluminium | mg/kg | 10 | Metals-020 | [NT] | 11 | 1000 | 1100 | 10 | [NT] | [NT] |
| Antimony - Low Level | mg/kg | 0.5 | Metals-022 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Arsenic | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 2 | 2 | 0 | [NT] | [NT] |
| Cadmium | mg/kg | 0.1 | Metals-022 | [NT] | 11 | <0.1 | <0.1 | 0 | [NT] | [NT] |
| Chromium | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 5 | 5 | 0 | [NT] | [NT] |
| Cobalt | mg/kg | 0.5 | Metals-022 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Copper | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 0.9 | 1 | 11 | [NT] | [NT] |
| Iron | mg/kg | 10 | Metals-020 | [NT] | 11 | 1900 | 2000 | 5 | [NT] | [NT] |
| Lead | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 3 | 4 | 29 | [NT] | [NT] |
| Manganese | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 39 | 41 | 5 | [NT] | [NT] |
| Mercury | mg/kg | 0.01 | Metals-021 | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| Nickel | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 2 | 2 | 0 | [NT] | [NT] |
| Selenium | mg/kg | 0.1 | Metals-022 | [NT] | 11 | 0.2 | 0.2 | 0 | [NT] | [NT] |
| Silver | mg/kg | 0.1 | Metals-022 | [NT] | 11 | <0.1 | <0.1 | 0 | [NT] | [NT] |
| Vanadium | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 5.5 | 5.6 | 2 | [NT] | [NT] |
| Zinc | mg/kg | 0.5 | Metals-022 | [NT] | 11 | 7.5 | 7.5 | 0 | [NT] | [NT] |

| QUALITY CONTROL: Acid Extractable metals in soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-2 | 411426-2 |
| Date prepared | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Date analysed | - | | | 26/06/2026 | 1 | 26/06/2026 | 26/06/2026 | | 26/06/2026 | 26/06/2026 |
| Phosphorus | mg/kg | 10 | Metals-020 | <10 | 1 | 70 | 90 | 25 | 107 | 103 |

| QUALITY CONTROL: Acid Extractable metals in soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 26/06/2026 | 26/06/2026 | | [NT] | [NT] |
| Phosphorus | mg/kg | 10 | Metals-020 | [NT] | 11 | 140 | 140 | 0 | [NT] | [NT] |

| QUALITY CONTROL: PFAS in Soils Short | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 23/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 23/06/2026 | 23/06/2026 | | 23/06/2026 | 23/06/2026 |
| Perfluorobutanesulfonic acid | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 97 | 99 |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 100 | 103 |
| Perfluorooctanesulfonic acid PFOS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 96 | 97 |
| Perfluorooctanoic acid PFOA | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 101 | 106 |
| 6:2 FTS | µg/kg | 0.1 | Org-029 | <0.1 | 1 | <0.1 | <0.1 | 0 | 99 | 99 |
| 8:2 FTS | µg/kg | 0.2 | Org-029 | <0.2 | 1 | <0.2 | <0.2 | 0 | 93 | 94 |
| *Surrogate* $^{13}C_8$ *PFOS* | % | | Org-029 | 97 | 1 | 95 | 101 | 6 | 97 | 102 |
| *Surrogate* $^{13}C_2$ *PFOA* | % | | Org-029 | 100 | 1 | 99 | 109 | 10 | 100 | 104 |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | | Org-029 | 100 | 1 | 92 | 92 | 0 | 99 | 96 |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | | Org-029 | 95 | 1 | 85 | 83 | 2 | 94 | 88 |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | | Org-029 | 94 | 1 | 86 | 83 | 4 | 96 | 87 |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | | Org-029 | 98 | 1 | 86 | 82 | 5 | 99 | 83 |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | | Org-029 | 95 | 1 | 59 | 58 | 2 | 95 | 63 |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | | Org-029 | 100 | 1 | 69 | 73 | 6 | 95 | 72 |

| QUALITY CONTROL: PFAS in Soils Short | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-4 | [NT] |
| Date prepared | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | 23/06/2026 | [NT] |
| Date analysed | - | | | [NT] | 11 | 23/06/2026 | 23/06/2026 | | 24/06/2026 | [NT] |
| Perfluorobutanesulfonic acid | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 98 | [NT] |
| Perfluorohexanesulfonic acid - PFHxS | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 101 | [NT] |
| Perfluorooctanesulfonic acid PFOS | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 100 | [NT] |
| Perfluorooctanoic acid PFOA | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 95 | [NT] |
| 6:2 FTS | µg/kg | 0.1 | Org-029 | [NT] | 11 | <0.1 | <0.1 | 0 | 109 | [NT] |
| 8:2 FTS | µg/kg | 0.2 | Org-029 | [NT] | 11 | <0.2 | <0.2 | 0 | 96 | [NT] |
| *Surrogate* $^{13}C_8$ *PFOS* | % | | Org-029 | [NT] | 11 | 98 | 96 | 2 | 103 | [NT] |
| *Surrogate* $^{13}C_2$ *PFOA* | % | | Org-029 | [NT] | 11 | 112 | 113 | 1 | 102 | [NT] |
| *Extracted ISTD* $^{13}C_3$ *PFBS* | % | | Org-029 | [NT] | 11 | 96 | 96 | 0 | 120 | [NT] |
| *Extracted ISTD* $^{18}O_2$ *PFHxS* | % | | Org-029 | [NT] | 11 | 88 | 86 | 2 | 110 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOS* | % | | Org-029 | [NT] | 11 | 90 | 92 | 2 | 97 | [NT] |
| *Extracted ISTD* $^{13}C_4$ *PFOA* | % | | Org-029 | [NT] | 11 | 82 | 88 | 7 | 109 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *6:2FTS* | % | | Org-029 | [NT] | 11 | 58 | 59 | 2 | 110 | [NT] |
| *Extracted ISTD* $^{13}C_2$ *8:2FTS* | % | | Org-029 | [NT] | 11 | 74 | 73 | 1 | 99 | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | <100 | 1 | 1100 | 1300 | 17 | 106 | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | <0.5 | 1 | 1.2 | 1.2 | 0 | 93 | 87 |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 98 | 85 |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | <0.1 | 1 | <0.1 | <0.1 | 0 | 99 | 92 |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | <10 | 1 | 130 | 170 | 27 | 101 | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | <0.5 | 1 | <0.5 | <0.5 | 0 | 98 | 85 |
| Organic Nitrogen as N | mg/kg | 10 | | <10 | 1 | 130 | 170 | 27 | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | <0.5 | 1 | <0.5 | <0.5 | 0 | 110 | 91 |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | <0.01 | 1 | 0.1 | 0.08 | 22 | 80 | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | <10 | 1 | 470 | 470 | 0 | 110 | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | <0.01 | 1 | 0.08 | 0.07 | 13 | [NT] | [NT] |

| QUALITY CONTROL: TOC_NAGA | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Total Organic Carbon in soil/solids | mg/kg | 100 | INORG-137 | [NT] | 11 | 2300 | 3500 | 41 | [NT] | [NT] |
| Ammonia as N in soil | mg/kg | 0.5 | Inorg-057 | [NT] | 11 | 1.5 | 1.6 | 6 | [NT] | [NT] |
| Nitrate as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Nitrite as N in soil | mg/kg | 0.1 | Inorg-055 | [NT] | 11 | <0.1 | <0.1 | 0 | [NT] | [NT] |
| Total Nitrogen in soil/solids | mg/kg | 10 | INORG-137 | [NT] | 11 | 300 | 210 | 35 | [NT] | [NT] |
| NOx as N in soil | mg/kg | 0.5 | Inorg-055 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Organic Nitrogen as N | mg/kg | 10 | | [NT] | 11 | 300 | 210 | 35 | [NT] | [NT] |
| Phosphate as P in soil | mg/kg | 0.5 | Inorg-060 | [NT] | 11 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Total Sulfur in soil/solids | %w/w | 0.01 | INORG-137 | [NT] | 11 | 0.10 | 0.09 | 11 | [NT] | [NT] |
| Sulphate, SO4 1:5 soil:water | mg/kg | 10 | Inorg-081 | [NT] | 11 | 800 | 830 | 4 | [NT] | [NT] |
| Sulfide Sulfur by calculation* | % | 0.01 | INORG-124 | [NT] | 11 | 0.07 | 0.06 | 15 | [NT] | [NT] |

| QUALITY CONTROL: Total Kjeldahl Nitrogen (TKN) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Date analysed | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| TKN in soil (by Calculation) | mg/kg | 10 | Inorg-062 | <10 | 1 | 130 | 170 | 27 | [NT] | [NT] |

| QUALITY CONTROL: Total Kjeldahl Nitrogen (TKN) | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| TKN in soil (by Calculation) | mg/kg | 10 | Inorg-062 | [NT] | 11 | 300 | 210 | 35 | [NT] | [NT] |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | [NT] |
| Date prepared | - | | | 19/06/2026 | 1 | 19/06/2026 | 19/06/2026 | | 19/06/2026 | [NT] |
| Date analysed | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | 1 | 9.6 | 9.6 | 0 | 97 | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | <0.01 | 1 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | <5 | <5 | 0 | 96 | [NT] |
| a-$S_{POS}$ | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | 20 | 19 | 5 | [NT] | [NT] |
| $S_{POS}$ | %w/w | 0.005 | Inorg-068 | <0.005 | 1 | 0.03 | 0.03 | 0 | [NT] | [NT] |
| $S_P$ | %w/w | 0.005 | Inorg-068 | <0.005 | 1 | 0.06 | 0.05 | 18 | [NT] | [NT] |
| $S_{KCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | 0.024 | 0.024 | 0 | [NT] | [NT] |
| $S_{HCl}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | [NT] | [NT] | | [NT] | [NT] |
| $S_{NAS}$ | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | [NT] | [NT] | | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | <0.05 | 1 | 10 | 10 | 0 | 99 | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | <0.05 | 1 | 3.3 | 3.3 | 0 | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | 0.031 | 0.030 | 3 | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | 20 | 19 | 5 | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | 1 | 1.5 | 1.4 | 7 | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | <0.005 | 1 | <0.005 | <0.005 | 0 | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | <5 | 1 | <5 | <5 | 0 | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | <0.75 | 1 | <0.75 | <0.75 | 0 | [NT] | [NT] |

| QUALITY CONTROL: Acid Sulphate Soil Suite | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 11 | 19/06/2026 | 19/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | [NT] |
| pH $_{kcl}$ | pH units | | Inorg-068 | [NT] | 11 | 9.5 | 9.5 | 0 | [NT] | [NT] |
| s-TAA pH 6.5 | %w/w S | 0.01 | Inorg-068 | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| TAA pH 6.5 | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| a-$S_{POS}$ | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | 20 | 20 | 0 | [NT] | [NT] |
| $S_{POS}$ | %w/w | 0.005 | Inorg-068 | [NT] | 11 | 0.03 | 0.03 | 0 | [NT] | [NT] |
| $S_P$ | %w/w | 0.005 | Inorg-068 | [NT] | 11 | 0.07 | 0.07 | 0 | [NT] | [NT] |
| $S_{KCl}$ | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | 0.036 | 0.037 | 3 | [NT] | [NT] |
| $ANC_{BT}$ | % $CaCO_3$ | 0.05 | Inorg-068 | [NT] | 11 | 16 | 15 | 6 | [NT] | [NT] |
| s-$ANC_{BT}$ | %w/w S | 0.05 | Inorg-068 | [NT] | 11 | 5.0 | 5.0 | 0 | [NT] | [NT] |
| s-Net Acidity excluding ANC | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | 0.032 | 0.032 | 0 | [NT] | [NT] |
| a-Net Acidity excluding ANC | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | 20 | 20 | 0 | [NT] | [NT] |
| Liming rate excluding ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | [NT] | 11 | 1.5 | 1.5 | 0 | [NT] | [NT] |
| s-Net Acidity including ANC | %w/w S | 0.005 | Inorg-068 | [NT] | 11 | <0.005 | <0.005 | 0 | [NT] | [NT] |
| a-Net Acidity including ANC | moles $H^+$ /t | 5 | Inorg-068 | [NT] | 11 | <5 | <5 | 0 | [NT] | [NT] |
| Liming rate including ANC | kg $CaCO_3$ /t | 0.75 | Inorg-068 | [NT] | 11 | <0.75 | <0.75 | 0 | [NT] | [NT] |

| QUALITY CONTROL: AVS/SEM | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 19/06/2026 | 1 | 19/06/2026 | 19/06/2026 | | 19/06/2026 | 19/06/2026 |
| Date analysed | - | | | 22/06/2026 | 1 | 22/06/2026 | 22/06/2026 | | 22/06/2026 | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.5 | AVS-SEM | <0.5 | 1 | 0.6 | 0.7 | 15 | 97 | [NT] |
| Aluminium | µmole/g dry weight | 0.05 | Metals-020 | <0.05 | 1 | 3 | 4 | 29 | 106 | # |
| Antimony | µmole/g dry weight | 0.05 | Metals-020 | <0.05 | 1 | <0.05 | <0.05 | 0 | 94 | 93 |
| Arsenic | µmole/g dry weight | 0.05 | AVS-SEM | <0.05 | 1 | <0.05 | <0.05 | 0 | 101 | 103 |
| Cadmium | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | 1 | <0.01 | <0.01 | 0 | 94 | 87 |
| Chromium | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | 1 | 0.04 | 0.04 | 0 | 96 | 93 |
| Cobalt | µmole/g dry weight | 0.01 | AVS-SEM | <0.01 | 1 | <0.01 | <0.01 | 0 | 96 | 92 |
| Copper | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | <0.02 | <0.02 | 0 | 94 | 103 |
| Iron | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | 1 | 3 | 3 | 0 | 103 | ## |
| Lead | µmole/g dry weight | 0.005 | AVS-SEM | <0.005 | 1 | 0.005 | 0.006 | 18 | 94 | 90 |
| Manganese | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | 0.3 | 0.3 | 0 | 101 | 90 |
| Mercury | µmole/g dry weight | 0.0005 | AVS-SEM | <0.0005 | 1 | <0.0005 | <0.0005 | 0 | [NT] | [NT] |
| Nickel | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | <0.02 | <0.02 | 0 | 95 | 88 |
| Selenium | µmole/g dry weight | 0.04 | AVS-SEM | <0.04 | 1 | <0.04 | <0.04 | 0 | 105 | 100 |
| Silver | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | 1 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Vanadium | µmole/g dry weight | 0.02 | Metals-020 | <0.02 | 1 | 0.05 | 0.05 | 0 | 95 | 96 |
| Zinc | µmole/g dry weight | 0.02 | AVS-SEM | <0.02 | 1 | 0.05 | 0.05 | 0 | 103 | # |
| Total SEM | µmole/g dry weight | 0.13 | AVS-SEM | <0.13 | 1 | 7.2 | 7.5 | 4 | [NT] | [NT] |
| SEM/AVS ratio | - | 0 | AVS-SEM | <0 | 1 | 12 | 11 | 9 | [NT] | [NT] |

| QUALITY CONTROL: AVS/SEM | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | 411426-5 |
| Date prepared | - | | | [NT] | 11 | 19/06/2026 | 19/06/2026 | | [NT] | 19/06/2026 |
| Date analysed | - | | | [NT] | 11 | 22/06/2026 | 22/06/2026 | | [NT] | 22/06/2026 |
| Acid Volatile Sulphide | µmole/g dry weight | 0.5 | AVS-SEM | [NT] | 11 | 1 | 0.9 | 11 | [NT] | 100 |
| Aluminium | µmole/g dry weight | 0.05 | Metals-020 | [NT] | 11 | 5 | 4 | 22 | [NT] | [NT] |
| Antimony | µmole/g dry weight | 0.05 | Metals-020 | [NT] | 11 | <0.05 | <0.05 | 0 | [NT] | [NT] |
| Arsenic | µmole/g dry weight | 0.05 | AVS-SEM | [NT] | 11 | <0.05 | <0.05 | 0 | [NT] | [NT] |
| Cadmium | µmole/g dry weight | 0.01 | AVS-SEM | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| Chromium | µmole/g dry weight | 0.01 | AVS-SEM | [NT] | 11 | 0.04 | 0.04 | 0 | [NT] | [NT] |
| Cobalt | µmole/g dry weight | 0.01 | AVS-SEM | [NT] | 11 | <0.01 | <0.01 | 0 | [NT] | [NT] |
| Copper | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Iron | µmole/g dry weight | 0.02 | Metals-020 | [NT] | 11 | 5 | 4 | 22 | [NT] | [NT] |
| Lead | µmole/g dry weight | 0.005 | AVS-SEM | [NT] | 11 | 0.016 | 0.015 | 6 | [NT] | [NT] |
| Manganese | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | 0.4 | 0.4 | 0 | [NT] | [NT] |
| Mercury | µmole/g dry weight | 0.0005 | AVS-SEM | [NT] | 11 | <0.0005 | <0.0005 | 0 | [NT] | [NT] |
| Nickel | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Selenium | µmole/g dry weight | 0.04 | AVS-SEM | [NT] | 11 | <0.04 | <0.04 | 0 | [NT] | [NT] |
| Silver | µmole/g dry weight | 0.02 | Metals-020 | [NT] | 11 | <0.02 | <0.02 | 0 | [NT] | [NT] |
| Vanadium | µmole/g dry weight | 0.02 | Metals-020 | [NT] | 11 | 0.05 | 0.04 | 22 | [NT] | [NT] |
| Zinc | µmole/g dry weight | 0.02 | AVS-SEM | [NT] | 11 | 0.09 | 0.08 | 12 | [NT] | [NT] |
| Total SEM | µmole/g dry weight | 0.13 | AVS-SEM | [NT] | 11 | 10 | 9.2 | 8 | [NT] | [NT] |
| SEM/AVS ratio | - | 0 | AVS-SEM | [NT] | 11 | 9.7 | 9.8 | 1 | [NT] | [NT] |

| QUALITY CONTROL: Organotin Compunds in Soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-1 | 411426-2 |
| Date prepared | - | | | 24/06/2026 | 1 | 24/06/2026 | 24/06/2026 | | 24/06/2026 | 24/06/2026 |
| Date analysed | - | | | 25/06/2026 | 1 | 25/06/2026 | 25/06/2026 | | 25/06/2026 | 25/06/2026 |
| Monobutyltin as Sn | µg/kg | 20 | Ext-054 | <20 | 1 | <40 | <40 | 0 | [NT] | [NT] |
| Dibutyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <1 | <1 | 0 | 96 | 103 |
| Tributyltin as Sn | µg/kg | 0.5 | Ext-054 | <0.5 | 1 | <1 | <1 | 0 | 90 | 105 |
| Surrogate Triphenyltin | % | | Ext-054 | 97 | 1 | 95 | 96 | 1 | 98 | 92 |

| QUALITY CONTROL: Organotin Compunds in Soil | | | | | | Duplicate | | | Spike Recovery % | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 10 | 24/06/2026 | 24/06/2026 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 10 | 25/06/2026 | 25/06/2026 | | [NT] | [NT] |
| Monobutyltin as Sn | µg/kg | 20 | Ext-054 | [NT] | 10 | <20 | <20 | 0 | [NT] | [NT] |
| Dibutyltin as Sn | µg/kg | 0.5 | Ext-054 | [NT] | 10 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Tributyltin as Sn | µg/kg | 0.5 | Ext-054 | [NT] | 10 | <0.5 | <0.5 | 0 | [NT] | [NT] |
| Surrogate Triphenyltin | % | | Ext-054 | [NT] | 10 | 95 | 98 | 3 | [NT] | [NT] |

## Result Definitions

| | |
|---|---|
| **NT** | Not tested |
| **NA** | Test not required |
| **INS** | Insufficient sample for this test |
| **PQL** | Practical Quantitation Limit |
| **<** | Less than |
| **>** | Greater than |
| **RPD** | Relative Percent Difference |
| **LCS** | Laboratory Control Sample |
| **NS** | Not specified |
| **NEPM** | National Environmental Protection Measure |
| **NR** | Not Reported |

## Quality Control Definitions

| | |
|---|---|
| **Blank** | This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. |
| **Duplicate** | This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable. |
| **Matrix Spike** | A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. |
| **LCS (Laboratory Control Sample)** | This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample. |
| **Surrogate Spike** | Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples. |

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field).

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

## Report Comments

Organotin Compunds in Soil analysed by MPL Laboratories, report no. PHF1622.
PQLs for samples 411426-1,2,4,6,8,9 and 11 have been raised due to suppression of the extracted internal standard.

MISC_INORG_S: TOTAL NITROGEN IN SOILS/TOTAL ORGANIC CARBON IN SOILS - The duplicate result is greater than the acceptable RPD. Re-analysis indicates possible sample heterogeneity. 411426-11,11D

AVS/SEM

## Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.
# Low spike recovery was obtained for this sample. This is due to matrix interferences. However, an acceptable recovery was obtained for the LCS.