

**PORT AUTHORITY OF NEW SOUTH WALES**

# **Eden Cruise Wharf Modification 3 to SSI 7734**

## **Operational Water Quality Monitoring Report - Quantum Class Visit**

311015-00687 \_RevO



19 May 2025

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PROJECT 311012- 00687 - Eden MOD3 Operational Water Quality Program							
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## Executive summary

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The Port of Eden (the Port) is located within Twofold Bay, in the Bega Valley local government area (LGA). It is the southern-most declared port in New South Wales (NSW), approximately equidistant between Sydney and Melbourne and approximately 40 kilometres (km) from the NSW and Victorian border. The Eden Cruise Wharf is located at the western end of Weecoon Street, within Snug Cove, which is on the northern side of Twofold Bay.

Worley was engaged by Port Authority of New South Wales (Port Authority) to prepare an Operational Water Quality Program in accordance with Conditions D10, D11 and D21 of the SSI 7734 MOD 3 Conditions of Approval and deliver this program once monitoring triggers occur. The Operational Water Quality Program results outlined in this report relate to the first Quantum Vessel visit to the Port which occurred on 22<sup>nd</sup> February 2025.

The Water Quality Monitoring Program was implemented with monitoring undertaken the day prior, day of and day following the first Quantum Class Vessel visit (the Ovation of the Seas) to the Port in February 2025. Over the three days, depth profiling of physicochemistry parameters (turbidity, temperature, pH, dissolved oxygen, salinity, total dissolved solids and conductivity) was undertaken at twelve sites with six sampling events per day. Water quality grab samples were also collected from these twelve sites, with two sampling events per day, for subsequent laboratory analysis of total suspended solids (TSS).

The water quality monitoring results indicate that the water quality impacts from the Quantum Class Vessel visit to the Port were largely within the predicted and previously modelled ranges. There was some elevated turbidity and TSS concentrations at sites during cruise ship movements, these were short term in nature and largely within the vessel route or modelling predictions. Most of the results validate the sediment plume modelling and support the MOD 3 assessment. Results of monitoring confirmed that the potential impacts on sensitive seagrass areas and mussel aquaculture receptors from visits of Quantum Class vessels remains low in most areas of the Port.

An exception to the modelling predictions and MOD3 assessment was seen in the water quality results around the area of the mapped sparse Posidonia in the north-eastern (NE) corner of the Port, in shallow waters adjacent to the boat ramp and the Mooring Jetty. In this area, TSS concentrations were higher than previously modelled. The TSS results suggest potential for higher loads of sediment deposition in this area than previously predicted, and hence higher potential for smothering impacts on Posidonia seagrass as well as other marine vegetation and areas rocky seafloor habitat in this area of the Port. Apart from this finding, the results of this study confirm the modelling prediction that the sediment plume generated by a Quantum class vessel would be short lived in nature and would dissipate quickly following arrival and departure. The following mitigation is recommended to address this identified impact for cruise ships entering the Port of Eden: *"Where practicable minimise the power and duration that thrusters are used, especially in the berth box, to reduce sediment resuspension and the resultant impacts on water quality and sensitive ecological communities within the Port of Eden"*.

## Acronyms and abbreviations

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Acronym/abbreviation	Definition
<b>ANZECC</b>	Australian and New Zealand Environment Conservation Council
<b>ANZG</b>	Australian and New Zealand Fresh and Marine Water Quality Guidelines
<b>DO</b>	Dissolved oxygen
<b>EA</b>	Environmental Assessment
<b>EPA</b>	Environmental Protection Authority
<b>LOR</b>	Limit of Reporting
<b>MOD 3</b>	Eden Cruise Wharf Modification 3 to SSI 7734
<b>NATA</b>	National Association Testing Authority
<b>NSW DPI</b>	New South Wales Department of Primary Industries
<b>NSW DPIRD</b>	New South Wales Department of Primary Industries and Regional Development
<b>NTU</b>	Nephelometric Turbidity Units
<b>ODO</b>	Optical dissolved oxygen
<b>ppt</b>	Part per thousand
<b>QAQC</b>	Quality Assurance and Quality Control
<b>SSI</b>	State Significant Infrastructure
<b>TDS</b>	Total dissolved solids
<b>TSS</b>	Total suspended solids
<b>WQGV</b>	Water quality guideline value

# 1. Background

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## 1.1 Port of Eden

The Port of Eden (the Port) is located within Twofold Bay, in the Bega Valley local government area (LGA). It is the southern-most declared port in New South Wales (NSW), approximately equidistant between Sydney and Melbourne and approximately 40 kilometres (km) from the NSW and Victorian border. The Eden Cruise Wharf is located at the western end of Weecoon Street, within Snug Cove, which is on the northern side of Twofold Bay (Figure 1-1).

Twofold Bay is an open oceanic embayment with a catchment area of approximately 11 km<sup>2</sup> and an average depth of approximately 10.9 metres (m). Twofold Bay is the third deepest natural harbour in the Southern Hemisphere. The Eden Cruise Wharf was approved by the Minister for Planning's delegate on the 5 July 2017 as State Significant Infrastructure (SSI) 7734. The original Infrastructure Approval provided for dredging adjacent to the existing breakwall and construction and operation of an extension to the existing Breakwater Wharf and five marine dolphins for use by cruise ships with lengths up to 325 m and approximately 3,500 persons on board. Cruise ships were allowed to berth at the wharf during the hours 7:00am to 10:00pm. The original Infrastructure Approval restricted the operation of the Eden Cruise Wharf to up to 60 cruise ship visits per annum. The area adjacent to the Eden Cruise Wharf was dredged in 2017 to -10.5 m.

In response to ongoing demand from the cruise and shipping industries and the Royal Australian Navy (RAN) to use the Eden Cruise Wharf, optimise the use of the wharf and support business opportunities and economic growth in the region, Port Authority of New South Wales (Port Authority) obtained approval for MOD 3 on 24 May 2024. MOD 3 allowed the use of the Eden Cruise Wharf by cruise and non-cruise vessels up to 370 m in length (non-cruise vessels exclude dry/wet bulk cargo and dangerous goods or hazardous materials vessels), with all vessels allowed to remain at berth 24 hours per day. MOD 3 allowed unrestricted number of vessel visits to the Eden Cruise Wharf.

Since the Eden Cruise Wharf became operational in September 2019, there have been 117 cruise ship visits up to the end of the 2024/2025 Cruise Season (weather permitting). The first Quantum Class vessel to visit the Port was the Ovation of the Seas, a 348 m long ship owned by Royal Caribbean International. The Ovation of the Seas entered Twofold Bay early on 22<sup>nd</sup> February 2025, berthing at 6:55am and departing the berth at 4pm. The vessel carried over 4,800 passengers and 1,500 crew. Images of the ship in Eden during this visit are shown in Figure 1-2.



Figure 1-1 Location of the Eden Cruise Wharf (Base Map: Nearmap 2024)





Figure 1-2 The Ovation of the Seas at Port of Eden (February 22<sup>nd</sup> 2025)

## 1.2 Operational Water Quality Monitoring Program

Worley was engaged in 2024 by Port Authority to prepare an Operational Water Quality Monitoring Program in accordance with Conditions D10, D11 and D21 of the Eden MOD 3 Conditions of Approval (Appendix A, Table 5-1) and deliver this program when identified monitoring triggers were met (Section 2.2). The objective of this Operational Water Quality Monitoring Program was to undertake water quality monitoring during the first Quantum Class (or equivalent) cruise ship visit to compare the actual operational performance against the predicted performance to validate the MOD 3 water quality modelling studies and impact assessment on identified sensitive receptors (Advisian 2023; Jacobs 2017; Jacobs 2023). The Operational Water Quality Program was endorsed by NSW Department of Primary Industries and Regional Development (DPIRD) Fisheries and approved by the Planning Secretary on 25 September 2024.

This report provides the results of the first Quantum Class cruise ship visit water quality monitoring.

## 2. Methods

### 2.1 Water Quality Guidelines

The following water quality guidelines are applicable to the Operational Water Quality Monitoring Program:

- NSW Department of Environment and Conservation – Marine Water Quality Objectives for NSW Ocean Waters (2005)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) - Toxicant Default Guideline Values for 95% species protection  
<http://www.waterquality.gov.au/anz-guidelines>
- IMCRA mesoscale bioregions Default Guideline Values for Physical and Chemical Stressors, Batemans Shelf <http://www.waterquality.gov.au/anz-guidelines>
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) - Default Guideline Values for Physical and Chemical Stressors, East Coast Australia and Guidelines for Aquaculture and human consumption of aquatic foods
- NSW Food Authority Shellfish Industry Manual (NSWFA 2018).

The following water quality values are also relevant to the site:

- Protection of Aquatic Ecosystems (including protected adjacent seagrass communities)
- Protection of Shellfish Aquaculture
- Protection of Cultural and Spiritual values associated with marine waters
- Protection of Visual Amenity.

Protection of water quality values is achieved through the selection of appropriate water quality guideline values (WQGV) for the parameters being tested. The adopted relevant water quality guideline values are included in Table 2-1.

Table 2-1 Water quality guidelines

Parameter	Method	Unit	Level Of Reporting (LOR)	Water Quality Guideline
Turbidity	Field	NTU	-	< 10 NTU <sup>1</sup>
Temperature	Field	°C	-	16.8 – 19.6 °C <sup>3</sup>
Conductivity	Field	µS/cm	-	--
Salinity	Field	PSU	-	33 - 37 <sup>3</sup>
pH	Field	-	-	8 - 8.4 <sup>1</sup>

Parameter	Method	Unit	Level Of Reporting (LOR)	Water Quality Guideline
Dissolved oxygen	Field	%Sat	-	> 93.4 <sup>3,4</sup> 5 mg/L <sup>2</sup>
Total suspended solids	Lab	mg/L	1 mg/L (low level)	< 10 mg/L <sup>2</sup>

1 Default water quality guidelines for stressors in marine waters of south-east Australia (ANZECC 2000)

2 Default water quality guidelines for aquaculture and human consumption of aquatic foods (ANZECC 2000)

3 Site specific guideline for marine Twofold Shelf IMCRA bioregion during season of spring (ANZG 2018)

4 The ANZG 2018 site specific guideline for dissolved oxygen in summer in the marine Twofold Shelf IMCRA bioregion was converted from mL/L to %Sat assuming the average temperature (19.5°C) and average salinity (34.4 PSU).

## 2.2 Monitoring Triggers

The monitoring trigger for this program was the first visit of a Quantum Class (or equivalent) size cruise ship to the Port. This occurred on the 22<sup>nd</sup> of February 2025.

## 2.3 Monitoring Frequency

The operational water quality monitoring was undertaken at least six times per day over three days associated with this visit including:

1. Day before berthing (21<sup>st</sup> February 2025)
2. Day during berthing (including during arrival and departure) (22<sup>nd</sup> February 2025)
3. Day following berthing (23<sup>rd</sup> February 2025).

## 2.4 Monitoring Sites

Twelve (12) water quality monitoring sites were sampled. The monitoring sites were located within the vessel generated sediment disturbance modelling domain (Jacobs 2023) and at the previously identified sensitive receptors (i.e., seagrasses and aquaculture leases). Water quality monitoring sites are shown in Figure 2-1 and Table 2-2.

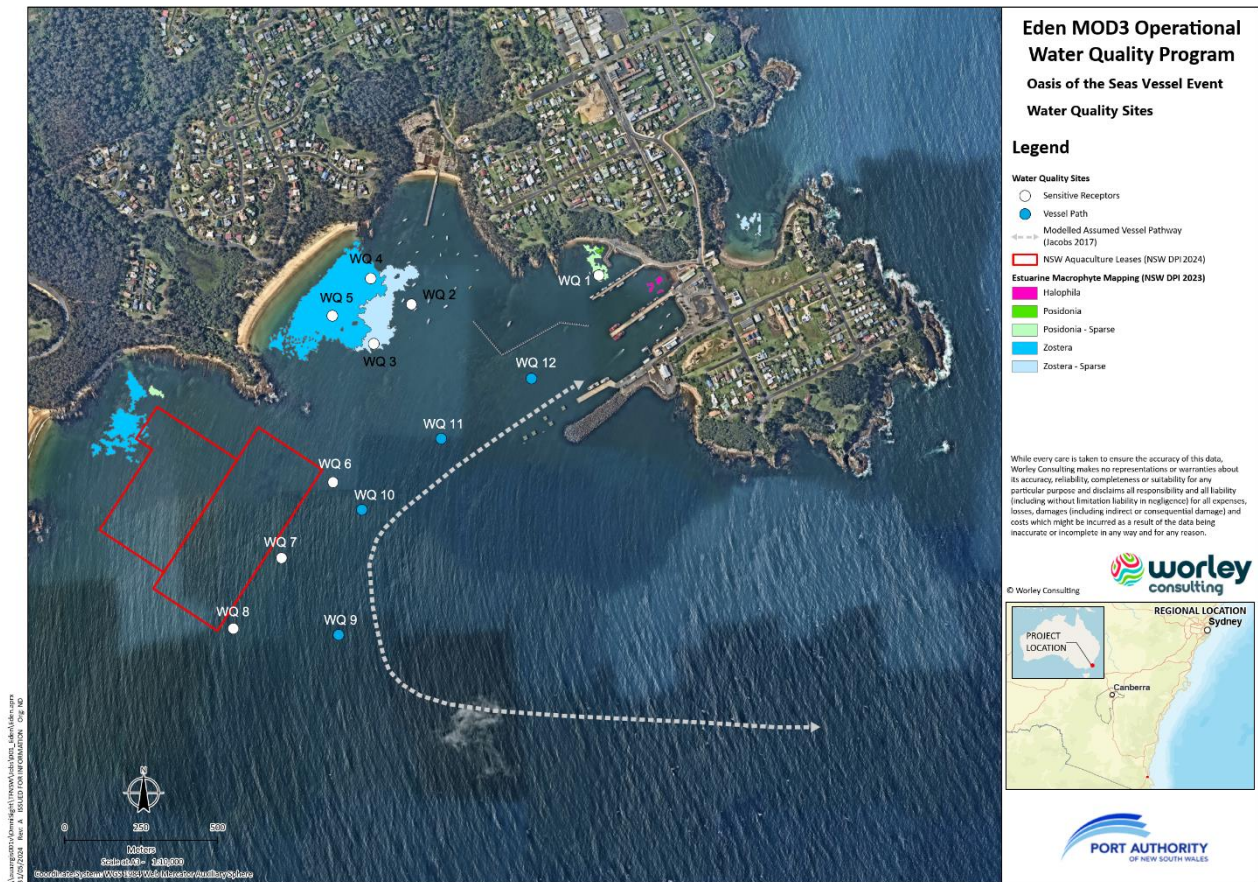


Figure 2-1 Location of water quality monitoring sites for the Operational Water Quality Program

Table 2-2 GPS coordinates of water quality monitoring sites for the Operational Water Quality Program

Site	Longitude	Latitude
<b>WQ1</b>	37°04.170'S	149°54.260'E
<b>WQ2</b>	37°04.297'S	149°54.104'E
<b>WQ3</b>	37°04.356'S	149°54.023'E
<b>WQ4</b>	37°04.288'S	149°54.063'E
<b>WQ5</b>	37°04.345'S	149°53.980'E
<b>WQ6</b>	37°04.565'S	149°53.954'E
<b>WQ7</b>	37°04.674'S	149°53.871'E
<b>WQ8</b>	37°04.793'S	149°53.778'E
<b>WQ9</b>	37°04.798'S	149°54.079'E
<b>WQ10</b>	37°04.601'S	149°54.074'E
<b>WQ11</b>	37°04.531'S	149°54.215'E
<b>WQ12</b>	37°04.422'S	149°54.310'E

## 2.5 Monitoring Parameters

### 2.5.1 Field Conditions

The following field conditions were recorded at each site during sample collection:

- Timing of the cruise ship movements
- Timing of other vessel movements
- Date
- Time of sampling
- Site
- Depths of sampling
- Tide times (low and high) and tide states (ebb or flood)
- Wind speed and direction
- Current speed and direction
- Any natural regional events that occur such as upwellings, major storms or algae blooms etc.
- Swell height and direction
- Rainfall (mm) on day of sampling and days preceding sampling
- Visual observations of water quality (e.g., presence of surface slicks, rubbish, debris, discoloured water or odour).

Field notes are included in **Appendix B**.

### 2.5.2 Water Quality Parameters

During each day:

- In-situ water quality monitoring at 12 sites was undertaken with physicochemistry measurements collected from surface to seabed every 1 hour, over 6 hours per day. Physicochemical parameters are listed in Table 2-1.
- Water quality samples at 12 sites were collected twice per day using a grab sampling method for subsequent NATA laboratory analysis of TSS. The only chemistry parameter was TSS which is listed in Table 2-1.

## 2.6 Collection Methods

Physicochemical parameters (turbidity, temperature, conductivity/salinity, pH and dissolved oxygen) were measured in-situ using a hand-held probe to undertake continuous profiling through the water column (surface water to seabed) at each site. Water samples for laboratory

analysis of TSS were collected using a water grab sampler (see water quality equipment in Figure 2-2). Photographs of the field sampling methods and boat GPS navigation system, showing the vessel route and tracks over the three sampling days, are shown in Figure 2-3.

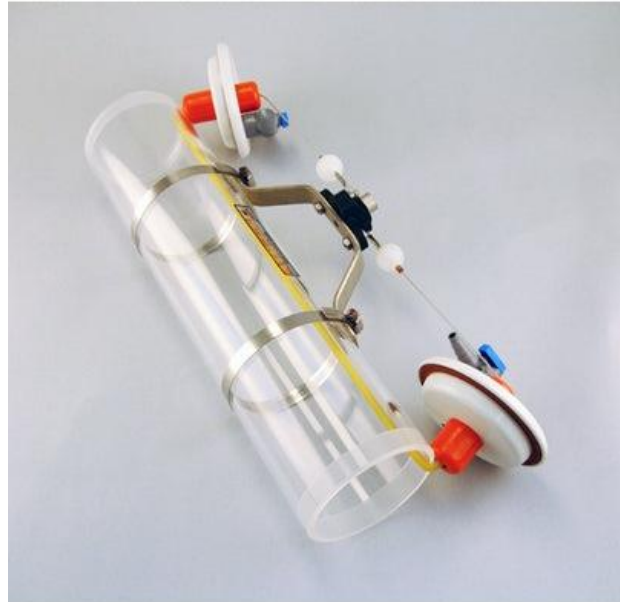


Figure 2-2 YSI multi parameter probe ([www.ysi.com](http://www.ysi.com)) and beta water grab sampler ([www.wildco.com](http://www.wildco.com))



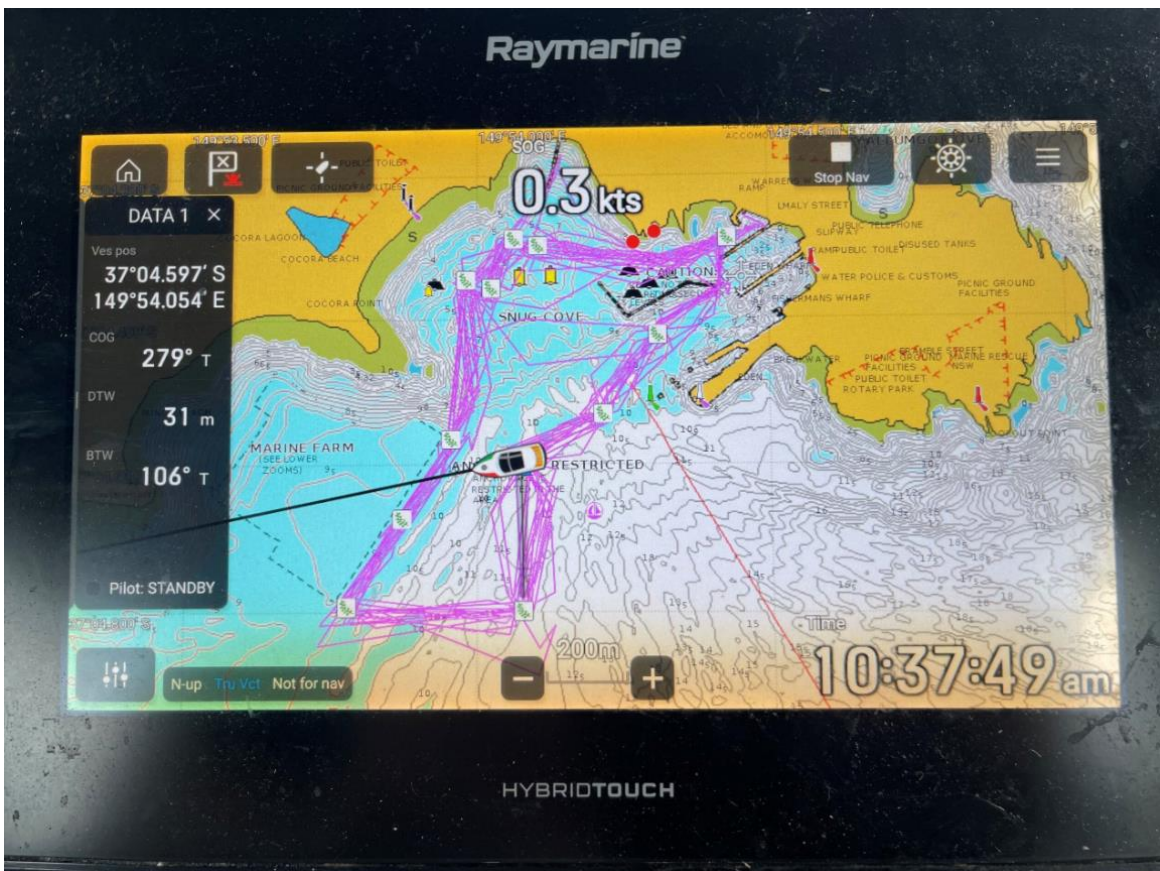


Figure 2-3 Photographs of field sampling and boat GPS navigation system

## 2.7 TSS and turbidity coefficient

In the Water and Sediment Quality Assessment undertaken for the Eden MOD 3 approvals, it was recommended to calculate a TSS conversion factor based on turbidity. This is because site specific trigger values are often provided as a TSS concentration rather than in NTU. However, there was not sufficient historical data to accurately establish this given that most values were below the laboratory LOR.

A TSS conversion factor is useful where immediate or short-term construction or operational changes may be necessary in response to meeting TSS triggers, as turbidity can be measured in the field, whereas TSS is a laboratory method which can take weeks to return the results. The relationship between turbidity and TSS is different for every environment so requires site specific data.

A site specific TSS and turbidity correlation efficient was derived for the site using the TSS and turbidity data collected in February 2025 in the following steps:

- In the field, turbidity was measured using a water quality meter. At the same time and site, grab samples were collected and sent to a laboratory for TSS analysis
- The TSS and turbidity paired results were recorded in an excel spreadsheet
- A linear regression was undertaken between all TSS results and corresponding turbidity results
- The regression relationship equation ( $y = 0.5499x + 0.7529$ ) was used to extrapolate and calculate TSS results across the full turbidity dataset.

## 2.8 QA/QC

### 2.8.1 In-field

The following in-field quality assurance and quality control (QA/QC) protocols were followed:

- Population of field data sheets for each site and sample was undertaken (see Appendix B)
- All field members were experienced marine / water quality scientists with offshore seawater sampling experience. All field members were appropriately trained in the water sampling techniques being used
- Water samples for TSS were collected using a grab sampler
- Following collection, water samples were placed immediately into sterile sampling containers provided by the lab and into eskies on ice
- Standard identification labels were adhered to each individual container and labelled with date, location, sampler and sample ID
- The water grab sampler was held at the sampling sites for one minute to allow site waters to flow through and rinse prior to collection. Sampler was decontaminated prior to use and at end of the sampling by triple rinsing with either chlorinated tap water or distilled water

- All samples were forwarded to a NATA accredited laboratory under recognised chain of custody (COC) with clear identification including date, location, sampler and sample ID (see Appendix C).

### **2.8.2 Laboratory**

QA/QC procedures employed by the laboratory included:

- Analysis was undertaken by a NATA certified laboratory (ALS Environmental)
- The laboratory reported that all the samples arrived intact and were analysed within holding times for the respective analytes. Samples were kept below 4°C at all times from the point of collection to the analysis
- The laboratory has established sampling analysis methods that are based on internationally recognised procedures such as those published by the United States Environment Protection Agency (USEPA), American Public Health Association (APHA), Australian Standard (AS) and National Environment Protection Measures (NEPM)
- The laboratory has established QA/QC standards and internal testing.

### 3. Results

#### 3.1 Field observations

##### 3.1.1 Day Prior

Water quality sampling was undertaken from 7:30 AM to 12:36 PM on 21st February 2025, the day before the arrival of the Ovation of the Seas at the Port. During the morning (7:30 AM - 10:30 AM), conditions were calm with WNW winds under 5 knots. Sampling occurred during a high ebb tide, and during the morning most sites exhibited discoloured green waters. Surface scum and filamentous algae were observed at sites closest to the Port. The low slack tide was at 9:51 AM. After 10:30 AM, wind speeds increased and shifted to E winds under 15 knots, improving water clarity with the breeze. The smaller Azamara cruise ship entered the Port at approximately 12:30 PM, as sampling was being completed. During the last two sampling events, tugboats were leaving the port and passing the vessel during sampling. Refer to Figure 3-1 for photos during this day.

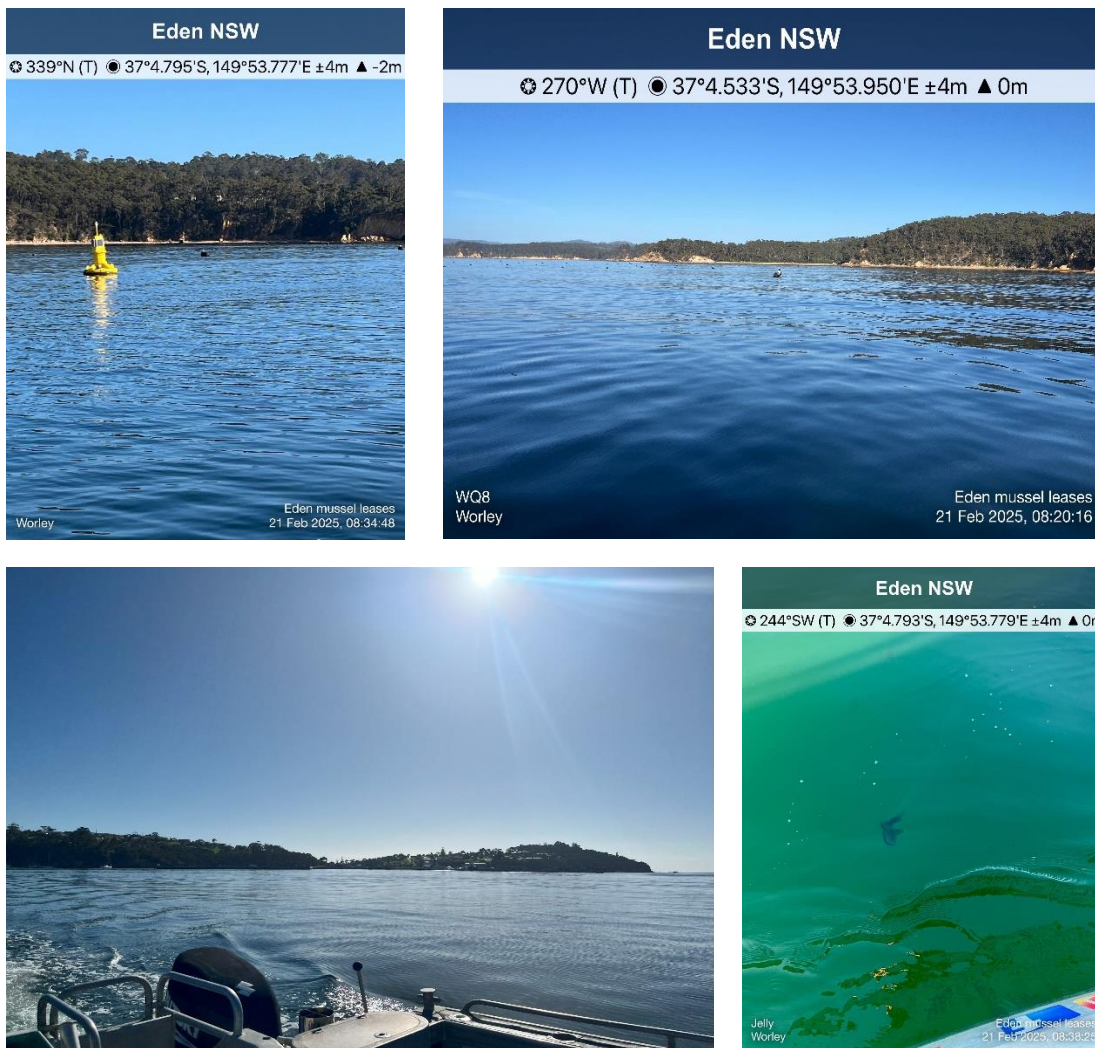


Figure 3-1 Water sampling on the day prior. Top left = calm morning waters, top right = green/algae discoloured waters at eastern sites in the morning, bottom left and right = mussel monitoring sites.

### 3.1.2 Cruise Day - Vessel Arrival

Water quality sampling was undertaken from 6:04 AM to 8:51 AM on 22nd February 2025, coinciding with the arrival of the Ovation of the Seas at the Port. The morning featured a high ebb tide and calm NE winds under 5 knots. The waters were greenish, similar to the previous morning. The vessel arrived at the berth at 6:55 AM. There was no visible plume seen during the arrival into berth. Physicochemistry and TSS sampling were performed while the vessel was entering the Port and while the bow thrusters were active. Before and after the vessel's arrival, numerous other vessels, including tugboats, were moving around the Port. Refer to Figure 3-2 for photos during the arrival.

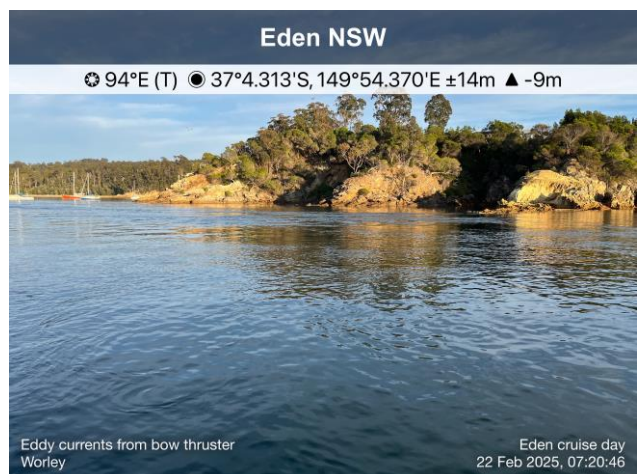
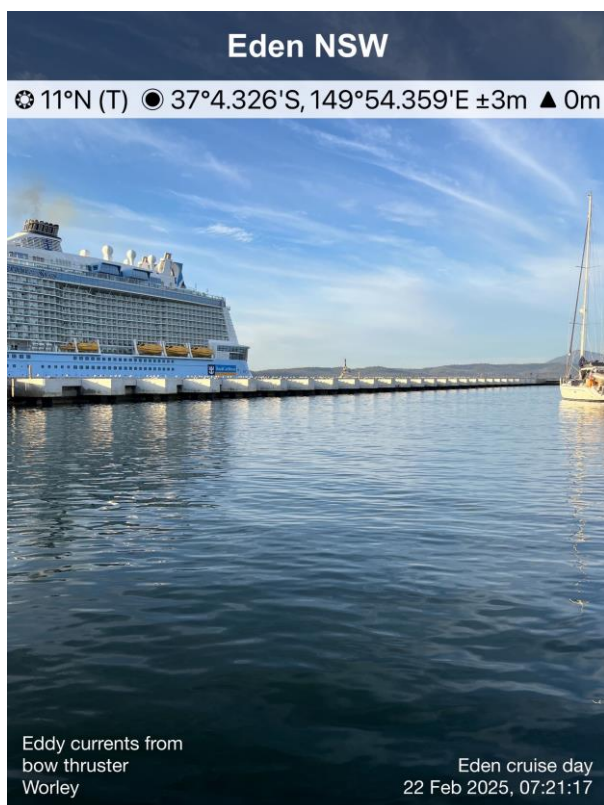


Figure 3-2 Water sampling during arrival. Top left and right = Ovation of the Seas entering Port, bottom left = eddy currents from the bow thruster and right = eddy currents towards the seagrass monitoring sites.

### **3.1.3 Cruise Day - Vessel Departure**

Water quality sampling was also conducted from 2:58 PM to 5:34 PM on 22nd February 2025, during the departure of the Ovation of the Seas from the Port. The afternoon featured a low flood tide and strong NE winds between 15-20 knots. Prior to the cruise ship's departure, the waters were visibly clearer compared to the morning. The vessel departed the berth at 4:55 PM. Physicochemistry and TSS sampling were performed during the vessel's departure and while the bow thrusters were active. A visible sediment plume was observed within the berth pocket very soon after the thrusters were turned on, and quite rapidly moved from the location of the bow thrusters north and northwest across the Port. By the time the next sampling round commenced at these locations within Snug Cove (approximately 30 minutes later), the sediment plume was no longer visible, although some incidences of elevated NTU were still apparent. There was a large sediment plume that was generated in the berth pocket and along the departure route during departure of the vessel from the berth and out into Twofold Bay. This plume moved and dispersed relatively rapidly (within about an hour to the naked eye). Before and after the vessel's departure, numerous other vessels, including tugboats, were moving around the Port. Refer to Figure 3-3 for photos during the departure within the berth pocket. Refer to Figure 3-4 for images of the sediment plume along the departure route in Twofold Bay.

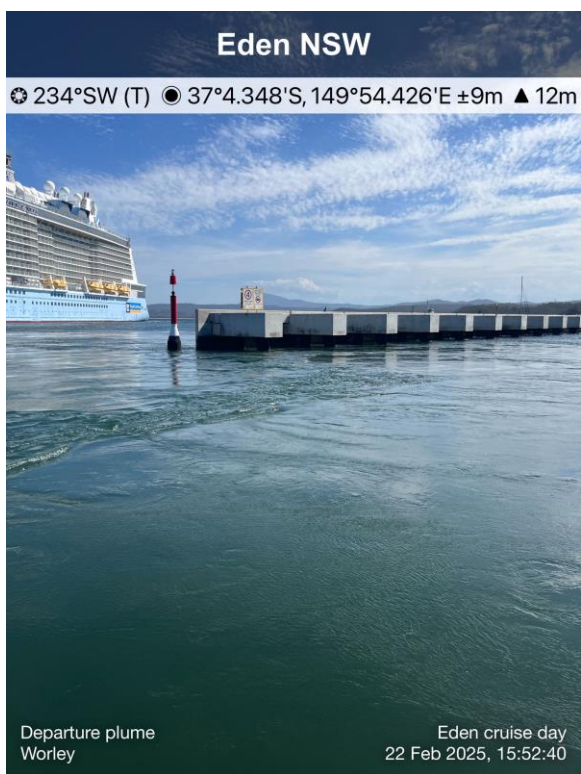


Figure 3-3 Water sampling during departure. All photos = sediment plume and eddies in the Port.



Figure 3-4 Water sampling during departure. All photos = sediment plume along departure route.

### 3.1.4 Day Following

Water quality sampling was conducted from 6:47 AM to 11:19 AM on 23rd February 2025, the day following the Ovation of the Seas' visit to the Port. Sampling occurred during a high ebb tide and calm conditions. There were slight SSW winds under 5 knots, which changed direction to N winds under 5 knots at approximately 8:30 AM. The water was noted to be visibly clean, clear and still, with very few vessel movements around the Port during sampling.

## 3.2 Physico-chemical Parameters

Physicochemistry parameters were measured using continuous depth profiling at twelve sites, with six sampling events per day. In total, there were over 13,000 measurements recorded for each water quality parameter over the three days.

The physicochemistry results are summarised by key statistics (minimum, maximum, mean, median, 80th percentile and standard deviation) by site type and sampling date in Table 3-1.

Boxplots of the physicochemistry results are shown in Figure 3-11. More detailed individual value plots for turbidity by sampling day, site and site depth are provided in Figure 3-12 - Figure 3-14. The detail individual value plots for other water quality parameters are attached in **Appendix F**.

### **Day prior**

On the day prior to the Ovation of the Seas visit, the following physicochemistry results were recorded:

- Overall, the turbidity levels were highest this day at the seagrass and mussel aquaculture sites with some values above the WQGV of 10 NTU. There were similar elevated turbidity levels across all sites
- Conductivity, TDS and salinity were lowest and most variable on this day. There were some salinity values below the lower limit WQGV of 33 PSU at the mussel and vessel route sites. Water temperatures were also lowest in comparison to the other two sampling days
- Physicochemistry parameters temperature, pH and ODO were all within the respective WQGV.

### **Cruise Day**

On the day of the Ovation of the Seas visit, the following physicochemistry results were recorded:

- Turbidity was elevated at the vessel route sites for approximately 30 – 60 minutes following the vessel arrival and departure, which could also be seen as a visible plume (Figure 3-3, Figure 3-4 and Figure 3-12). Turbidity values at the vessel route sites were highest immediately following the departure with elevated values throughout the water column. A maximum turbidity value of almost 63 NTU was recorded during active departure at the vessel route sites, but the median value was only 0.63 NTU and mean value just 1.98 NTU (Table 3-1)
- For some of the sensitive receptor seagrass and mussel sites, turbidity was slightly elevated following the vessel arrival and departure but with values well below the adopted WQGV of 10 NTU. Median turbidity values at the seagrass and mussel sites on the day of the Ovation of the Seas visit were below the 80<sup>th</sup> percentiles at the same sites on the day prior and day following (Table 3-1)
- Other physicochemical parameters (pH, TDS, specific conductivity, salinity, ODO and temperature) were mostly within the adopted available WQGVs. There were little differences in these parameters between the monitoring sites.

### **Day following**

On the day following the Ovation of the Seas visit, the following physicochemistry results were recorded:

- Overall, the turbidity levels were lowest on this day with all values below the WQGV of 10 NTU. There were no differences between sites
- There were some ODO values below the lower limit WQGV of 93.4 %Sat at all sites. Water temperatures were also above the upper limit WQGV of 19.7°C, noting this guideline value was likely derived from more marine reference locations not located within a port. There were no differences between sites for either of these parameters

- Other physicochemistry parameters (pH and salinity) were all within the respective WQGVs. There were no differences between sites.

Table 3-1 Summary of physicochemistry water quality statistics by site type and sampling day. The Ovation of the Seas Cruise date is highlighted in light green for visual comparison.

Site Type	Date	Min	Max	Mean	Median	80th percentile	StDev
<b>Turbidity (NTU), WQGV = 10 NTU</b>							
<b>Mussel</b>	Day prior	0.24	12.79	1.37	0.68	0.97	2.12
<b>Mussel</b>	Cruise day	0.23	4.16	0.63	0.53	0.68	0.53
<b>Mussel</b>	Day following	0.24	3.26	0.72	0.64	0.89	0.42
<b>Seagrass</b>	Day prior	0.08	12.41	1.29	0.63	0.91	2.13
<b>Seagrass</b>	Cruise day	0.35	6.98	1.46	0.89	2.36	1.28
<b>Seagrass</b>	Day following	0.29	4.89	0.54	0.47	0.54	0.38
<b>Vessel route</b>	Day prior	0.26	13.68	1.57	0.58	0.88	2.80
<b>Vessel route</b>	Cruise day	0.20	62.93	1.98	0.63	2.44	3.41
<b>Vessel route</b>	Day following	0.23	5.18	0.61	0.50	0.69	0.55
<b>pH, WQGV = 8 – 8.4</b>							
<b>Mussel</b>	Day prior	8.14	8.27	8.22	8.22	8.24	0.02
<b>Mussel</b>	Cruise day	8.18	8.23	8.21	8.21	8.22	0.01
<b>Mussel</b>	Day following	8.18	8.22	8.20	8.20	8.20	0.01
<b>Seagrass</b>	Day prior	8.11	8.24	8.20	8.21	8.22	0.02
<b>Seagrass</b>	Cruise day	8.10	8.23	8.19	8.20	8.21	0.02
<b>Seagrass</b>	Day following	8.16	8.23	8.21	8.21	8.21	0.01
<b>Vessel route</b>	Day prior	8.15	8.26	8.22	8.22	8.23	0.02
<b>Vessel route</b>	Cruise day	8.17	8.23	8.20	8.20	8.21	0.01
<b>Vessel route</b>	Day following	8.17	8.23	8.21	8.21	8.21	0.01
<b>TDS (mg/L)</b>							
<b>Mussel</b>	Day prior	32201	34187	33649	33641	34071	386
<b>Mussel</b>	Cruise day	33300	34266	33937	34061	34189	297
<b>Mussel</b>	Day following	32733	34214	33596	33565	34003	371
<b>Seagrass</b>	Day prior	32550	34107	33332	33277	33699	254
<b>Seagrass</b>	Cruise day	33447	34209	33941	33963	34127	184
<b>Seagrass</b>	Day following	33360	34201	33716	33658	33933	216
<b>Vessel route</b>	Day prior	27412	34294	33634	33644	34084	460
<b>Vessel route</b>	Cruise day	33286	34294	33985	34071	34188	242
<b>Vessel route</b>	Day following	33140	34209	33702	33656	34051	307
<b>Specific Conductivity (µS/cm)</b>							
<b>Mussel</b>	Day prior	49541	52595	51768	51755	52417	595
<b>Mussel</b>	Cruise day	51231	52718	52211	52402	52599	457
<b>Mussel</b>	Day following	50358	52638	51686	51638	52312	571
<b>Seagrass</b>	Day prior	51321	52472	51280	51196	51845	345
<b>Seagrass</b>	Cruise day	51458	52630	52217	52250	52502	283
<b>Seagrass</b>	Day following	51323	52618	51871	51781	52205	332

Site Type	Date	Min	Max	Mean	Median	80th percentile	StDev
<b>Vessel route</b>	Day prior	42172	52760	51744	51760	52437	707
<b>Vessel route</b>	Cruise day	51209	52760	52284	52416	52597	372
<b>Vessel route</b>	Day following	50984	52629	51849	51779	52385	472
<b>Salinity (PSU), WQGV = 33 – 37 PSU</b>							
<b>Mussel</b>	Day prior	32.47	34.71	34.11	34.10	34.58	0.44
<b>Mussel</b>	Cruise day	33.71	34.81	34.44	34.58	34.72	0.34
<b>Mussel</b>	Day following	33.06	34.75	34.05	34.01	34.51	0.42
<b>Seagrass</b>	Day prior	33.77	34.63	33.75	33.69	34.16	0.41
<b>Seagrass</b>	Cruise day	33.88	34.75	34.44	34.47	34.65	0.21
<b>Seagrass</b>	Day following	33.78	34.74	34.18	34.12	34.43	0.25
<b>Vessel route</b>	Day prior	27.14	34.84	34.09	34.10	34.60	0.52
<b>Vessel route</b>	Cruise day	33.70	34.84	34.49	34.59	34.72	0.27
<b>Vessel route</b>	Day following	33.53	34.74	34.17	34.11	34.56	0.35
<b>Temperature (°C), WQGV = 16.8 – 19.6 °C</b>							
<b>Mussel</b>	Day prior	17.49	19.20	18.48	18.51	18.66	0.23
<b>Mussel</b>	Cruise day	18.78	19.68	19.25	19.25	19.43	0.19
<b>Mussel</b>	Day following	19.10	20.92	20.14	20.19	20.58	0.46
<b>Seagrass</b>	Day prior	17.34	19.44	18.40	18.50	18.61	0.34
<b>Seagrass</b>	Cruise day	18.84	19.87	19.20	19.11	19.42	0.22
<b>Seagrass</b>	Day following	19.12	20.57	19.97	20.04	20.30	0.35
<b>Vessel route</b>	Day prior	17.24	19.24	18.46	18.50	18.65	0.27
<b>Vessel route</b>	Cruise day	18.83	19.88	19.24	19.23	19.37	0.19
<b>Vessel route</b>	Day following	19.07	20.71	20.01	20.09	20.41	0.43
<b>ODO (%Sat)</b>							
<b>Mussel</b>	Day prior	95.1	109.2	103.3573	103.5	105.5	2.669167
<b>Mussel</b>	Cruise day	97.5	107.4	102.8078	103	103.9	1.276751
<b>Mussel</b>	Day following	93.1	103	98.99306	99.2	100	1.235967
<b>Seagrass</b>	Day prior	95.1	106.2	100.4057	100.7	102.8	2.526408
<b>Seagrass</b>	Cruise day	97.4	106.3	102.074	102	103.1	1.551558
<b>Seagrass</b>	Day following	92.9	102	99.72224	99.9	100.6	1.517896
<b>Vessel route</b>	Day prior	95.2	107.7	102.4795	102.6	104.8	2.714627
<b>Vessel route</b>	Cruise day	96.3	104.3	101.6867	101.8	103	1.481757
<b>Vessel route</b>	Day following	91.8	101.3	99.54095	99.7	100.5	1.252944

Day prior = 21<sup>st</sup> Feb 2025, cruise day = 22<sup>nd</sup> Feb 2025, day following = 23<sup>rd</sup> Feb 2025

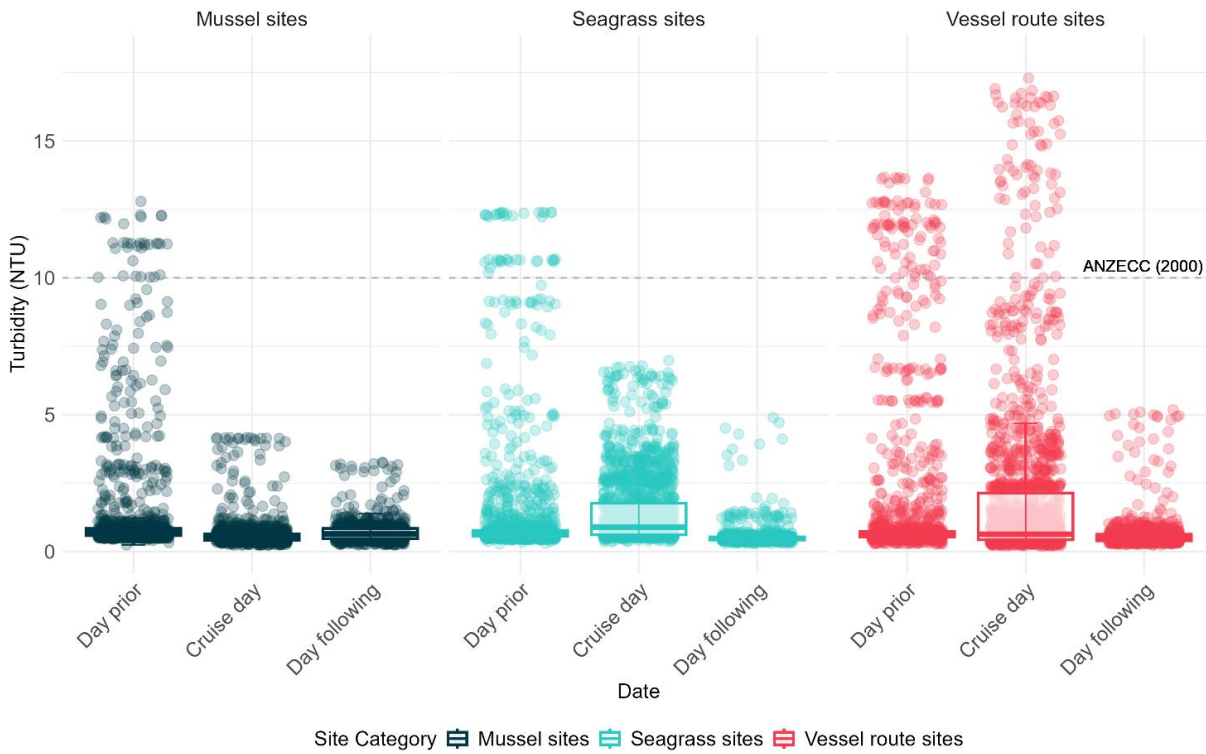


Figure 3-5 Boxplot of turbidity (NTU) on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites.

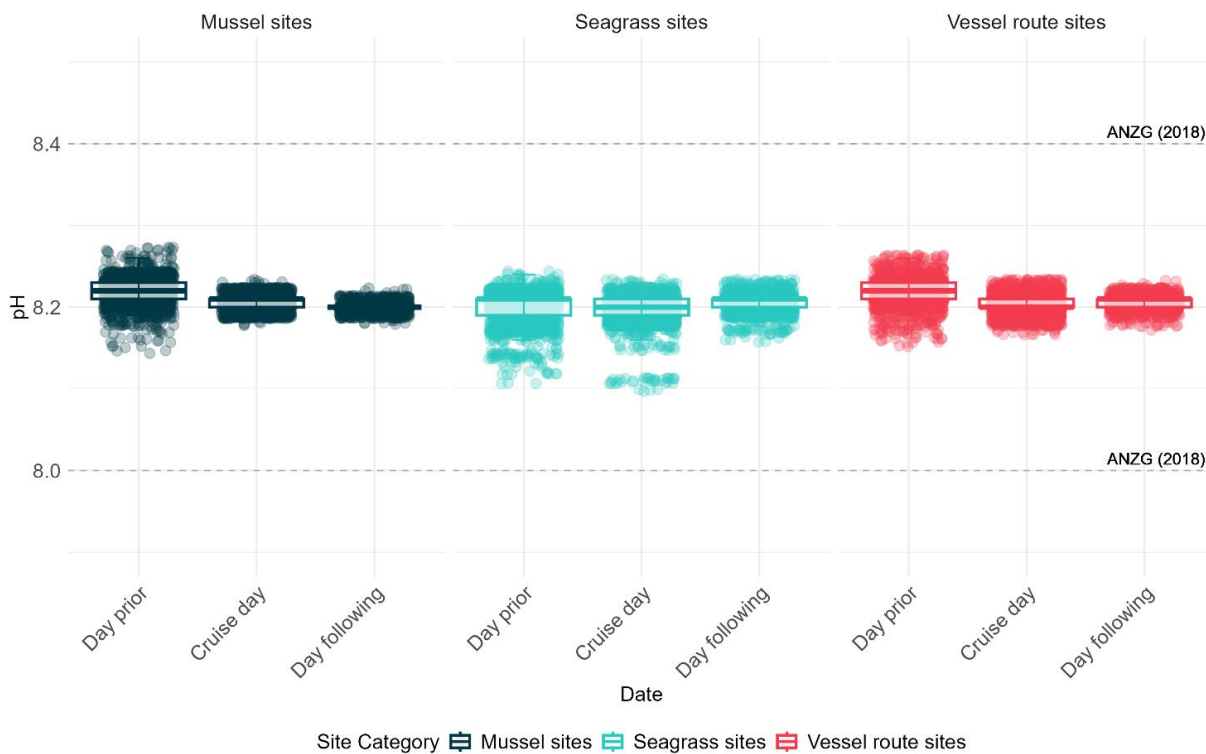


Figure 3-6 Boxplot of pH on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites. WQGV = 8 – 8.4.

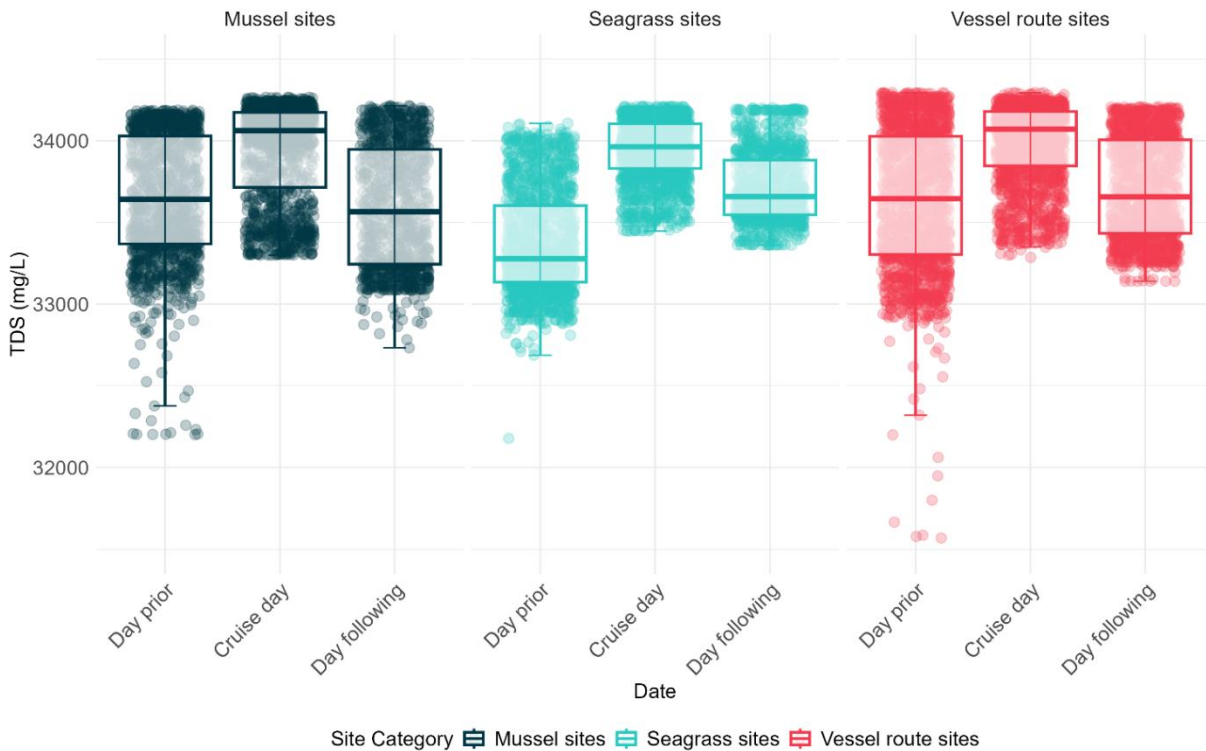


Figure 3-7 Boxplot of total dissolved solids (TDS) (mg/L) on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites.

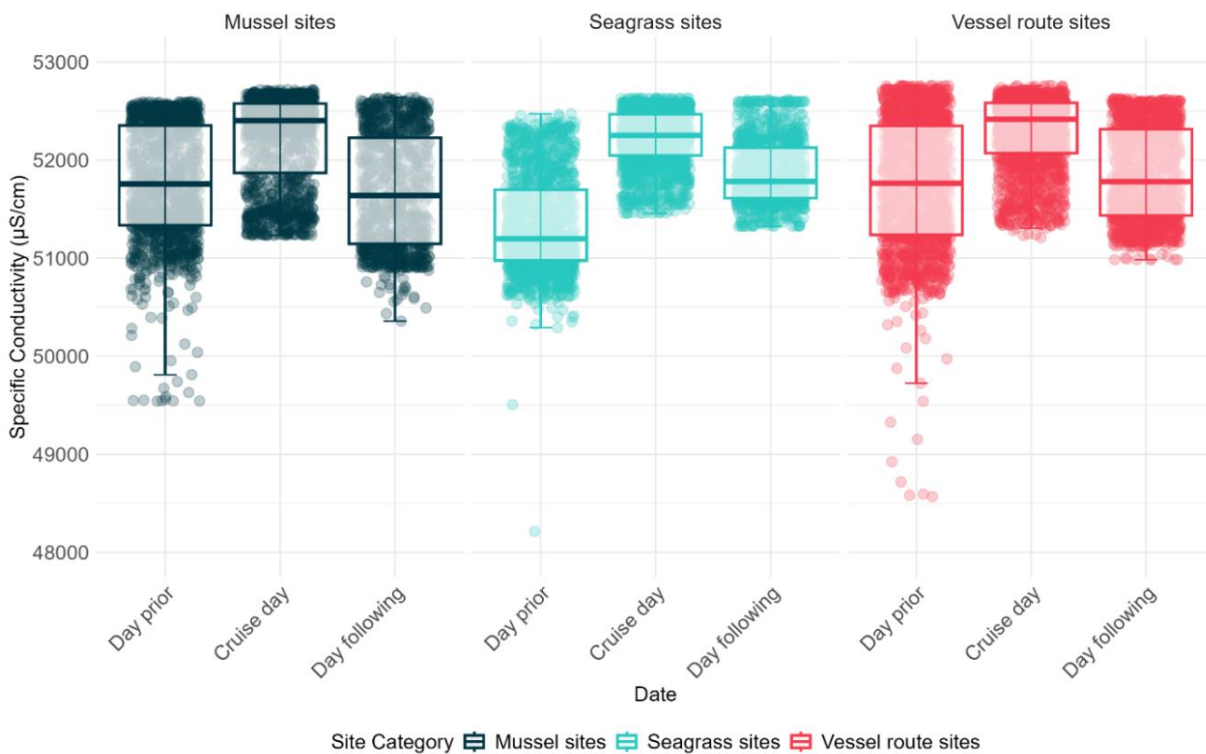


Figure 3-8 Boxplot of specific conductivity (µS/cm) on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites.

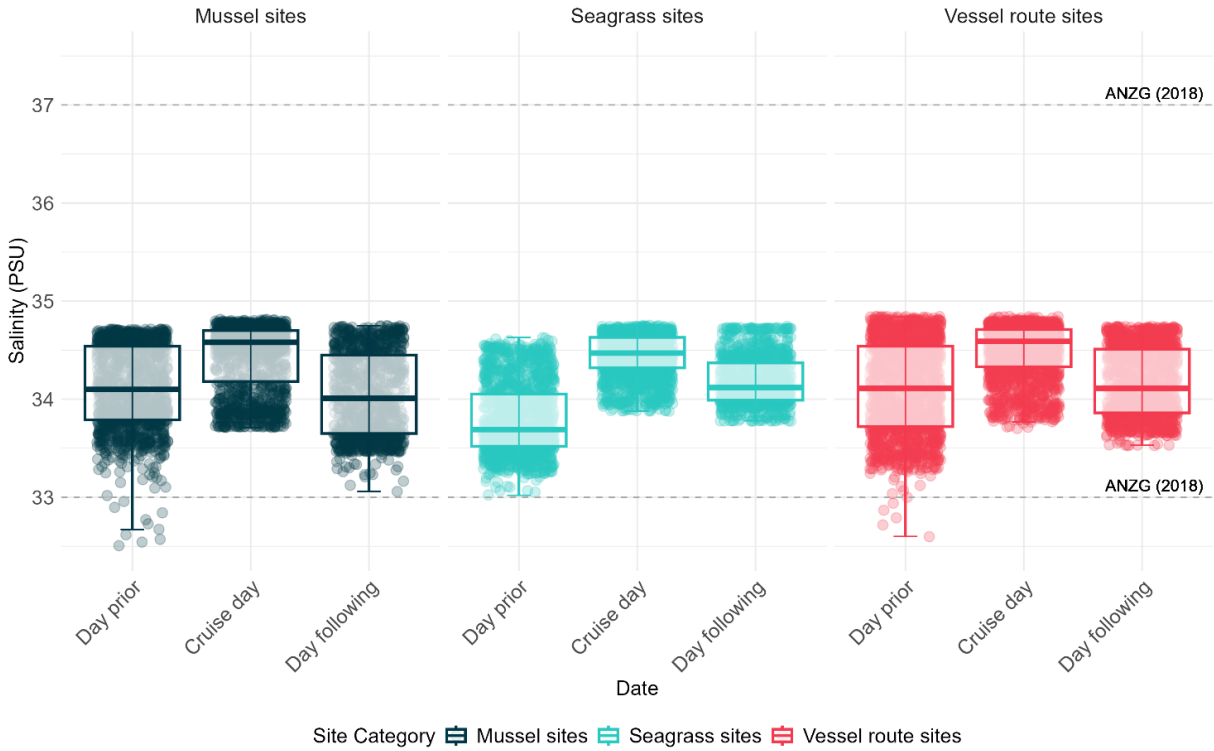


Figure 3-9 Boxplot of salinity (PSU) on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites.

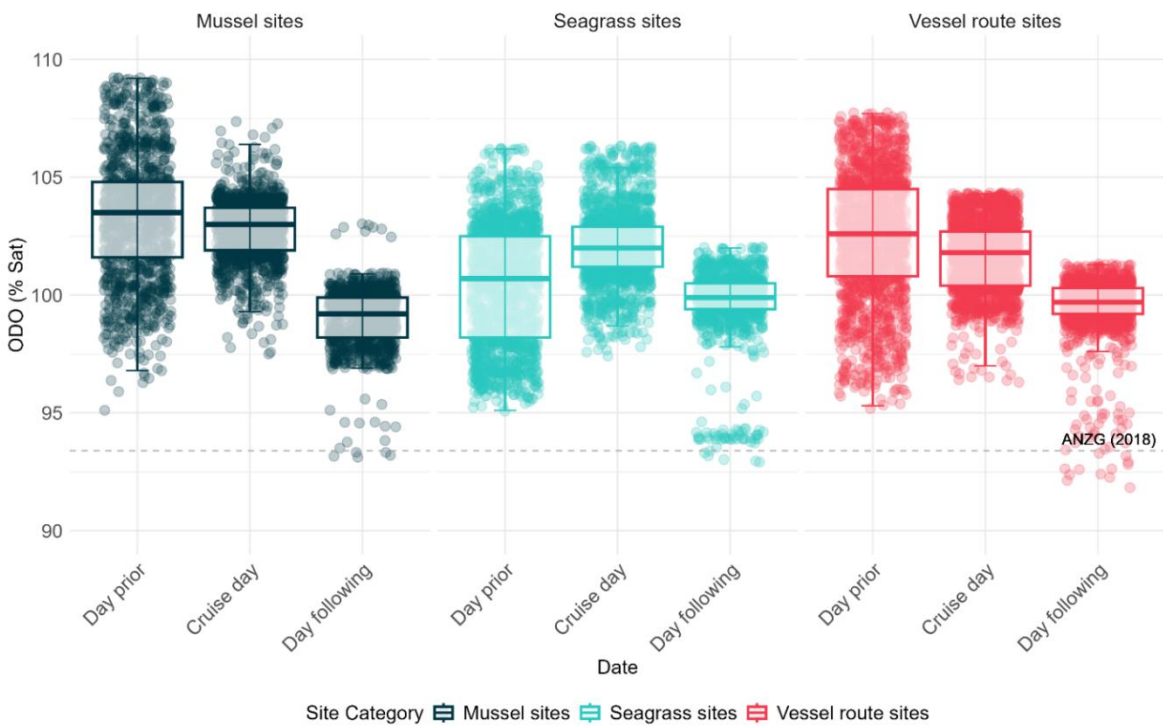


Figure 3-10 Boxplot of ODO (% Sat) on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites.

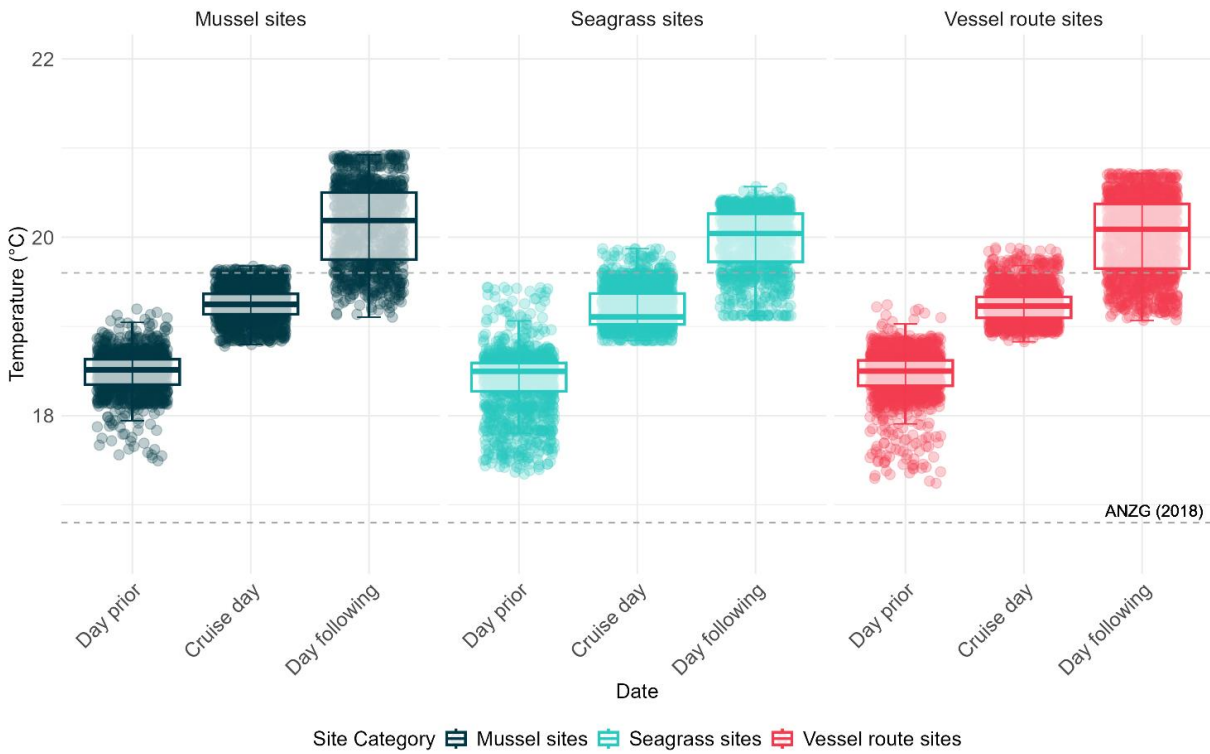


Figure 3-11 Boxplot of temperature (°C) on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites.

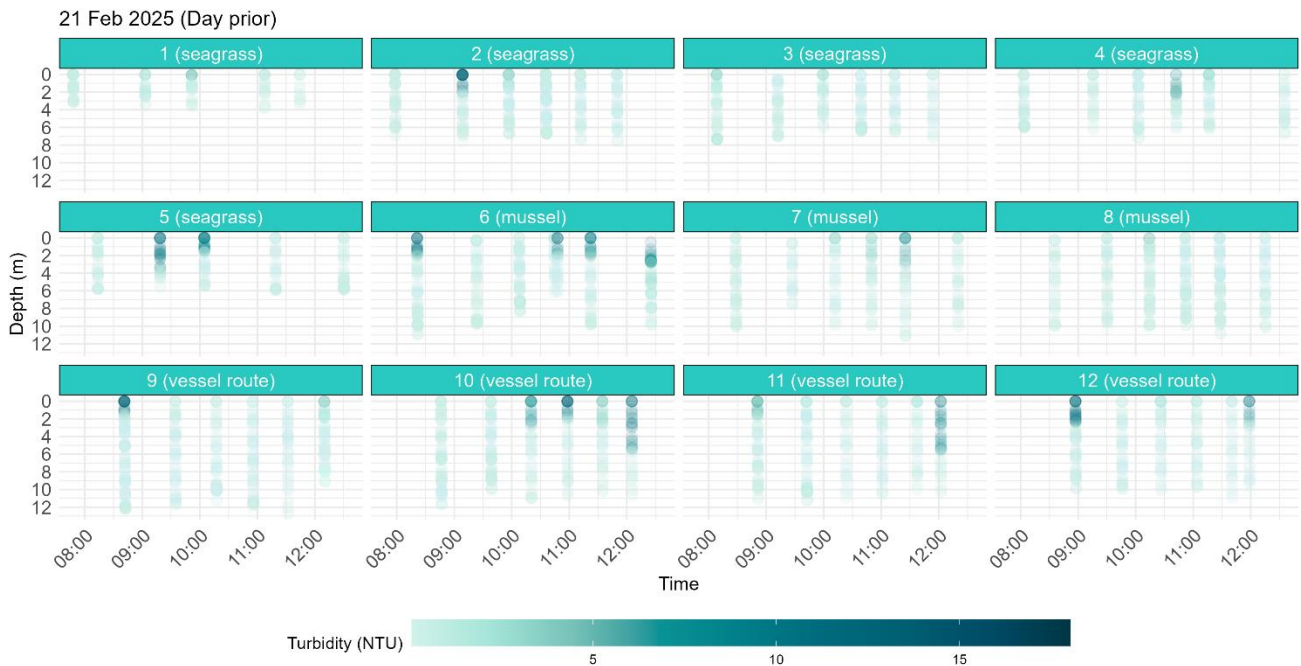


Figure 3-12 Turbidity (NTU) concentrations by water depth and time. Plot shows results for the day prior to cruise vessel visit.

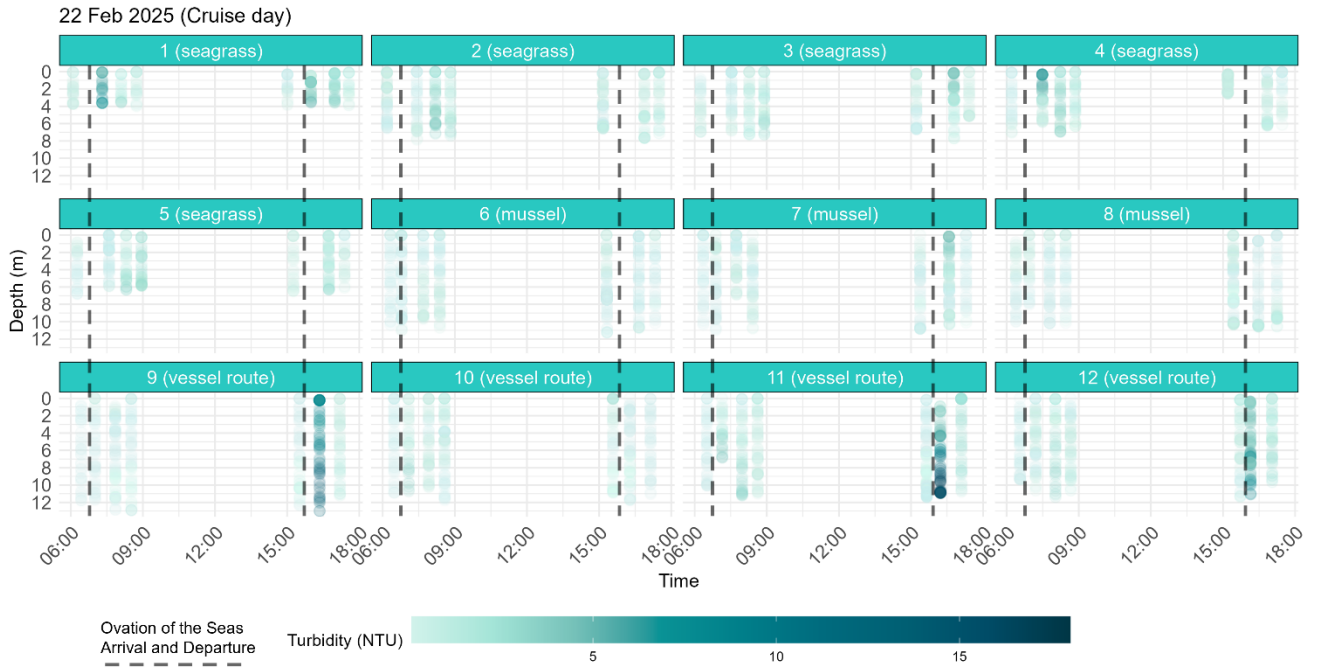


Figure 3-13 Turbidity (NTU) concentrations by water depth and time. Plot shows results for the day of the cruise vessel visit with arrival and departure times shown with dotted lines.

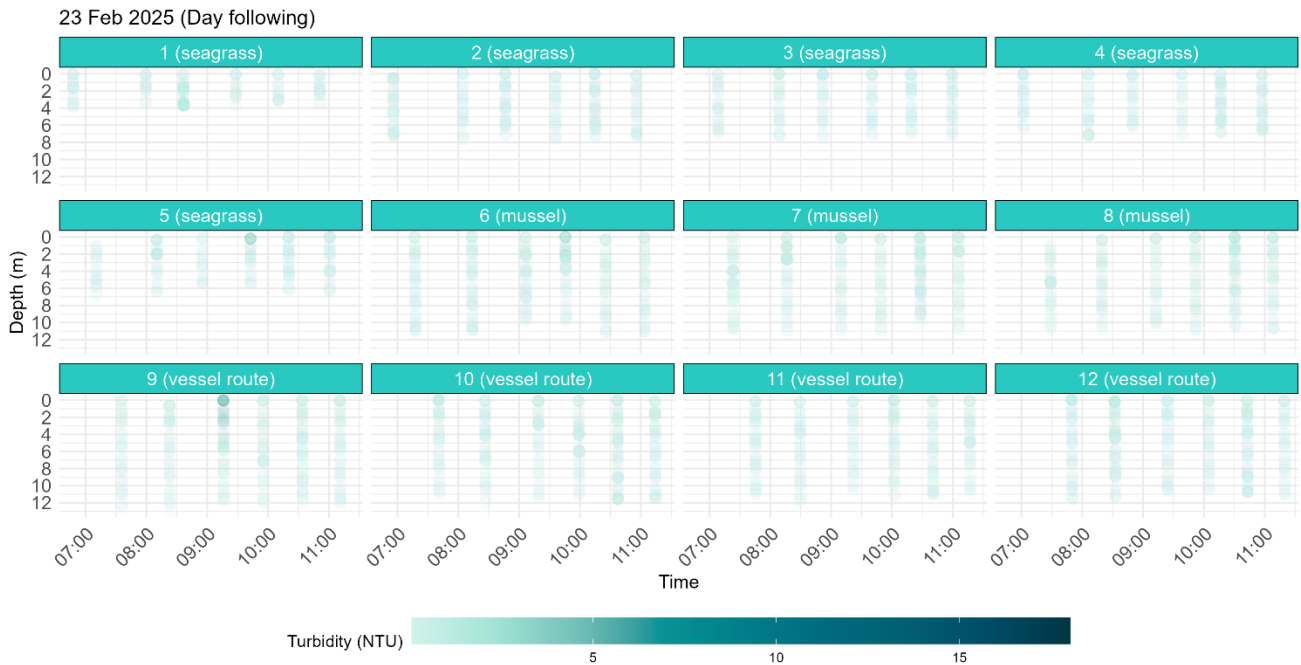


Figure 3-14 Turbidity (NTU) concentrations by water depth and time. Plot shows results for the day following the cruise vessel visit.

### 3.3 Total Suspended Solids

#### 3.3.1 TSS (actual)

TSS results which were above the laboratory LOR are shown in Table 3-3. A boxplot of the TSS results is shown in Figure 3-15.

TSS was measured in water samples from the surface and midwater depths at twelve sites, twice per day (144 samples in total). On the day of the Ovation of the Seas visit, TSS sampling was undertaken during the cruise ship arrival and departure. On the day prior and the day following, the TSS sampling was undertaken during the first and last sampling event to capture the tidal range.

The majority of the TSS detections (above laboratory LOR) occurred during the arrival and departure of the Ovation of the Seas. At the mussel sites, TSS ranged from <math><0.5 - 25 \text{ mg/L}</math> with only one value above the laboratory LOR. The value of 25 mg/L was detected at site 7, near the mussel leases, during the vessel arrival and is above the WQGV of 10 mg/L TSS. At the seagrass sites, TSS ranged from <math><0.5 - 16 \text{ mg/L}</math>, with two detections of 14 mg/L and 16 mg/L occurring at site 1 (which is located within Snug Cove, above a small patch of Posidonia seagrass). These values are above the WQGV of 10 mg/L TSS, noting this WQGV applies to aquaculture leases. The vessel route sites had the most TSS detections and values ranged from <math><0.5 - 35 \text{ mg/L}</math>.

Despite some individual readings above the WQGV, median TSS values at the sensitive receptor seagrass and mussel sites were below the laboratory LOR and WQGV during all sampling days and sampling depths.

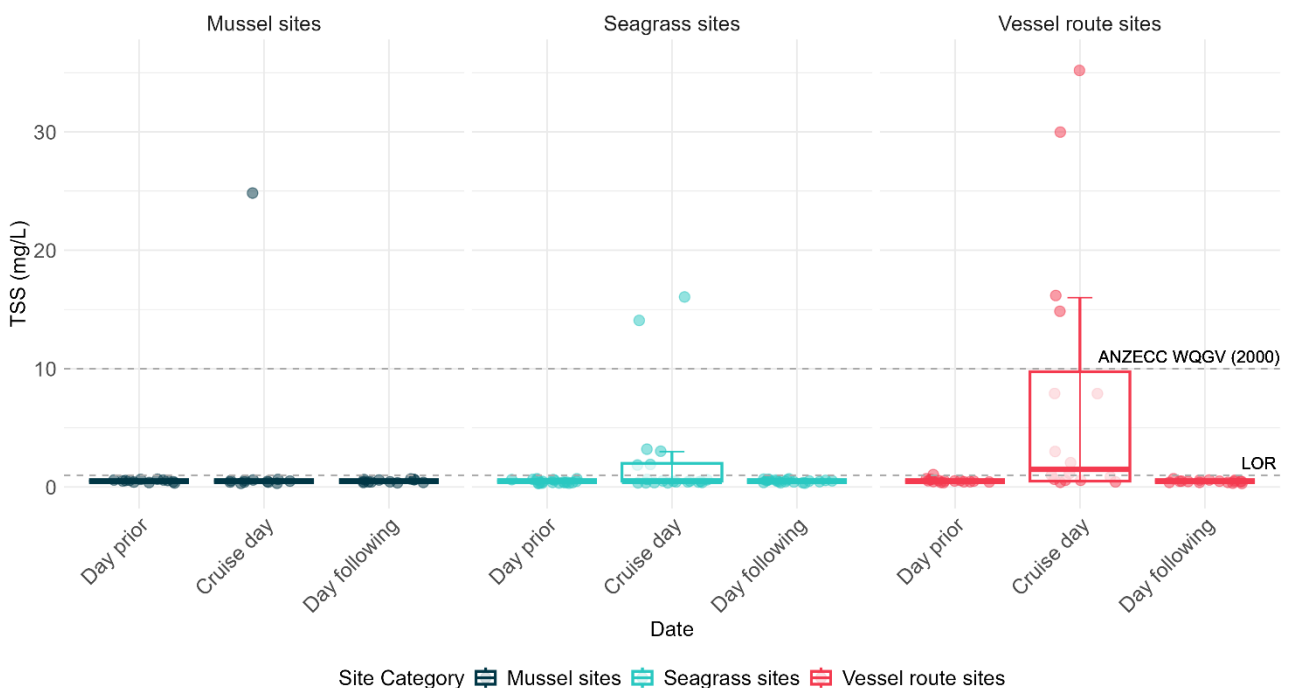


Table 3-2 TSS detections, turbidity and sampling conditions.

Label	Time	Date	Timing	Site	Site Depth	Sample Depth	Turbidity (NTU)	TSS (mg/L)
<b>D1-T1-WQ12-S</b>	8:57:10 AM	Day prior	Day prior	12	10.5	S	11.94	1
<b>D2-T1-WQ1-S</b>	7:18:00 AM	Cruise day	Arrival	1	3.9	S	5.41	3
<b>D2-T1-WQ1-M</b>	7:25:00 AM	Cruise day	Arrival	1	3.9	M	6.32	16
<b>D2-T1-WQ7-M</b>	6:52:00 AM	Cruise day	Arrival	7	10.8	M	0.52	25
<b>D2-T1-WQ9-M</b>	7:00:00 AM	Cruise day	Arrival	9	12.5	M	0.41	1
<b>D2-T1-WQ10-M</b>	7:04:00 AM	Cruise day	Arrival	10	11.6	M	2.19	8
<b>D2-T1-WQ11-M</b>	7:09:00 AM	Cruise day	Arrival	11	11	M	3.38	8
<b>D2-T1-WQ12-M</b>	7:02:00 AM	Cruise day	Arrival	12	11.1	M	0.87	1
<b>D2-T2-WQ1-M</b>	3:58:00 PM	Cruise day	Departure	1	3.7	M	3.48	14
<b>D2-T2-WQ3-M</b>	4:46:00 PM	Cruise day	Departure	3	6.6	M	1.63	2
<b>D2-T2-WQ4-M</b>	4:50:00 PM	Cruise day	Departure	4	6.8	M	0.82	2
<b>D2-T2-WQ5-M</b>	4:43:00 PM	Cruise day	Departure	5	6.2	M	1.31	3
<b>D2-T2-WQ9-S</b>	4:21:00 PM	Cruise day	Departure	9	10.6	S	10	15
<b>D2-T2-WQ9-M</b>	4:21:05 PM	Cruise day	Departure	9	10.6	M	8.73	30
<b>D2-T2-WQ10-M</b>	4:16:00 PM	Cruise day	Departure	10	11.6	M	0.35	1
<b>D2-T2-WQ11-S</b>	4:13:00 PM	Cruise day	Departure	11	11	S	3.18	2
<b>D2-T2-WQ11-M</b>	4:13:05 PM	Cruise day	Departure	11	11	M	6.65	35
<b>D2-T2-WQ12-S</b>	4:08:00 PM	Cruise day	Departure	12	10.8	S	3.7	3
<b>D2-T2-WQ12-M</b>	4:08:05 PM	Cruise day	Departure	12	10.8	M	4.29	16

TSS values below the limit of reporting are not shown. Day prior = 21<sup>st</sup> Feb 2025, cruise day = 22<sup>nd</sup> Feb 2025, day following = 23<sup>rd</sup> Feb 2025.

### 3.3.2 TSS (calculated)

#### 3.3.2.1 TSS and Turbidity Relationship

The relationship between actual TSS and turbidity measurements was compared using linear regression to determine the correlation relationship and coefficient. The methodology used for this approach is described in Section 2.7. A plot of the TSS versus turbidity regression results is shown in Figure 3-16.

The regression analysis found a significant positive relationship between TSS and turbidity. The t-value (6.13) and low p-value ( $p < 0.001$ ) for TSS indicate this relationship is statistically significant. However, the model has a very low R-squared value of 0.1 which suggests it explains a low proportion of variance. Note that the low R-squared value is related to the high proportion of non-detects and a few outliers of the turbidity: TSS ratios. The residuals show a relatively small spread, with a standard error of 2.688.

The results show that the regression results in an overestimation of the low range of TSS calculated results. The regression was also run by excluding non-detects and TSS: turbidity outliers which significantly improved the R squared ( $R^2 = 0.84$ ), however this significantly underestimated higher TSS results above 20 mg/L (these results are not shown). On this basis, the latter approach was not adopted.

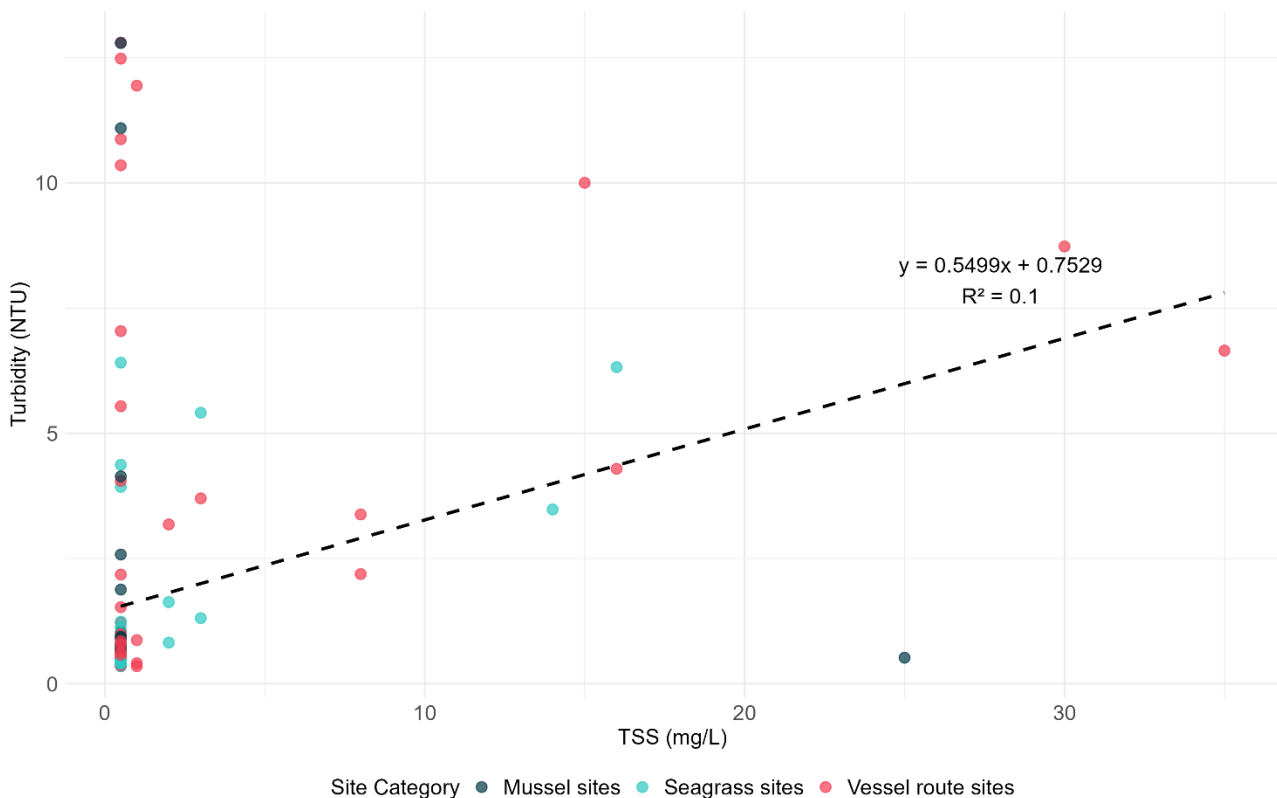


Figure 3-16 Linear regression between TSS (mg/L) and turbidity (NTU).

### 3.3.2.2 Calculated TSS Results

The TSS and turbidity regression relationship ( $y = 0.5499x + 0.7529$ ) was used to extrapolate TSS values across the full turbidity dataset.

A summary of the TSS calculated results is provided in Table 3-3. A boxplot of the TSS calculated results is shown in Figure 3-17. More detailed individual value plots by site and site depth for each sampling day are provided in Figure 3-18, Figure 3-19 and Figure 3-20.

The calculated TSS results do not closely match the actual TSS which has resulted in low level results being overestimated. For example, in the mussel and seagrass sites, the method used to calculate TSS estimates that 86% of the values exceed the laboratory limit of reporting (LOR) of 1 mg/L, while only 2% of the actual TSS measurements were found to be above this limit. However, for the higher TSS results, this was more accurate, with the same maximum calculated and actual TSS value of 35 mg/L. I.e. essentially this method is overestimating low level TSS levels but is more accurate for higher values.

The calculated TSS results follow a similar pattern to turbidity. The highest calculated TSS values were recorded on the day of the Ovation of the Seas visit at the vessel route sites. At the seagrass and mussel sites on the same day, all calculated TSS values were within 5 mg/L, with no exceedances above the adopted WQGV of 10 mg/L for TSS.

Table 3-3 Summary of calculated TSS water quality statistics by site type and sampling day. The Ovation of the Seas Cruise date is highlighted in light green for visual comparison.

Site Type	Date	Min	Max	Mean	Median	80th percentile	StDev
<b>Calculated TSS (mg/L)</b>							
<b>Mussel</b>	Day prior	0.88	7.79	1.51	1.13	1.29	1.17
<b>Mussel</b>	Cruise day	0.88	3.04	1.10	1.04	1.13	0.29
<b>Mussel</b>	Day following	0.88	2.55	1.15	1.10	1.24	0.23
<b>Seagrass</b>	Day prior	0.80	7.58	1.46	1.10	1.25	1.17
<b>Seagrass</b>	Cruise day	0.95	4.59	1.56	1.24	2.05	0.70
<b>Seagrass</b>	Day following	0.91	3.44	1.05	1.01	1.05	0.21
<b>Vessel route</b>	Day prior	0.90	8.28	1.62	1.07	1.24	1.54
<b>Vessel route</b>	Cruise day	0.86	<b>35.36</b>	1.84	1.10	2.10	1.88
<b>Vessel route</b>	Day following	0.88	3.60	1.09	1.03	1.13	0.30

Day prior = 21<sup>st</sup> Feb 2025, cruise day = 22<sup>nd</sup> Feb 2025, day following = 23<sup>rd</sup> Feb 2025

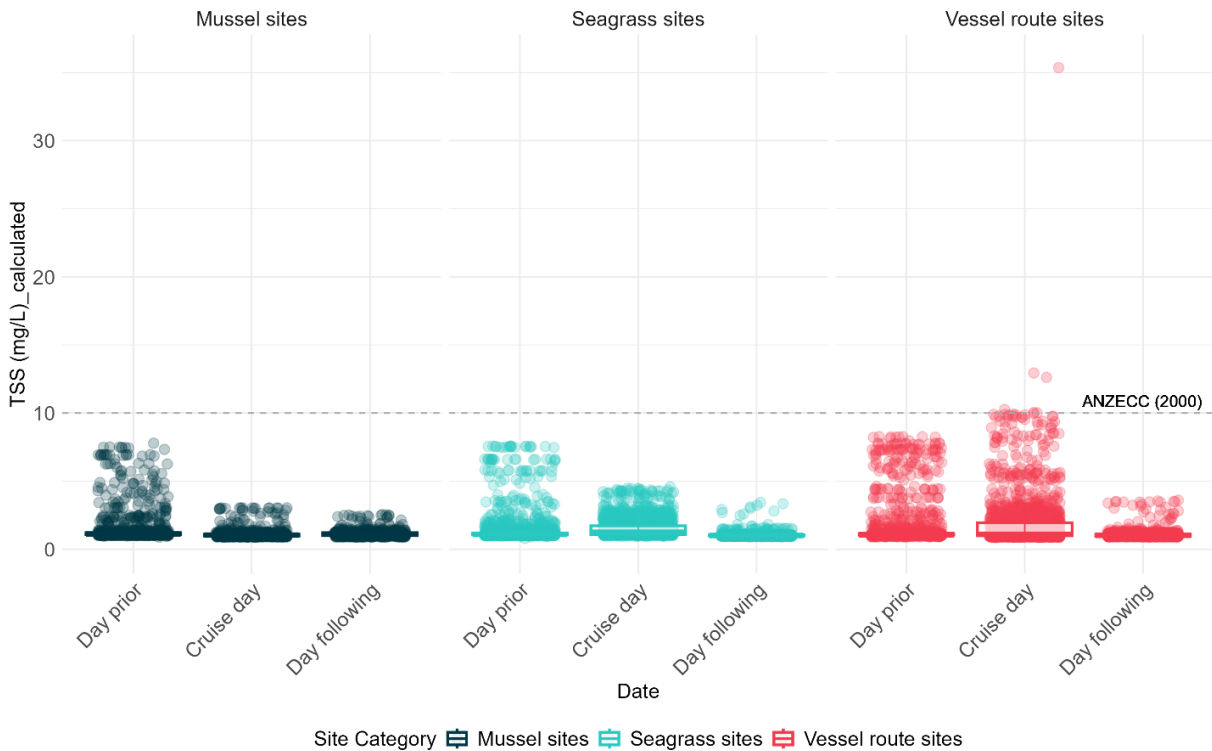


Figure 3-17 Boxplot of TSS calculated (mg/L) on days prior, during and following the Ovation of the Seas berthing in Port of Eden at seagrass, mussel and vessel route monitoring sites.



Figure 3-18 Calculated TSS (mg/L) concentrations by water depth and time. Plot shows results for the day prior to cruise vessel visit.

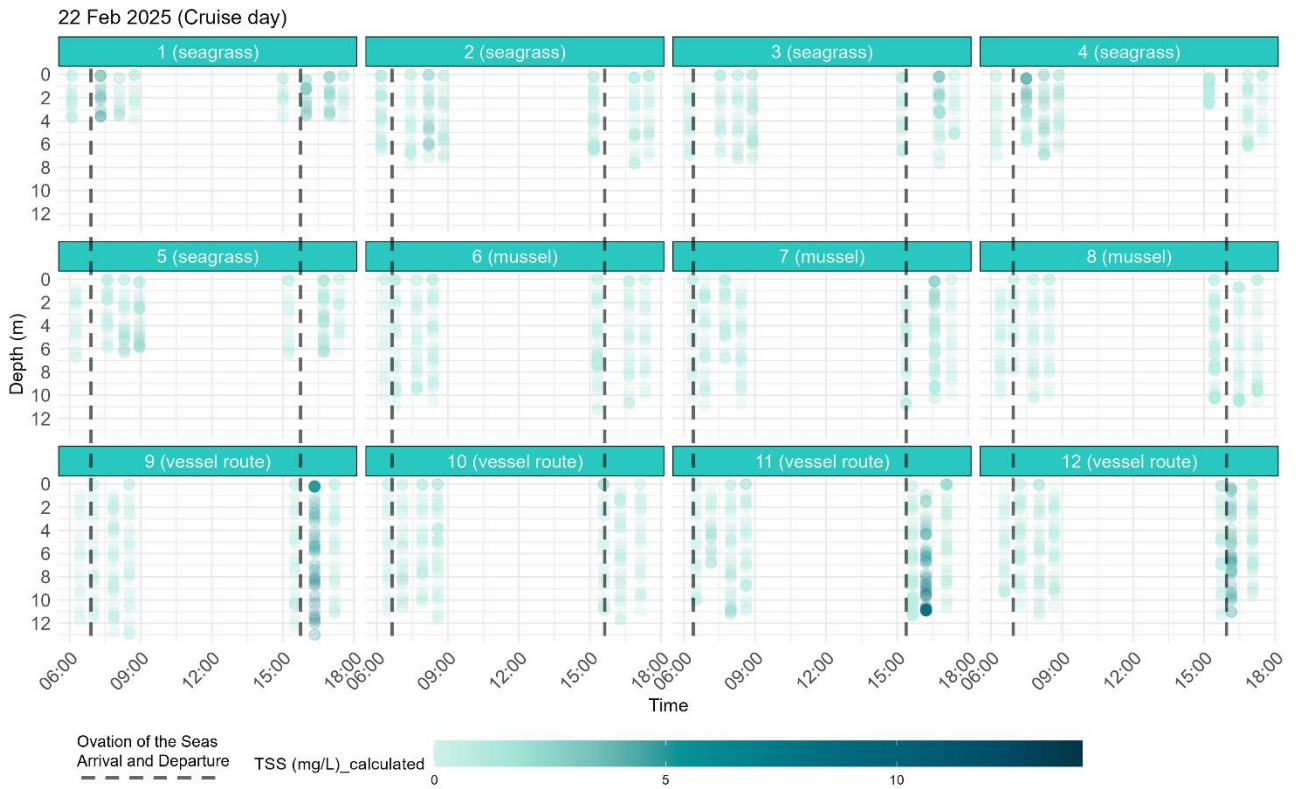


Figure 3-19 Calculated TSS (mg/L) concentrations by water depth and time. Plot shows results for the day of the cruise vessel visit with arrival and departure times shown with dotted lines.



Figure 3-20 Calculated TSS (mg/L) concentrations by water depth and time. Plot shows results for the day following the cruise vessel visit.

### 3.4 Comparison to modelling

Jacobs (2023) modelled TSS concentrations during an Oasis class vessel visit to the Port during various scenarios including 15 knot NE winds. The NE winds scenario was considered the worst-case scenario in terms of potential exposure to the sensitive seagrass and mussel receptors. The modelled NE scenario is comparable to the actual conditions during the Oasis of the Seas departure on the 22<sup>nd</sup> of February 2025, with high NE winds of 15 – 20 knots. The TSS (actual) results recorded on the cruise day are compared to the sampling sites in Figure 3-21 and the previously modelled NE winds scenario in Figure 3-22 and Figure 3-23.

During the vessel **arrival** on the cruise day, the following TSS results were recorded in comparison to the previously modelled NE scenario:

- **Seagrass sites:** There was one value of 16 mg/L TSS recorded at the mid water depth at WQ 1 which is above the WQGV of 10 mg/L. This value is above the modelled TSS range of 0 – 5 mg/L for this area during NE winds. WQ 1 is located in shallow waters within the Port near sparse mapped Posidonia. There were no TSS detections recorded at WQ 2 - WQ 5, sites located in the NW of the port and above mapped Zostera. All calculated TSS results (based on turbidity) were below 5 mg/L during the vessel arrival for the seagrass sites.
- **Mussel sites:** There was one value of 25 mg/L TSS recorded at the mid water depth at WQ 7 which is above the WQGV of 10 mg/L which is based on ANZECC (2000) for protection of aquaculture leases. WQ 7 is located adjacent to the leases and not directly within the lease area. This value is within the modelled TSS range of 20 - 25 mg/L for this area during NE winds. All calculated TSS results (based on turbidity) were below 5 mg/L during the vessel arrival for the mussel sites.
- **Vessel route sites:** TSS values at the mid water depths ranged from <LOR – 8 mg/L for sites WQ 9 – 12 located along the vessel route. These values are much lower than the modelled TSS range of 50 – 100 mg/L for this area. There were no detections of TSS in surface waters. Note there was a short (< 5 minute) delay between vessel movements and sampling for these sites due to safety reasons. No visible plume or significantly increased turbidity values were seen during the arrival at these sites.

During the vessel **departure** on the cruise day, the following TSS results were recorded in comparison to the previously modelled NE scenario:

- **Seagrass sites:** There was one value of 14 mg/L TSS recorded at the mid water depth at WQ 1 during the vessel departure. This concentration is above the WQGV of 10 mg/L. This value is above the modelled TSS range of 0 – 5 mg/L for this area during NE winds. There were three TSS detections of 2 – 3 mg/L recorded in the midwaters at sites WQ3, WQ4 and WQ5 (all located above mapped Zostera to the NW of the Port). These values are within the modelled TSS range of 0 – 5 mg/L for this area. All calculated TSS results (based on turbidity) were below 5 mg/L during the vessel departure for the seagrass sites.
- **Mussel sites:** There were no TSS detections at any of the mussel sites during the departure. The modelled range for these sites which are adjacent to the mussel leases

was 2 – 25 mg/L. All calculated TSS results (based on turbidity) were below 5 mg/L during the vessel during the vessel departure for the seagrass sites.

- **Vessel route sites:** TSS values at the mid water depth ranged from <LOR – 35 mg/L at sites WQ 9 – 12 located along the vessel route during departure. These values are lower than the modelled TSS range of 50 – 100 mg/L for this area. However, a visible plume was still present and turbidity values were relatively high for a short period of time here during this departure sampling.

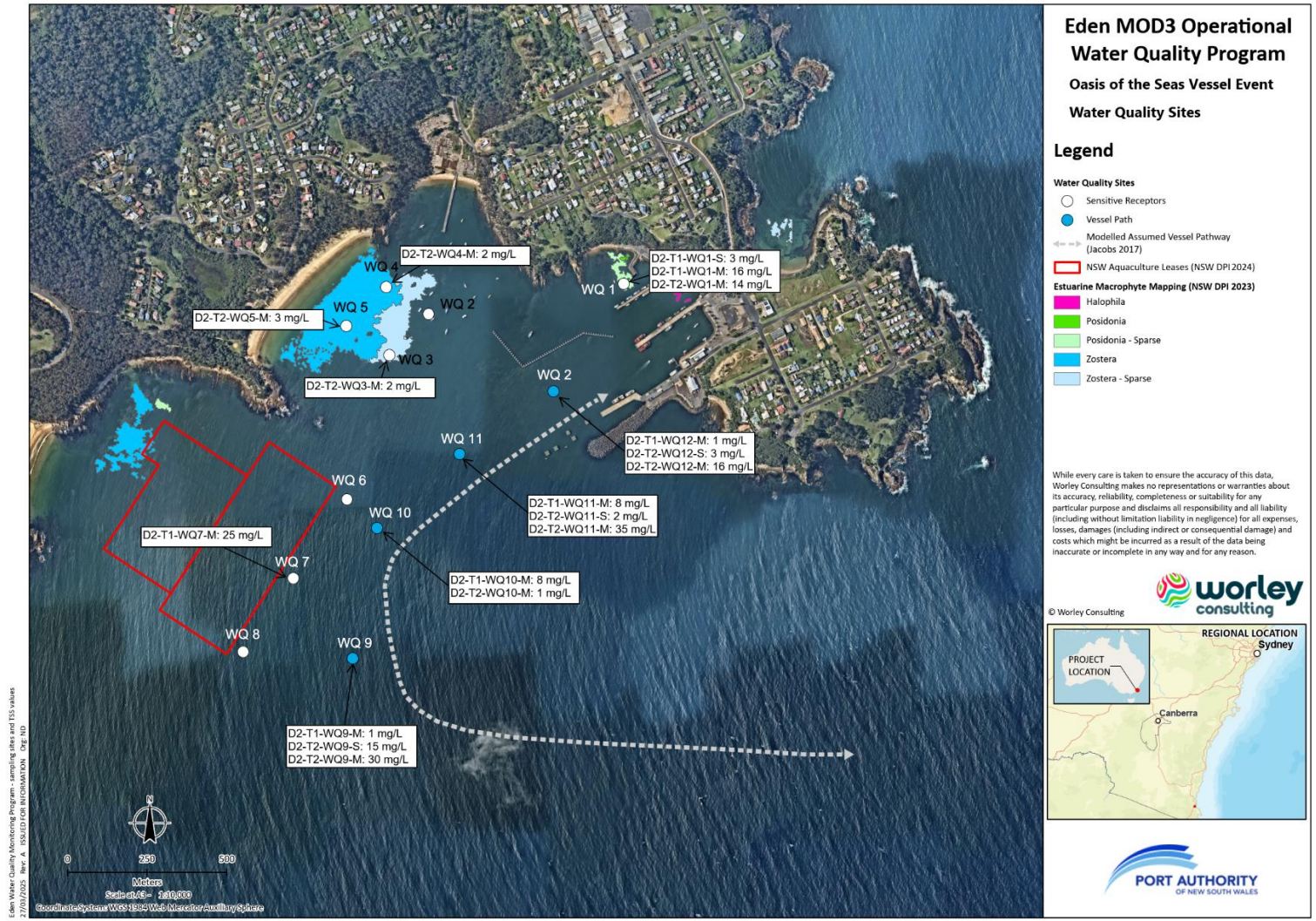


Figure 3-21 TSS detections on the cruise day in relation to the water quality monitoring sites for the Operational Water Quality Program.

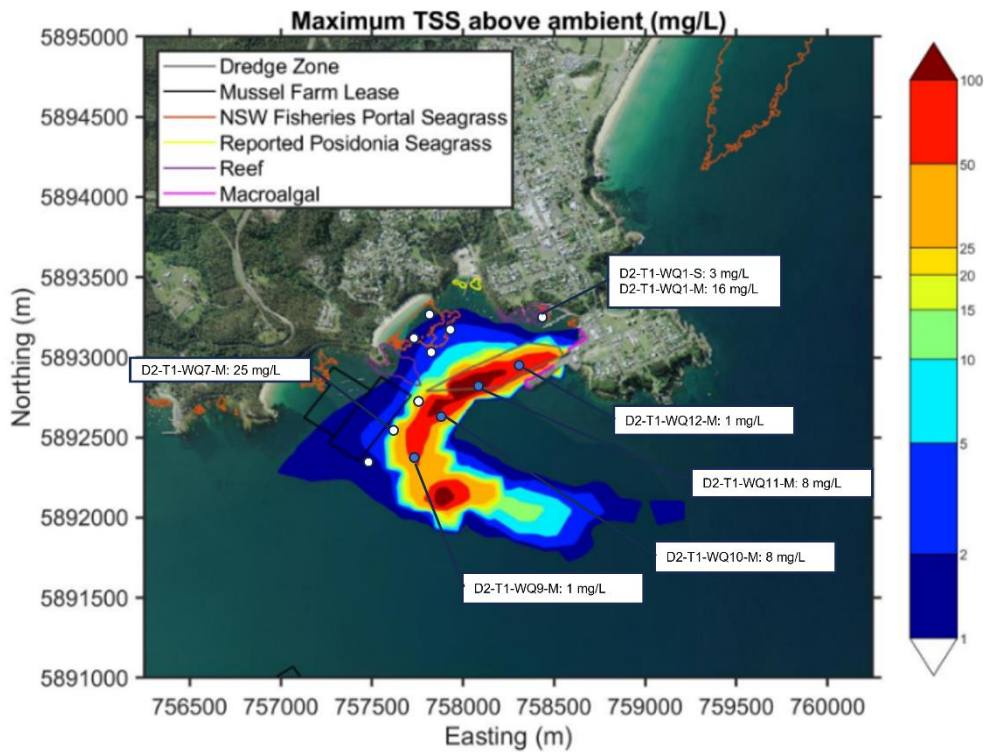


Figure 3-22 TSS concentrations during the vessel **arrival** on the Cruise day in relation to the sediment plume modelling for a NE wind scenario (Sediment plume mapping from: Jacobs 2023).

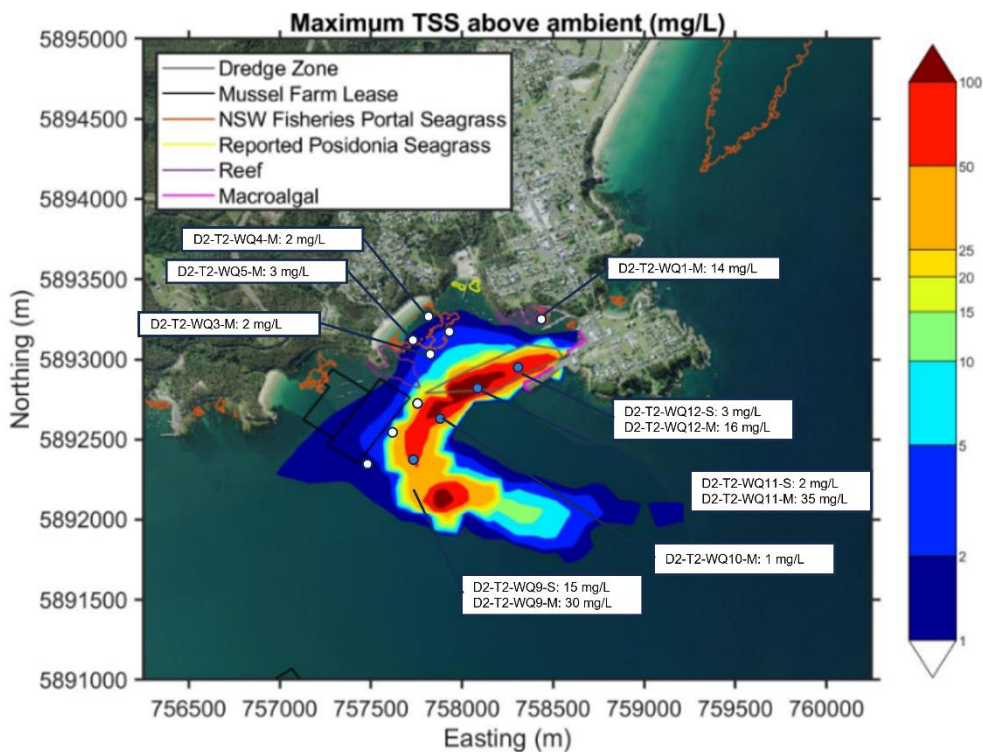


Figure 3-23 TSS concentrations during the vessel **departure** on the Cruise day in relation to the sediment plume modelling for a NE wind scenario (Sediment plume mapping from: Jacobs 2023).

## 4. Discussion

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### **Review of monitoring results in relation to the performance of the SSI**

Physicochemistry was measured using continuous depth profiling at twelve sites, with six sampling events each day, over three days including the day prior, day of and day following the first Quantum Class Vessel visit to the Port. The water quality results of most importance to this assessment are turbidity and TSS. Most of the turbidity and TSS results were within the previously assessed concentrations and impacts identified and modelled in previous assessments (Advisian 2023; Jacobs 2023). As expected, during the cruise ship movements, particularly during departure, there was elevated turbidity seen, especially along the vessel route of up to 63 NTU. However, at the sensitive seagrass and mussel sites, turbidity was below 7 NTU (and below the WQGV of 10 NTU). Except for the northern corner, the TSS results were largely comparable to those previously modelled by Jacobs (2023). TSS results are discussed in further detail below.

For all other physicochemistry parameters (such as salinity, conductivity, TDS, temperature, ODO and pH), there were no differences between the site locations or patterns that were potentially related to cruise ship movements. However, there were obvious variations in these parameters between sampling days and times, associated with the tidal movements. On two sampling days, during the ebb high tide, it was observed that there were green discoloured waters which cleared up following increases in winds and with the flood tide. There were also variable and lower conductivity values recorded on the day prior to the cruise visit, however there was no rainfall recorded at the closest BOM monitoring site (Green Cape) in the week prior to sampling.

### **Comparison to predicted modelling within the vessel pathway and sensitive receptors**

The water monitoring results provide validation of sediment plume modelling undertaken for the Eden MOD 3 (Jacobs 2023). This was updated modelling based on the MOD 3 conditions for an Oasis or Quantum Class vessel to visit the Port and also an increase in the frequency of visitations. The modelling was based on simulations of the TSS concentrations in the water column based on calculated seabed current velocities, sediment particle size and scour induced propeller wash. The modelling included several scenarios, including strong NE winds (15 knots) which was considered worst case in terms of potential exposure of TSS to sensitive seagrass and mussel receptors, based on the assumption that it would generate a southerly circulation of currents within the Port.

The water quality monitoring results were consistent with predictions based on the modelling including:

- The actual conditions during the departure of the Ovation of the Seas were consistent with the worst-case NE winds scenarios, with the actual conditions at time of the departure being 15 – 20 knot NE winds.
- Peak TSS results at the sites located in the vicinity of sensitive seagrass and mussel aquaculture receptors were largely within 1 – 5 mg/L, as predicted by modelling. The exception was WQ1 located within the shallow waters in the northern end of the Port, just

west of the Mooring Jetty, where sparse *Posidonia* spp. has been previously mapped (NSW DPI 2023) and still occurs. At this site during arrival and departure, TSS was up to 16 mg/L in the midwaters, which is above the < 5 mg/L previously modelled for this area (Jacobs 2023).

- For mussel aquaculture sites, there was only one detection of TSS up to 25 mg/L which was within the 20 – 25 mg/L previously modelled for this area. Although this is above the WQGV of 10 mg/L for aquaculture leases, it is noted that this site is not actually located within the lease area, but adjacent to the mussel leases where modelling did show increases of up to 25 mg/L.
- Within the vessel route sites, TSS was < LOR – 35 mg/L which was lower than the 50 – 100 mg/L modelled for this pathway. Overall, TSS values were higher during departure which is likely related to a combination of the strong NW winds of up to 20 knots and the higher amount of energy from the bow thrusters that is required to reverse the vessel out of the Port (Advisian 2023). The water quality results for the vessel route sites indicate that TSS in the navigation channel was much lower than what was modelled, noting that there is a short delay between the transit and ability to sample (i.e. TSS levels may have already dropped or been horizontally distributed in the water column by the time of sampling, although visible plumes were still present and turbidity values elevated).
- The modelling predicted that elevated TSS would occur along the seabed and through the water column with minor TSS at the surface. This was very clear at WQ11 and WQ12, both on the vessel route immediately following cruise ship departure, however, at the other vessel route sites WQ9 and WQ10, TSS was more even through the water column. On the days where no cruise ship activity was occurring, TSS values were higher at the surface than the seafloor.
- In the modelling study, Jacobs (2023) produced spatial plots of the fine sediment deposition across the Port with estimated values to be below 0.2 mm during all scenarios in the mapped seagrass and mussel aquaculture areas. This information cannot be recorded in the field campaign but is supported based on observations of TSS suspension in the water column.
- The modelling predicted that most of the TSS would be contained to the navigation channel and short lived which was confirmed based on the water quality results.

### **Comparison to the MOD3 Water and Sediment Quality Assessment**

The MOD 3 Water and Sediment Quality Assessment (Advisian 2023) identified potential impacts on seagrasses and mussels via changes to water quality associated with the mobilisation of sediments in the water column. It was identified that the Quantum and Oasis class vessels have a wider beam, deeper draft and a different thruster configuration than the vessels that were at that time approved to berth at the Eden Cruise Wharf, hence there is a higher potential for higher velocities at the seabed and greater remobilisation of seabed sediments (in terms of the frequency of occurrence and the extent of sediment plumes, which are likely to be beyond the currently modelled areas).

The assessment of impacts was largely based on the modelling of the sediment plume including during worst case scenarios and back-to-back transits. The results of this water

quality study are largely in line with the predictions of the modelling which provides validation to the MOD 3 assessment of potential impacts on water quality and sensitive seagrass and mussel receptors. This includes the following assessments from MOD 3:

- Localised and short-term reductions in dissolved oxygen are not expected to significantly increase due to MOD 3 proposal.
- The risk of impacts on mussel farms is still considered low due to the concentrations of TSS (both modelled and actual) and the short-term nature of the sediment plumes following arrival and departure. Based on the results of this water quality monitoring, no differences to assessment of the predicted sediment deposition of 0.2 mm are expected.
- As assessed in the MOD 3 report, the risk of impacts on seagrasses in the area of mapped *Zostera* (at sites WQ2 – WQ4) is still considered to be very low considering the low concentration and short-term nature of the sediment plume.
- However, in contrast to the MOD 3 report, there is potential for greater than anticipated impacts on seagrasses, macroalgae and subtidal reef located in the northern area of the Port (within Snug Cove), as recorded around the mapped *Posidonia* (WQ1). This area is within 250 m of the bow thrusters and berth area of the vessel and in shallow waters (<4 m) near the Port and adjacent to the Mooring Jetty. The TSS results in this area were higher (up to 16 mg/L) than the modelled 0 – 5 mg/L so may result in higher than predicted (0.2 mm) sediment deposition.

### **Impacts on *Posidonia*, macroalgae and reefs from elevated TSS - Mitigation**

There are no known guidelines for TSS specific to seagrasses and the adopted WQGV is based on ANZECC (2000) limits established for aquaculture leases. However, it is well established that impacts on seagrasses from elevated TSS may occur via either a reduction in light penetration and/or smothering. Extended periods of elevated TSS/turbidity blocks the light penetration through the water column affecting photosynthesis and therefore growth. Considering the short-term nature of the sediment plumes (residing within 30 minutes of arrival and departure), it is considered unlikely that sustained impacts would occur due to reduced light penetration. However, the higher TSS loads than previously predicted could result in higher sediment deposition and potential for smothering of seabed habitats than previously predicted for this area. Given the shallow nature of this site and nearby areas, and its location in the Port with protection from the newly constructed wave attenuator, potentially resulting in less mixing of waters and less capability to disperse sedimentation, there are potential cumulative impacts given it is regularly exposed to sediment deposition from other vessel movements. The following mitigation is recommended to address this identified impact for cruise ships entering the Port of Eden:

*"Where practicable minimise the power and duration that thrusters are used, especially in the berth box, to reduce sediment resuspension and the resultant impacts on water quality and sensitive ecological communities within the Port of Eden".*

### **Proposed Turbidity Water Quality Guideline**

A TSS to turbidity conversion factor was determined in this study and is potentially useful because turbidity can be measured in the field, whereas TSS can take weeks to return the

results. The relationship between turbidity and TSS is different for every environment so requires site specific data. The results of the TSS: turbidity regression shows that this approach overestimates the low range of TSS results but is relatively accurate for higher TSS values (above 5 mg/L).

Based on the turbidity: TSS relationship, a water quality turbidity guideline of 6.25 mg/L is recommended for the Port of Eden which corresponds to the existing aquaculture WQGV of 10 mg/L TSS. This may be useful in the context of the existing continuous monitoring program that is undertaken at the aquaculture leases.

## **Conclusion**

The monitoring results indicate that the water quality impacts from the Quantum Class cruise vessel visit to the Port were largely within the predicted and acceptable ranges. While there were some elevated turbidity and TSS concentrations at sites during cruise ship movements, these were short term in nature and largely within the vessel route or modelling predictions. One exception was higher than expected TSS and turbidity within Snug Cove at site WQ1. Overall, the results validate the sediment plume modelling and support the MOD3 assessment, confirming that the potential impacts on the main mapped areas of sensitive seagrass and mussel aquaculture receptors from visits of Quantum Class vessels remains low. However, it is suggested that where practical, cruise vessels will minimise the power and duration of thrusters used during arrival and departure to reduce impacts on water quality within the Port of Eden and their spread northwards into Snug Cove to sensitive areas of Posidonia seagrass, macroalgae and subtidal reef.

## 5. References

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## **Appendix A. Approval Conditions**

Table 5-1 MOD 3 Relevant Conditions of Approval

Conditions		Approval Conditions
<b>D10</b>	Operational Monitoring Programs	<b>Operational Monitoring Program(s)</b> must be prepared to compare actual operational performance against predicted performance of that identified in <b>Condition A1c(ix) and (x)</b> . The <b>Operational Monitoring Program(s)</b> must be prepared in consultation with identified relevant authorities. Details of information requested by an agency during consultation must be provided to the Planning Secretary as part of any submission of the relevant <b>Operational Monitoring Program</b> , including copies of correspondence from those agencies as required by <b>Condition A7</b> .
<b>D11</b>	Operational Monitoring Program	a) Details of baseline data.
		b) The relevant environmental performance criteria or parameter (including reference to where the criteria or parameter are identified in the documents listed in <b>Condition A1(c)(ix) and (x)</b> .
		c) Details of monitoring of the project to be undertaken.
		d) The parameters of the project to be monitored.
		e) The frequency and lifespan of monitoring to be undertaken.
		f) The location of monitoring.
		g) The reporting of monitoring and analysis of results against the relevant environmental performance criteria or parameter.
		h) Details of the methods that will be employed to analyse the monitoring data.
		i) Procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory.
		j) Any consultation to be undertaken in relation to the monitoring programs.
<b>D21</b>	Operational Water Quality Monitoring Program	a) Details of the type and frequency of monitoring to be undertaken for single vessel events (the first Quantum class or equivalent and first Oasis class or equivalent) and the first cruise season with more than 60 vessel visits.
		b) A review of the monitoring results that considers the performance of the SSI relative to the environmental parameters.

## **Appendix B. Field Notes**

Date	Sampling Day	Sampling Event	Site	Time	Site Depth	Mid Site Depth	Sample Depth	Tide	Tide State	Wind Speed	Wind Direction	Current Speed	Current Direction	Rain on day	Rain in 3 days preceding	Water Temp	Air Temp (average)	Field Obs
21/02/2025	Arrival/departure	1	1	7:47:00 AM	3.9	1.95	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	1pm Azamara. Brown green tinged water. Visible suspended material. Oil slick in port. Some surface scum.
21/02/2025	Arrival/departure	1	2	7:58:00 AM	7.2	3.6	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	3	8:03:00 AM	6.6	3.3	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	4	8:08:00 AM	7	3.5	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	5	8:14:00 AM	6	3	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	6	8:21:00 AM	10.6	5.3	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	7	8:25:00 AM	10.5	5.25	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	8	8:34:00 AM	10.4	5.2	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	9	8:41:00 AM	12.2	6.1	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	10	8:46:00 AM	11.1	5.55	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	11	8:51:00 AM	10.6	5.3	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	1	12	8:56:00 AM	10.5	5.25	S/M	High	Ebb	<5	WNW	<5	Tidal	0	0	19.7	17.5	
21/02/2025	Arrival/departure	2	1	9:03:00 AM	3.6	1.8	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	Green water, some surface scum and oil in port area.
21/02/2025	Arrival/departure	2	2	9:08:00 AM	7.1	3.55	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	3	9:12:00 AM	7	3.5	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	4	9:15:00 AM	6.6	3.3	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	5	9:18:00 AM	5.7	2.85	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	6	9:23:00 AM	10.6	5.3	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	7	9:26:00 AM	10.3	5.15	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	8	9:30:00 AM	10.2	5.1	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	9	9:34:00 AM	12.1	6.05	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	10	9:38:00 AM	11.3	5.65	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	11	9:42:00 AM	10.6	5.3	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	2	12	9:46:00 AM	10.7	5.35	---	High	Ebb	0	---	<5	Tidal	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	1	9:51:00 AM	3.6	1.8	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	Water green with visible suspended material/algae. Filamentous algae on surface at some sites.
21/02/2025	Arrival/departure	3	2	9:57:00 AM	7.1	3.55	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	3	9:59:00 AM	6.8	3.4	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	4	10:03:00 AM	6.6	3.3	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	5	10:05:00 AM	5.7	2.85	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	6	10:08:00 AM	10.5	5.25	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	7	10:12:00 AM	10.5	5.25	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	8	10:14:00 AM	10.3	5.15	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	9	10:18:00 AM	12.2	6.1	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	10	10:20:00 AM	11.4	5.7	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	11	10:23:00 AM	10.6	5.3	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	3	12	10:26:00 AM	10.6	5.3	---	Low	Slack	<5	E	---	SSE	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	1	10:31:00 AM	3.5	1.75	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	e waters cleaned
21/02/2025	Arrival/departure	4	2	10:36:00 AM	7.2	3.6	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	3	10:38:00 AM	6.8	3.4	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	4	10:41:00 AM	6.6	3.3	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	5	10:44:00 AM	6	3	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	6	10:48:00 AM	10.6	5.3	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	7	10:49:00 AM	10.6	5.3	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	8	10:52:00 AM	10.2	5.1	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	9	10:55:00 AM	12.2	6.1	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	10	10:58:00 AM	11.4	5.7	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	11	11:00:00 AM	10.6	5.3	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	4	12	11:04:00 AM	10.5	5.25	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	5	1	11:07:00 AM	3.6	1.8	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	

Date	Sampling Day	Sampling Event	Site	Time	Site Depth	Mid Site Depth	Sample Depth	Tide	Tide State	Wind Speed	Wind Direction	Current Speed	Current Direction	Rain on day	Rain in 3 days preceding	Water Temp	Air Temp (average)	Field Obs
21/02/2025	Arrival/departure	5	2	11:12:00 AM	7.3	3.65	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	As last event.
21/02/2025	Arrival/departure	5	3	11:19:00 AM	6.8	3.4	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	Pilot and tugs leaving to get
21/02/2025	Arrival/departure	5	4	11:16:00 AM	6.8	3.4	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	Azamara. Tug passed at site
21/02/2025	Arrival/departure	5	5	11:19:00 AM	6.5	3.25	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	11 and 12 while sampling.
21/02/2025	Arrival/departure	5	6	11:22:00 AM	10.6	5.3	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	11:35am - Tugs leave port.
21/02/2025	Arrival/departure	5	7	11:25:00 AM	10.5	5.25	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	5	8	11:28:00 AM	10.3	5.15	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	5	9	11:32:00 AM	12.2	6.1	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	5	10	11:35:00 AM	11.4	5.7	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	5	11	11:37:00 AM	10.8	5.4	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	5	12	11:40:00 AM	10.5	5.25	---	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	1	11:45:00 AM	3.4	1.7	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	2	11:05:00 AM	7.3	3.65	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	3	11:54:00 AM	6.8	3.4	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	4	12:36:00 PM	6.9	3.45	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	5	12:30:00 PM	6.3	3.15	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	6	12:25:00 PM	10.6	5.3	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	7	12:19:00 PM	10.6	5.3	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	8	12:14:00 PM	10.7	5.35	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	9	12:09:00 PM	12.2	6.1	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	10	12:05:00 PM	11.1	5.55	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	11	12:02:00 PM	11.6	5.8	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
21/02/2025	Arrival/departure	6	12	11:59:00 AM	10.4	5.2	S/M	Low	Flood	<15	NE	---	---	0	0	19.7	21.5	
22/02/2025	Arrival/departure	1	1	6:04:00 AM	3.9	1.95	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	2	6:10:00 AM	7.7	3.85	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	3	6:14:00 AM	7.1	3.55	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	4	6:12:00 AM	7	3.5	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	5	6:16:00 AM	6.7	3.35	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	6	6:19:00 AM	10.7	5.35	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	7	6:21:00 AM	10.8	5.4	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	8	6:23:00 AM	10.7	5.35	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	9	6:26:00 AM	12.5	6.25	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	10	6:28:00 AM	11.6	5.8	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	11	6:31:00 AM	11	5.5	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	1	12	6:33:00 AM	11.1	5.55	---	High	Ebb	<10	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	1	7:18:00 AM	3.9	1.95	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	2	7:25:00 AM	7.4	3.7	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	3	7:32:00 AM	6.9	3.45	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	4	7:29:00 AM	6.4	3.2	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	5	7:35:00 AM	6.5	3.25	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	6	6:47:00 AM	10.8	5.4	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	7	6:52:00 AM	10.8	5.4	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	8	6:56:00 AM	10.6	5.3	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	9	7:00:00 AM	12.3	6.15	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	10	7:04:00 AM	11.6	5.8	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	11	7:09:00 AM	11	5.5	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	2	12	7:02:00 AM	11	5.5	---	High	Ebb	---	---	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	1	8:05:00 AM	3.9	1.95	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	2	8:11:00 AM	7.4	3.7	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	

Date	Sampling Day	Sampling Event	Site	Time	Site Depth	Mid Site Depth	Sample Depth	Tide	Tide State	Wind Speed	Wind Direction	Current Speed	Current Direction	Rain on day	Rain in 3 days preceding	Water Temp	Air Temp (average)	Field Obs
22/02/2025	Arrival/departure	3	3	8:16:00 AM	6.7	3.35	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	after entry - started at 6. water greenish as per 21/2/2025. Weather conditions similar to day before. Thrusters
22/02/2025	Arrival/departure	3	4	8:13:00 AM	6.7	3.35	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	5	8:18:00 AM	6.3	3.15	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	6	7:41:00 AM	10.7	5.35	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	7	7:44:00 AM	10.7	5.35	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	8	7:47:00 AM	10.4	5.2	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	9	7:51:00 AM	12.3	6.15	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	10	7:55:00 AM	11.4	5.7	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	11	7:58:00 AM	10.8	5.4	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	3	12	8:01:00 AM	10.7	5.35	---	High	Ebb	<5	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	1	8:44:00 AM	3.8	1.9	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	2	8:49:00 AM	7.2	3.6	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	3	8:53:00 AM	6.6	3.3	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	4	8:51:00 AM	6.7	3.35	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	5	8:56:00 AM	6.2	3.1	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	6	8:21:00 AM	10.7	5.35	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	7	8:25:00 AM	10.5	5.25	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	8	8:27:00 AM	10.3	5.15	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	9	8:31:00 AM	12.2	6.1	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	10	8:34:00 AM	11.4	5.7	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	11	8:37:00 AM	10.7	5.35	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	4	12	8:40:00 AM	10.6	5.3	---	High	Ebb	<15	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	1	2:58:00 PM	3.7	1.85	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	2	3:06:00 PM	7.3	3.65	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	3	3:10:00 PM	6.6	3.3	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	4	3:09:00 PM	6.8	3.4	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	5	3:15:00 PM	6.2	3.1	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	6	3:19:00 PM	10.6	5.3	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	7	3:22:00 PM	10.6	5.3	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	8	3:25:00 PM	10.5	5.25	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	9	3:31:00 PM	10.6	5.3	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	10	3:34:00 PM	11.6	5.8	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	11	3:38:00 PM	11	5.5	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	5	12	3:42:00 PM	10.8	5.4	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	1	3:58:00 PM	3.5	1.75	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	2	4:52:00 PM	7.4	3.7	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	3	4:46:00 PM	7	3.5	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	4	4:50:00 PM	6.8	3.4	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	5	4:43:00 PM	6.5	3.25	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	6	4:39:00 PM	10.8	5.4	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	7	4:32:00 PM	10.6	5.3	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	8	4:26:00 PM	10.7	5.35	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	9	4:21:00 PM	12.5	6.25	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	10	4:16:00 PM	11.3	5.65	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	11	4:13:00 PM	11.1	5.55	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	6	12	4:08:00 PM	10.9	5.45	S/M	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	1	4:58:00 PM	3.7	1.85	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	12	5:02:00 PM	10.8	5.4	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	11	5:05:00 PM	11.2	5.6	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	

Date	Sampling Day	Sampling Event	Site	Time	Site Depth	Mid Site Depth	Sample Depth	Tide	Tide State	Wind Speed	Wind Direction	Current Speed	Current Direction	Rain on day	Rain in 3 days preceding	Water Temp	Air Temp (average)	Field Obs
22/02/2025	Arrival/departure	7	10	5:08:00 PM	11.6	5.8	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	Water cleared at site 10. Additional round following ship departure. Physico WQ2 = WQ12 (didn't change meter)
22/02/2025	Arrival/departure	7	9	5:11:00 PM	12.3	6.15	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	8	5:14:00 PM	10.6	5.3	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	7	5:17:00 PM	10.7	5.35	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	6	5:20:00 PM	10.8	5.4	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	5	5:23:00 PM	6.7	3.35	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	4	5:27:00 PM	6.8	3.4	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	3	5:25:00 PM	7.3	3.65	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	2	5:29:00 PM	7.3	3.65	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
22/02/2025	Arrival/departure	7	1	5:34:00 PM	3.8	1.9	---	Low	Flood	<20	NE	---	---	0	0	19.7	20.6	
23/02/2025	Day after	1	1	6:47:00 AM	3.8	1.9	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	N/A Clear waters
23/02/2025	Day after	1	2	6:56:00 AM	7.6	3.8	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	3	7:04:00 AM	7.1	3.55	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	4	7:00:00 AM	6.8	3.4	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	5	7:10:00 AM	6.5	3.25	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	6	7:17:00 AM	11	5.5	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	7	7:23:00 AM	10.8	5.4	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	8	7:28:00 AM	10.7	5.35	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	9	7:36:00 AM	12.6	6.3	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	10	7:41:00 AM	11.6	5.8	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	11	7:45:00 AM	11	5.5	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	1	12	7:50:00 AM	10.9	5.45	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	1	8:00:00 AM	3.1	1.55	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	N/A Clear waters
23/02/2025	Day after	2	2	8:04:00 AM	7.5	3.75	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	3	8:08:00 AM	6.7	3.35	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	4	8:06:00 AM	6.8	3.4	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	5	8:10:00 AM	6.5	3.25	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	6	8:13:00 AM	10.8	5.4	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	7	8:16:00 AM	10.6	5.3	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	8	8:19:00 AM	10.5	5.25	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	9	8:23:00 AM	12.4	6.2	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	10	8:26:00 AM	11.6	5.8	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	11	8:29:00 AM	11	5.5	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	2	12	8:32:00 AM	10.8	5.4	S/M	High	Ebb	<5	SSW	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	1	8:36:00 AM	3.9	1.95	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	Weather conditions similar to 21st and 22nd.
23/02/2025	Day after	3	2	8:46:00 AM	7	3.5	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	3	8:51:00 AM	6.8	3.4	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	4	8:48:00 AM	6.8	3.4	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	5	8:54:00 AM	6	3	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	6	9:05:00 AM	10.6	5.3	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	7	9:09:00 AM	10.6	5.3	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	8	9:12:00 AM	10.3	5.15	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	9	9:15:00 AM	12.1	6.05	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	10	9:19:00 AM	11.3	5.65	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	11	9:21:00 AM	10.8	5.4	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	3	12	12:00:00 AM	10.6	5.3	---	High	Ebb	<5	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	1	9:28:00 AM	3.5	1.75	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	2	9:34:00 AM	7	3.5	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	3	9:40:00 AM	6.5	3.25	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	

Date	Sampling Day	Sampling Event	Site	Time	Site Depth	Mid Site Depth	Sample Depth	Tide	Tide State	Wind Speed	Wind Direction	Current Speed	Current Direction	Rain on day	Rain in 3 days preceding	Water Temp	Air Temp (average)	Field Obs
23/02/2025	Day after	4	4	9:38:00 AM	6.5	3.25	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	5	9:43:00 AM	6.2	3.1	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	6	9:46:00 AM	10.5	5.25	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	7	9:48:00 AM	10.4	5.2	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	8	9:51:00 AM	10.3	5.15	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	9	9:55:00 AM	12.2	6.1	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	10	9:59:00 AM	11.3	5.65	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	11	10:02:00 AM	10.6	5.3	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	4	12	10:05:00 AM	10.4	5.2	S/M	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	1	10:11:00 AM	3.5	1.75	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	2	10:14:00 AM	7	3.5	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	3	10:18:00 AM	6.6	3.3	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	4	10:16:00 AM	6.6	3.3	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	5	10:20:00 AM	6.3	3.15	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	6	10:23:00 AM	10.5	5.25	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	7	10:28:00 AM	10.2	5.1	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	8	10:30:00 AM	10.1	5.05	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	9	10:34:00 AM	12	6	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	10	10:37:00 AM	11.2	5.6	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	11	10:40:00 AM	10.6	5.3	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	5	12	10:42:00 AM	10.4	5.2	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	1	10:51:00 AM	3.4	1.7	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	2	10:56:00 AM	7.2	3.6	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	3	10:59:00 AM	6.6	3.3	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	4	10:57:00 AM	6.5	3.25	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	5	11:01:00 AM	6.2	3.1	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	6	11:03:00 AM	10.5	5.25	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	7	11:06:00 AM	10.3	5.15	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	8	11:08:00 AM	10.2	5.1	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	9	11:11:00 AM	11.8	5.9	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	10	11:14:00 AM	11.6	5.8	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	11	11:16:00 AM	10.3	5.15	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	
23/02/2025	Day after	6	12	11:19:00 AM	10.3	5.15	---	High	Ebb	<10	N	<5	---	0	0	23.1	21	

## **Appendix C. Chain of Custody Documents**



# CHAIN OF CUSTODY

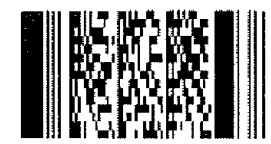
ALS Laboratory please tick →

CLIENT: Worley	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): 2 weeks from sample submission	FOR LABORATORY USE ONLY (Circle)
OFFICE: Newcastle	(Standard TAT may be longer for some tests e.g. UREA Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: Eden MOD3 Operational WQ Sampling	ALS QUOTE NO.: ALS-SY-162-22 V2	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PURCHASE ORDER NO: 311015-00687	COUNTRY OF ORIGIN: Australia	Random Sample Temperature on Receipt: C
PROJECT MANAGER: Megan Priestley, Katie Newton	CONTACT PH: 0435 173 345 (Megan)	Other comment
SAMPLER: Megan Priestley	SAMPLER MOBILE: 0435 173 345	RECEIVED BY: <i>[Signature]</i>
COC Emailed to ALS? YES	EDD FORMAT (or default): EQEOD	RECEIVED BY: <i>[Signature]</i>
Email Reports to: Megan.Priestley@advisian.com, Katie Newton@advisian.com	DATE/TIME	DATE/TIME: 24/11/15 10:30
Email Invoice to: Megan.Priestley@advisian.com, Katie Newton@advisian.com	DATE/TIME	DATE/TIME

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinses.

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB - Suite Codes must be listed to attract suite price)				Additional Information
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLE (S)	Low level TSS (EA/20L) LOR# 1mg/L			
1	D1-T1-WQ1-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
2	D1-T1-WQ2-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
3	D1-T1-WQ3-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
4	D1-T1-WQ4-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
5	D1-T1-WQ5-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
6	D1-T1-WQ6-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
7	D1-T1-WQ7-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
8	D1-T1-WQ8-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
9	D1-T1-WQ9-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
10	D1-T1-WQ10-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
11	D1-T1-WQ11-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
12	D1-T1-WQ12-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x				
TOTAL					12					

Environmental Division  
Sydney  
Work Order Reference  
**ES2505325**



Telephone : +61-2-8784 8555

Comments on any contaminant levels, dilutions, or samples requiring specific analysis etc.

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination, we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000 ml rinses.

Water Container Codes: P = Unpreserved Plastic, H = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cl<sub>2</sub> Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = AirTight Unpreserved Plastic  
V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulfate Preserved, VS = VOA Vial Sulfuric Preserved, AV = AirTight Unpreserved Vial SG = Sulfuric Preserved, Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass  
Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottle, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Solts, B = Unpreserved Bag, LI = Lugdunum Iodine Preserved Bottles, STT = Sterile Sodium Trisulfate Preserved Bottles.



### CHAIN OF CUSTODY

ALS Laboratory please tick →

<b>CLIENT:</b> Werley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eden MOD3 Operational WQ Sampling <b>PURCHASE ORDER NO.:</b> 311015-00037 <b>PROJECT MANAGER:</b> Megan Priestley, Katie Newton	<b>TURNAROUND REQUIREMENTS:</b> <input type="checkbox"/> Standard TAT (List due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent TAT (List due date): <b>ALS QUOTE NO.:</b> ALS-SY-162-22 V2 <b>COUNTRY OF ORIGIN:</b> Australia	<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt °C Other comment:	<b>COC SEQUENCE NUMBER (Circle)</b> COC: 2 OF: 12
<b>SAMPLER:</b> Megan Priestley <b>CONTACT PH:</b> 0435 173 345 (Megan) <b>EDD FORMAT (or default):</b> EQEDD	<b>SAMPLER MOBILE:</b> 0435 173 345 <b>RELINQUISHED BY:</b> DATE/TIME:	<b>RECEIVED BY:</b>  DATE/TIME: 24/2/25 10:30	<b>RECEIVED BY:</b> DATE/TIME:
<b>COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:</b> marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse			

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be listed to attract suite price)					Additional Information	
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL BOTTLE (S)	Low level TSS (EPA/225) mg/L	Metals as per test suite	Total	Dissolved		Other
13	D1-T1-WQ1-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						Comments on likely contaminated details (location, or samples requiring LHM/SC analysis etc.)  <b>ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination, we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000ml rinses</b>
14	D1-T1-WQ2-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
15	D1-T1-WQ3-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
16	D1-T1-WQ4-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
17	D1-T1-WQ5-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
18	D1-T1-WQ6-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
19	D1-T1-WQ7-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
20	D1-T1-WQ8-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
21	D1-T1-WQ9-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
22	D1-T1-WQ10-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
23	D1-T1-WQ11-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
24	D1-T1-WQ12-M	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
<b>TOTAL</b>					<b>12</b>							

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic  
 V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulphuric Preserved, AV = Airfreight Unpreserved Vial, SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, SP = Sulphuric Preserved Plastic, F = Formaldehyde Preserved Glass  
 Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, GT = Sterile Bottle, ACS = Plastic Bag for Acid Sulphate Soils, B = Unpreserved Bag Li = Lugol's Iodine Preserved Bottles, STI = Sterile Sodium Thiosulfate Preserved Bottles



**CHAIN OF CUSTODY**

ALS Laboratory please tick →

<b>CLIENT:</b> Worley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eden MOD3 Operational WQ Sampling <b>PURCHASE ORDER NO:</b> 311015-00687 <b>PROJECT MANAGER:</b> Megan Priestley, Katie Newton		<b>TURNAROUND REQUIREMENTS:</b> (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Standard TAT (List due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent TAT (List due date):		<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:	
<b>ALS QUOTE NO.:</b> ALS-SY-162-22 V2 <b>COUNTRY OF ORIGIN:</b> Australia		<b>COC SEQUENCE NUMBER (Circle)</b> COC: 3 CP: 12			
<b>SAMPLER:</b> Megan Priestley <b>EDD Formatted to ALS? YES</b> Email Reports to: Megan.Priestley@advisian.com, Katie.Newton@advisian.com Email Invoice to: Megan.Priestley@advisian.com, Katie.Newton@advisian.com		<b>SAMPLER MOBILE:</b> 0435 173 345 <b>EDD FORMAT (or default):</b> EQEDD <b>RELINQUISHED BY:</b> DATE/TIME:		<b>RECEIVED BY:</b> DATE/TIME: 24/2/25 12:32 <b>RELINQUISHED BY:</b> DATE/TIME:	

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse.

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB Suite Codes must be listed to attract suite prices)						Additional Information	
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLE (S)	Metals (see table for details) Total (see table for details) Dissolved (see table for details)						
25	D1-T2-WQ1-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
26	D1-T2-WQ2-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
27	D1-T2-WQ3-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
28	D1-T2-WQ4-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
29	D1-T2-WQ5-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
30	D1-T2-WQ6-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
31	D1-T2-WQ7-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
32	D1-T2-WQ8-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
33	D1-T2-WQ9-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
34	D1-T2-WQ10-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
35	D1-T2-WQ11-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
36	D1-T2-WQ12-S	21-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x							
<b>TOTAL</b>					12								

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination, we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000 ml rinses

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic  
 V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial, SG = Sulfuric Preserved, Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, CP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass  
 Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottle, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Solts, B = Unpreserved Bag, LI = Lugols Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles







**CHAIN OF CUSTODY**

ALS Laboratory please tick →

CLIENT: Worley	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard IAI (List due date): 2 weeks from sample submission	FOR LABORATORY USE ONLY (Circle)
OFFICE: Newcastle	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent IAI (List due date)	Custody Seal Intact? Yes No N/A
PROJECT: Eden MOD3 Operational WQ Sampling	ALS QUOTE NO.: ALS-SY-162-22-V2	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PURCHASE ORDER NO: 314015-00687	COUNTRY OF ORIGIN: Australia	Random Sample Temperature on Receipt C
PROJECT MANAGER: Megan Priestley, Kate Newton	CONTACT PH: 0435 173 345 (Megan)	Other comment
SAMPLER: Megan Priestley	SAMPLER MOBILE: 0435 173 345	RELINQUISHED BY:
COC Emailed to ALS? YES	EDD FORMAT (or default): EQEDD	RECEIVED BY: <i>[Signature]</i>
Email Reports to: Megan.Priestley@advisian.com, Kate.Newton@advisian.com	DATE/TIME	DATE/TIME
Email Invoice to: Megan.Priestley@advisian.com, Kate.Newton@advisian.com		DATE/TIME

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse.

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB Suite Codes must be listed to attract suite price)							Additional Information	
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLE (\$)	Low level TSS (EAG025), LOR (mg/L)							
61	D2-T1-WQ1-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
62	D2-T1-WQ2-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
63	D2-T1-WQ3-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
64	D2-T1-WQ4-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
65	D2-T1-WQ5-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
66	D2-T1-WQ6-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
67	D2-T1-WQ7-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
68	D2-T1-WQ8-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
69	D2-T1-WQ9-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
70	D2-T1-WQ10-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
71	D2-T1-WQ11-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
72	D2-T1-WQ12-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
<b>TOTAL</b>						<b>12</b>								

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Destination, we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000 ml rinses.

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airtight Unpreserved Plastic, V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulphuric Preserved, AV = Airfreight Unpreserved Vial, SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass, Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Golds, B = Unpreserved Bag, LI = Lugdun Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles



# CHAIN OF CUSTODY

ALS Laboratory please tick →

<b>CLIENT:</b> Worley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eden MOD3 Operational WQ Sampling <b>PURCHASE ORDER NO:</b> 311015-00987 <b>PROJECT MANAGER:</b> Megan Priestley, Kate Newton	<b>TURNAROUND REQUIREMENTS:</b> <small>(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)</small> <input type="checkbox"/> Standard TAT (List due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent TAT (List due date)	<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Yes No N/A Free / frozen ice blocks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:	<b>ALS QUOTE NO.:</b> ALS-SY-162-22 V2 <b>COUNTRY OF ORIGIN:</b> Australia <b>COC SEQUENCE NUMBER (Circle)</b> COC: 7 CP: 12
<b>SAMPLER:</b> Megan Priestley <b>COE Emailed to ALS?</b> YES <b>Email Reports to:</b> Megan.Priestley@advisian.com, Kate.Newton@advisian.com <b>Email Invoice to:</b> Megan.Priestley@advisian.com, Kate.Newton@advisian.com	<b>SAMPLER MOBILE:</b> 0435 173 345 <b>EDD FORMAT (or default):</b> EQEDD	<b>RELINQUISHED BY:</b> DATE/TIME:	<b>RECEIVED BY:</b> <i>[Signature]</i> DATE/TIME: <i>24/11/22 08:32</i>
<b>RECEIVED BY:</b> DATE/TIME:		<b>RECEIVED BY:</b> DATE/TIME:	

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse.

ALS USE ONLY	SAMPLE DETAILS <small>MATRIX: Solid/Sr Water/W</small>			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (AB - Site Codes must be listed to attract full price) <small>Metals, Asbestos, Lead, Total Chloride, Fluoride, Dissolved Phosphate, Boron, etc.</small>										Additional Information			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLE (S)	Low level TSS (EA025), LOI+ 1mg/L													
73	D2-T2-WQ1-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
74	D2-T2-WQ2-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
75	D2-T2-WQ3-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
76	D2-T2-WQ4-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
77	D2-T2-WQ5-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
78	D2-T2-WQ6-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
79	D2-T2-WQ7-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
80	D2-T2-WQ8-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
81	D2-T2-WQ9-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
82	D2-T2-WQ10-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
83	D2-T2-WQ11-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
84	D2-T2-WQ12-S	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x													
<b>TOTAL</b>					12														

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000ml rinses.

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cl Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic  
 V = VOA vial HCl Preserved, VB = VOA vial Sodium Bisophate Preserved, VS = VOA vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, SP = Sulfuric Preserved Plastic, F = Formoldehyde Preserved Glass  
 Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate, B = Unpreserved Bag, LI = Lumps Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles



# CHAIN OF CUSTODY

ALS Laboratory please tick →

<b>CLIENT:</b> Worley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eden BOD3 Operational WQ Sampling <b>PURCHASE ORDER NO:</b> 311015-00887 <b>PROJECT MANAGER:</b> Megan Priestley, Kate Newton	<b>TURNAROUND REQUIREMENTS:</b> <small>(Standard TAT may be longer for some tests e.g. Ultra Trace Elements)</small> <input type="checkbox"/> Standard IAT (List due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent IAT (List due date)	<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt _____ °C Other comment:
<b>ALS QUOTE NO.:</b> ALS-SY-162-22 V2 <b>COUNTRY OF ORIGIN:</b> Australia	<b>COC SEQUENCE NUMBER (Circle)</b> DOC: 8 CF: 12	
<b>SAMPLER:</b> Megan Priestley <b>EDD Emailed to ALS? YES</b> Email Reports to: Megan.Priestley@advisian.com, Kate.Newton@advisian.com Email Invoice to: Megan.Priestley@advisian.com, Kate.Newton@advisian.com	<b>SAMPLER MOBILE:</b> 0435 173 345 <b>EDD FORMAT (or default):</b> EQE00	<b>RELINQUISHED BY:</b> DATE/TIME:
		<b>RECEIVED BY:</b> <i>[Signature]</i> DATE/TIME: <i>24/02/2022</i>
		<b>RELINQUISHED BY:</b> DATE/TIME:

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 500ml rinse.

ALS USE ONLY	SAMPLE DETAILS <small>MATRIX: Solid(S) Water(W)</small>			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB Code Codes must be listed to attract suite price) <small>Metals: Metals (see table), Total, Dissolved, Dissolved/Total</small>										Additional Information		
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLE (S)	Low level TSS (EPA025), LOB= 1mg/L												
85	D2-T2-WQ1-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
86	D2-T2-WQ2-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
87	D2-T2-WQ3-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
88	D2-T2-WQ4-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
89	D2-T2-WQ5-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
90	D2-T2-WQ6-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
91	D2-T2-WQ7-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
92	D2-T2-WQ8-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
93	D2-T2-WQ9-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
94	D2-T2-WQ10-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
95	D2-T2-WQ11-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
96	D2-T2-WQ12-M	22-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x												
<b>TOTAL</b>					<b>12</b>													

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 500ml rinses.

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Od Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic, V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial, SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Operation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass, Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ABS = Plastic Bag for Acid Sulphate, B = Unpreserved Bag, LI = Lugols Iodine Preserved Bottles, GTI = Granite Sodium Thiosulfate Preserved Bottles



# CHAIN OF CUSTODY

ALS Laboratory please tick →

<b>CLIENT:</b> Worley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eden MOD3 Operational WQ Sampling <b>PURCHASE ORDER NO.:</b> 311015-00587 <b>PROJECT MANAGER:</b> Megan Priestley, Katie Newton	<b>TURNAROUND REQUIREMENTS:</b> <input type="checkbox"/> Standard FAT (List due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent FAT (List due date): <b>ALS QUOTE NO.:</b> ALS-SY-162-22 V2 <b>COUNTRY OF ORIGIN:</b> Australia	<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? <span style="float:right">Yes No N/A</span> Free ice / frozen ice bricks present upon receipt? <span style="float:right">Yes No N/A</span> Random Sample Temperature on Receipt <span style="float:right">C</span> Other comment:	<b>COC SEQUENCE NUMBER (Circle)</b> COC: 9 OF: 12
<b>SAMPLER:</b> Megan Priestley <b>COE Emailed to ALS? YES</b>	<b>SAMPLER MOBILE:</b> 0135 173 345 <b>EDD FORMAT (for default):</b> EQEDD	<b>RELINQUISHED BY:</b> DATE/TIME:	<b>RECEIVED BY:</b> DATE/TIME: <i>24/1/24 10:30</i>
<b>Email Reports to:</b> Megan.Priestley@advisian.com, Katie.Newton@advisian.com <b>Email Invoice to:</b> Megan.Priestley@advisian.com, Katie.Newton@advisian.com	<b>RECEIVED BY:</b> DATE/TIME:	<b>RELINQUISHED BY:</b> DATE/TIME:	<b>RECEIVED BY:</b> DATE/TIME:

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse.

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB Suite Codes must be listed to attract suite price)						Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL BOTTLE (S)	Low level TSS (EPA/NSW) LORs 1mg/L						
97	D3-T1-WQ1-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
98	D3-T1-WQ2-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
99	D3-T1-WQ3-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
100	D3-T1-WQ4-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
101	D3-T1-WQ5-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
102	D3-T1-WQ6-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
103	D3-T1-WQ7-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
104	D3-T1-WQ8-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
105	D3-T1-WQ9-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
106	D3-T1-WQ10-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
107	D3-T1-WQ11-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
108	D3-T1-WQ12-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x						
<b>TOTAL</b>					12							

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination, we previously had elevated results due to salt matrix issues and ALS used a 500ml sample with 5000 ml rinses.

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic, V = VOA Vial HCl Preserved, VD = VOA Vial Sodium Disulphate Preserved, VS = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved, Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Spectation bottle, EP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass, Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Solids, B = Unpreserved Bag, Li = Lugol's Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles



# CHAIN OF CUSTODY

ALS Laboratory please tick →

<b>CLIENT:</b> Worley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eden RFD3 Operational WQ Sampling <b>PURCHASE ORDER NO:</b> 311015-00837 <b>PROJECT MANAGER:</b> Megan Priestley, Katie Newton	<b>TURNAROUND REQUIREMENTS:</b> (Standard IAT may be longer for some tests e.g. Ultra Trace Organics) <b>ALS QUOTE NO.:</b> ALS-SY-167-22 V2 <b>COUNTRY OF ORIGIN:</b> Australia <b>CONTACT PH:</b> 0435 173 345 (Megan)	<input type="checkbox"/> Standard IAT (List due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent IAT (List due date):	<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:
<b>SAMPLER:</b> Megan Priestley <b>COC Emailed to ALS? YES</b> Email Reports to: Megan.Priestley@advisian.com, Katie Newton@advisian.com Email Invoice to: Megan.Priestley@advisian.com, Katie Newton@advisian.com	<b>SAMPLER MOBILE:</b> 0435 173 345 <b>EDD FORMAT (or default):</b> EQEDD	<b>RELINQUISHED BY:</b> DATE/TIME	<b>RECEIVED BY:</b> DATE/TIME <i>Fran 24/2/25</i>
<b>RECEIVED BY:</b> DATE/TIME		<b>RECEIVED BY:</b> DATE/TIME	

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** marine waters (saltwater). Additional rinsing may be required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse.

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be ticked to attract suite prices) <small>Low - Metals (see spec sheet) Total Ammonia Nitrogen Dissolved Phosphorus Nitrate Nitrite</small>							Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLE (S)	Low level TSS (E4029) LOR 1mg/L								
109	D3-T1-WQ1-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
110	D3-T1-WQ2-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
111	D3-T1-WQ3-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
112	D3-T1-WQ4-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
113	D3-T1-WQ5-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
114	D3-T1-WQ6-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
115	D3-T1-WQ7-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
116	D3-T1-WQ8-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
117	D3-T1-WQ9-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
118	D3-T1-WQ10-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
119	D3-T1-WQ11-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
120	D3-T1-WQ12-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
<b>TOTAL</b>					12									

**Water Container Codes:** P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic  
 V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VC = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial, SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Special bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass  
 Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ACS = Plastic Bag for Acid Substrate Soils, B = Unpreserved Bag, Li = Lugol's Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination, we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000ml rinses.



# CHAIN OF CUSTODY

ALS Laboratory please tick →

<b>CLIENT:</b> Worley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eden HOD3 Operational WQ Sampling <b>PURCHASE ORDER NO.:</b> 311015-00037 <b>PROJECT MANAGER:</b> Megan Priestley, Kate Newton	<b>TURNAROUND REQUIREMENTS:</b> <small>(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)</small> <input type="checkbox"/> Standard IAT (List due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent IAT (List due date):	<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Yes No N/A Free ice / frozen ice blocks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:
<b>ALS QUOTE NO.:</b> ALS-SY-162-22 V2 <b>COUNTRY OF ORIGIN:</b> Australia	<b>COC SEQUENCE NUMBER (Circle)</b> COC: 11 OF: 12	
<b>SAMPLER:</b> Megan Priestley <b>EDD Emailed to ALS? YES</b> Email Reports to: Megan.Priestley@advisian.com, Kate.Newton@advisian.com Email Invoice to: Megan.Priestley@advisian.com, Kate.Newton@advisian.com	<b>SAMPLER MOBILE:</b> 0435 173 345 <b>EDD FORMAT (or default):</b> EQEDD <b>RELINQUISHED BY:</b> DATE/TIME	<b>RECEIVED BY:</b>  DATE/TIME: 24/2/25 <b>RELINQUISHED BY:</b> DATE/TIME

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse.

ALS USE ONLY	SAMPLE DETAILS <small>(MATRIX: Solid(S) Water(W))</small>			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be ticked to attract suite price) <small>(NB: Metals, Volatile, Asbestos, Total, Nitrate, Phosphate, Dissolved Phosphorus, Fluoride)</small>							Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLE (S)	Low level TSS (EAD05) - LOB = 1mg/L								
121	D3-T2-WQ1-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
122	D3-T2-WQ2-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
123	D3-T2-WQ3-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
124	D3-T2-WQ4-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
125	D3-T2-WQ5-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
126	D3-T2-WQ6-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
127	D3-T2-WQ7-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
128	D3-T2-WQ8-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
129	D3-T2-WQ9-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
130	D3-T2-WQ10-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
131	D3-T2-WQ11-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
132	D3-T2-WQ12-S	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
<b>TOTAL</b>					12									

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination, we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000ml rinses.

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic  
 V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulfuric Preserved, AV = Aseptic Unpreserved Vial, SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass  
 Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Cont, B = Unpreserved Bag, LI = Lugols Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles



# CHAIN OF CUSTODY

ALS Laboratory please tick →

<b>CLIENT:</b> Worley <b>OFFICE:</b> Newcastle <b>PROJECT:</b> Eiken #ROD3 Operational WQ Sampling <b>PURCHASE ORDER NO.:</b> 311015-00337 <b>PROJECT MANAGER:</b> Megan Priestley, Katie Newton	<b>TURNAROUND REQUIREMENTS:</b> (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Standard TAT (Last due date): 2 weeks from sample submission <input type="checkbox"/> Non Standard or urgent TAT (Last due date)	<b>FOR LABORATORY USE ONLY (Circle)</b> Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt °C Other comment	<b>ALS QUOTE NO.:</b> ALS-SY-162-22 V2 <b>COC SEQUENCE NUMBER (Circle)</b> COC: 12 OF: 12 <b>COUNTRY OF ORIGIN:</b> Australia
<b>SAMPLER:</b> Megan Priestley <b>COC Emailed to ALS?</b> YES Email Reports to: Megan.Priestley@advisian.com, Katie Newton@advisian.com Email Invoice to: Megan.Priestley@advisian.com, Katie Newton@advisian.com	<b>SAMPLER MOBILE:</b> 0435 173 315 <b>EDD FORMAT (or default):</b> EQEDD	<b>RELINQUISHED BY:</b> DATE/TIME	<b>RECEIVED BY:</b> DATE/TIME <i>Fern 24/11/15 10:30</i>

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** marine waters (saltwater). Additional rinsing maybe required TSS samples to remove salt matrix issue - 500ml sample with 5000ml rinse.

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB Suite Codes must be listed to attract suite price)						Additional Information			
	LAB ID	SAMPLE ID	DATE / TIME		MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL BOTTLE (S)	<small>Metals (see codes below), Total, Unfiltered, Filtered, Dissolved (see codes below)</small> Low level TSS (EA029), LOB= 1mg/L						
133	D3-T2-WQ1-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
134	D3-T2-WQ2-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
135	D3-T2-WQ3-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
136	D3-T2-WQ4-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
137	D3-T2-WQ5-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
138	D3-T2-WQ6-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
139	D3-T2-WQ7-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
140	D3-T2-WQ9-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
141	D3-T2-WQ8-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
142	D3-T2-WQ10-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
143	D3-T2-WQ11-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
144	D3-T2-WQ12-M	23-Feb-25	Saltwater	Green 250ml or 500ml TSS	1	x								
<b>TOTAL</b>					12									

ALS Sydney - Please test TSS using suitable methods for SALTWATER. For Belmont Desalination we previously had elevated results due to salt matrix issue and ALS used a 500ml sample with 5000ml rinses.

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic, V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VC = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial, SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Separation bottle, EP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass, Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Solts, B = Unpreserved Bag, LI = Lugols Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles

## **Appendix D. Laboratory Reports**



## SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2505325**

Client	: <b>WORLEY CONSULTING PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Ms Megan Priestley	Contact	: Customer Services ES
Address	: 8-14 TELFORD STREET NEWCASTLE EAST NSW, AUSTRALIA 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: megan.priestley@advisian.com	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: Eden MOD3 Operational WQ Sampling	Page	: 1 of 6
Order number	: 311015-00687	Quote number	: ES2022ADVISI0001_V4 (SY/162/22_V4)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Megan Priestley		

### Dates

Date Samples Received	: 24-Feb-2025 10:30	Issue Date	: 25-Feb-2025
Client Requested Due Date	: 10-Mar-2025	Scheduled Reporting Date	: <b>10-Mar-2025</b>

### Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Intact.
No. of coolers/boxes	: 7	Temperature	: 5.8°C 6.3°C 6.8°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 144 / 144

### General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



## Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

### Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

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

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA025-SW Suspended Solids - Saline Water
ES2505325-001	21-Feb-2025 00:00	D1-T1-WQ1-S	✓
ES2505325-002	21-Feb-2025 00:00	D1-T1-WQ2-S	✓
ES2505325-003	21-Feb-2025 00:00	D1-T1-WQ3-S	✓
ES2505325-004	21-Feb-2025 00:00	D1-T1-WQ4-S	✓
ES2505325-005	21-Feb-2025 00:00	D1-T1-WQ5-S	✓
ES2505325-006	21-Feb-2025 00:00	D1-T1-WQ6-S	✓
ES2505325-007	21-Feb-2025 00:00	D1-T1-WQ7-S	✓
ES2505325-008	21-Feb-2025 00:00	D1-T1-WQ8-S	✓
ES2505325-009	21-Feb-2025 00:00	D1-T1-WQ9-S	✓
ES2505325-010	21-Feb-2025 00:00	D1-T1-WQ10-S	✓
ES2505325-011	21-Feb-2025 00:00	D1-T1-WQ11-S	✓
ES2505325-012	21-Feb-2025 00:00	D1-T1-WQ12-S	✓
ES2505325-013	21-Feb-2025 00:00	D1-T1-WQ1-M	✓
ES2505325-014	21-Feb-2025 00:00	D1-T1-WQ2-M	✓
ES2505325-015	21-Feb-2025 00:00	D1-T1-WQ3-M	✓
ES2505325-016	21-Feb-2025 00:00	D1-T1-WQ4-M	✓
ES2505325-017	21-Feb-2025 00:00	D1-T1-WQ5-M	✓
ES2505325-018	21-Feb-2025 00:00	D1-T1-WQ6-M	✓
ES2505325-019	21-Feb-2025 00:00	D1-T1-WQ7-M	✓
ES2505325-020	21-Feb-2025 00:00	D1-T1-WQ8-M	✓
ES2505325-021	21-Feb-2025 00:00	D1-T1-WQ9-M	✓
ES2505325-022	21-Feb-2025 00:00	D1-T1-WQ10-M	✓
ES2505325-023	21-Feb-2025 00:00	D1-T1-WQ11-M	✓
ES2505325-024	21-Feb-2025 00:00	D1-T1-WQ12-M	✓
ES2505325-025	21-Feb-2025 00:00	D1-T2-WQ1-S	✓
ES2505325-026	21-Feb-2025 00:00	D1-T2-WQ2-S	✓
ES2505325-027	21-Feb-2025 00:00	D1-T2-WQ3-S	✓
ES2505325-028	21-Feb-2025 00:00	D1-T2-WQ4-S	✓
ES2505325-029	21-Feb-2025 00:00	D1-T2-WQ5-S	✓
ES2505325-030	21-Feb-2025 00:00	D1-T2-WQ6-S	✓
ES2505325-031	21-Feb-2025 00:00	D1-T2-WQ7-S	✓
ES2505325-032	21-Feb-2025 00:00	D1-T2-WQ8-S	✓
ES2505325-033	21-Feb-2025 00:00	D1-T2-WQ9-S	✓
ES2505325-034	21-Feb-2025 00:00	D1-T2-WQ10-S	✓
ES2505325-035	21-Feb-2025 00:00	D1-T2-WQ11-S	✓



WATER - EA025-SW  
Suspended Solids - Saline Water

ES2505325-036	21-Feb-2025 00:00	D1-T2-WQ12-S	✓
ES2505325-037	21-Feb-2025 00:00	D1-T2-WQ1-M	✓
ES2505325-038	21-Feb-2025 00:00	D1-T2-WQ2-M	✓
ES2505325-039	21-Feb-2025 00:00	D1-T2-WQ3-M	✓
ES2505325-040	21-Feb-2025 00:00	D1-T2-WQ4-M	✓
ES2505325-041	21-Feb-2025 00:00	D1-T2-WQ5-M	✓
ES2505325-042	21-Feb-2025 00:00	D1-T2-WQ6-M	✓
ES2505325-043	21-Feb-2025 00:00	D1-T2-WQ7-M	✓
ES2505325-044	21-Feb-2025 00:00	D1-T2-WQ8-M	✓
ES2505325-045	21-Feb-2025 00:00	D1-T2-WQ9-M	✓
ES2505325-046	21-Feb-2025 00:00	D1-T2-WQ10-M	✓
ES2505325-047	21-Feb-2025 00:00	D1-T2-WQ11-M	✓
ES2505325-048	21-Feb-2025 00:00	D1-T2-WQ12-M	✓
ES2505325-049	22-Feb-2025 00:00	D2-T1-WQ1-S	✓
ES2505325-050	22-Feb-2025 00:00	D2-T1-WQ2-S	✓
ES2505325-051	22-Feb-2025 00:00	D2-T1-WQ3-S	✓
ES2505325-052	22-Feb-2025 00:00	D2-T1-WQ4-S	✓
ES2505325-053	22-Feb-2025 00:00	D2-T1-WQ5-S	✓
ES2505325-054	22-Feb-2025 00:00	D2-T1-WQ6-S	✓
ES2505325-055	22-Feb-2025 00:00	D2-T1-WQ7-S	✓
ES2505325-056	22-Feb-2025 00:00	D2-T1-WQ8-S	✓
ES2505325-057	22-Feb-2025 00:00	D2-T1-WQ9-S	✓
ES2505325-058	22-Feb-2025 00:00	D2-T1-WQ10-S	✓
ES2505325-059	22-Feb-2025 00:00	D2-T1-WQ11-S	✓
ES2505325-060	22-Feb-2025 00:00	D2-T1-WQ12-S	✓
ES2505325-061	22-Feb-2025 00:00	D2-T1-WQ1-M	✓
ES2505325-062	22-Feb-2025 00:00	D2-T1-WQ2-M	✓
ES2505325-063	22-Feb-2025 00:00	D2-T1-WQ3-M	✓
ES2505325-064	22-Feb-2025 00:00	D2-T1-WQ4-M	✓
ES2505325-065	22-Feb-2025 00:00	D2-T1-WQ5-M	✓
ES2505325-066	22-Feb-2025 00:00	D2-T1-WQ6-M	✓
ES2505325-067	22-Feb-2025 00:00	D2-T1-WQ7-M	✓
ES2505325-068	22-Feb-2025 00:00	D2-T1-WQ8-M	✓
ES2505325-069	22-Feb-2025 00:00	D2-T1-WQ9-M	✓
ES2505325-070	22-Feb-2025 00:00	D2-T1-WQ10-M	✓
ES2505325-071	22-Feb-2025 00:00	D2-T1-WQ11-M	✓
ES2505325-072	22-Feb-2025 00:00	D2-T1-WQ12-M	✓
ES2505325-073	22-Feb-2025 00:00	D2-T2-WQ1-S	✓
ES2505325-074	22-Feb-2025 00:00	D2-T2-WQ2-S	✓
ES2505325-075	22-Feb-2025 00:00	D2-T2-WQ3-S	✓
ES2505325-076	22-Feb-2025 00:00	D2-T2-WQ4-S	✓



WATER - EA025-SW  
Suspended Solids - Saline Water

ES2505325-077	22-Feb-2025 00:00	D2-T2-WQ5-S	✓
ES2505325-078	22-Feb-2025 00:00	D2-T2-WQ6-S	✓
ES2505325-079	22-Feb-2025 00:00	D2-T2-WQ7-S	✓
ES2505325-080	22-Feb-2025 00:00	D2-T2-WQ8-S	✓
ES2505325-081	22-Feb-2025 00:00	D2-T2-WQ9-S	✓
ES2505325-082	22-Feb-2025 00:00	D2-T2-WQ10-S	✓
ES2505325-083	22-Feb-2025 00:00	D2-T2-WQ11-S	✓
ES2505325-084	22-Feb-2025 00:00	D2-T2-WQ12-S	✓
ES2505325-085	22-Feb-2025 00:00	D2-T2-WQ1-M	✓
ES2505325-086	22-Feb-2025 00:00	D2-T2-WQ2-M	✓
ES2505325-087	22-Feb-2025 00:00	D2-T2-WQ3-M	✓
ES2505325-088	22-Feb-2025 00:00	D2-T2-WQ4-M	✓
ES2505325-089	22-Feb-2025 00:00	D2-T2-WQ5-M	✓
ES2505325-090	22-Feb-2025 00:00	D2-T2-WQ6-M	✓
ES2505325-091	22-Feb-2025 00:00	D2-T2-WQ7-M	✓
ES2505325-092	22-Feb-2025 00:00	D2-T2-WQ8-M	✓
ES2505325-093	22-Feb-2025 00:00	D2-T2-WQ9-M	✓
ES2505325-094	22-Feb-2025 00:00	D2-T2-WQ10-M	✓
ES2505325-095	22-Feb-2025 00:00	D2-T2-WQ11-M	✓
ES2505325-096	22-Feb-2025 00:00	D2-T2-WQ12-M	✓
ES2505325-097	23-Feb-2025 00:00	D3-T1-WQ1-S	✓
ES2505325-098	23-Feb-2025 00:00	D3-T1-WQ2-S	✓
ES2505325-099	23-Feb-2025 00:00	D3-T1-WQ3-S	✓
ES2505325-100	23-Feb-2025 00:00	D3-T1-WQ4-S	✓
ES2505325-101	23-Feb-2025 00:00	D3-T1-WQ5-S	✓
ES2505325-102	23-Feb-2025 00:00	D3-T1-WQ6-S	✓
ES2505325-103	23-Feb-2025 00:00	D3-T1-WQ7-S	✓
ES2505325-104	23-Feb-2025 00:00	D3-T1-WQ8-S	✓
ES2505325-105	23-Feb-2025 00:00	D3-T1-WQ9-S	✓
ES2505325-106	23-Feb-2025 00:00	D3-T1-WQ10-S	✓
ES2505325-107	23-Feb-2025 00:00	D3-T1-WQ11-S	✓
ES2505325-108	23-Feb-2025 00:00	D3-T1-WQ12-S	✓
ES2505325-109	23-Feb-2025 00:00	D3-T1-WQ1-M	✓
ES2505325-110	23-Feb-2025 00:00	D3-T1-WQ2-M	✓
ES2505325-111	23-Feb-2025 00:00	D3-T1-WQ3-M	✓
ES2505325-112	23-Feb-2025 00:00	D3-T1-WQ4-M	✓
ES2505325-113	23-Feb-2025 00:00	D3-T1-WQ5-M	✓
ES2505325-114	23-Feb-2025 00:00	D3-T1-WQ6-M	✓
ES2505325-115	23-Feb-2025 00:00	D3-T1-WQ7-M	✓
ES2505325-116	23-Feb-2025 00:00	D3-T1-WQ8-M	✓
ES2505325-117	23-Feb-2025 00:00	D3-T1-WQ9-M	✓



				WATER - EA025-SW Suspended Solids - Saline Water
ES2505325-118	23-Feb-2025 00:00	D3-T1-WQ10-M		✓
ES2505325-119	23-Feb-2025 00:00	D3-T1-WQ11-M		✓
ES2505325-120	23-Feb-2025 00:00	D3-T1-WQ12-M		✓
ES2505325-121	23-Feb-2025 00:00	D3-T2-WQ1-S		✓
ES2505325-122	23-Feb-2025 00:00	D3-T2-WQ2-S		✓
ES2505325-123	23-Feb-2025 00:00	D3-T2-WQ3-S		✓
ES2505325-124	23-Feb-2025 00:00	D3-T2-WQ4-S		✓
ES2505325-125	23-Feb-2025 00:00	D3-T2-WQ5-S		✓
ES2505325-126	23-Feb-2025 00:00	D3-T2-WQ6-S		✓
ES2505325-127	23-Feb-2025 00:00	D3-T2-WQ7-S		✓
ES2505325-128	23-Feb-2025 00:00	D3-T2-WQ8-S		✓
ES2505325-129	23-Feb-2025 00:00	D3-T2-WQ9-S		✓
ES2505325-130	23-Feb-2025 00:00	D3-T2-WQ10-S		✓
ES2505325-131	23-Feb-2025 00:00	D3-T2-WQ11-S		✓
ES2505325-132	23-Feb-2025 00:00	D3-T2-WQ12-S		✓
ES2505325-133	23-Feb-2025 00:00	D3-T2-WQ1-M		✓
ES2505325-134	23-Feb-2025 00:00	D3-T2-WQ2-M		✓
ES2505325-135	23-Feb-2025 00:00	D3-T2-WQ3-M		✓
ES2505325-136	23-Feb-2025 00:00	D3-T2-WQ4-M		✓
ES2505325-137	23-Feb-2025 00:00	D3-T2-WQ5-M		✓
ES2505325-138	23-Feb-2025 00:00	D3-T2-WQ6-M		✓
ES2505325-139	23-Feb-2025 00:00	D3-T2-WQ7-M		✓
ES2505325-140	23-Feb-2025 00:00	D3-T2-WQ8-M		✓
ES2505325-141	23-Feb-2025 00:00	D3-T2-WQ9-M		✓
ES2505325-142	23-Feb-2025 00:00	D3-T2-WQ10-M		✓
ES2505325-143	23-Feb-2025 00:00	D3-T2-WQ11-M		✓
ES2505325-144	23-Feb-2025 00:00	D3-T2-WQ12-M		✓

### Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.





## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2505325**  
**Client** : **WORLEY CONSULTING PTY LTD**  
**Contact** : Ms Megan Priestley  
**Address** : 8-14 TELFORD STREET  
NEWCASTLE EAST NSW, AUSTRALIA 2300  
**Telephone** : ----  
**Project** : Eden MOD3 Operational WQ Sampling  
**Order number** : 311015-00687  
**C-O-C number** : ----  
**Sampler** : Megan Priestley  
**Site** : ----  
**Quote number** : SY/162/22\_V4  
**No. of samples received** : 144  
**No. of samples analysed** : 144

**Page** : 1 of 31  
**Laboratory** : Environmental Division Sydney  
**Contact** : Customer Services ES  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 24-Feb-2025 10:30  
**Date Analysis Commenced** : 28-Feb-2025  
**Issue Date** : 10-Mar-2025 14:14



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



## General Comments

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

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
LOR = Limit of reporting  
^ = This result is computed from individual analyte detections at or above the level of reporting  
ø = ALS is not NATA accredited for these tests.  
~ = Indicates an estimated value.

- EA025, Invalidated Duplicate for Suspended Solids due to insufficient volume.
-



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D1-T1-WQ1-S	D1-T1-WQ2-S	D1-T1-WQ3-S	D1-T1-WQ4-S	D1-T1-WQ5-S
				Sampling date / time	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-001	ES2505325-002	ES2505325-003	ES2505325-004	ES2505325-005
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T1-WQ6-S	D1-T1-WQ7-S	D1-T1-WQ8-S	D1-T1-WQ9-S	D1-T1-WQ10-S
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-006	ES2505325-007	ES2505325-008	ES2505325-009	ES2505325-010
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T1-WQ11-S	D1-T1-WQ12-S	D1-T1-WQ1-M	D1-T1-WQ2-M	D1-T1-WQ3-M
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-011	ES2505325-012	ES2505325-013	ES2505325-014	ES2505325-015
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T1-WQ4-M	D1-T1-WQ5-M	D1-T1-WQ6-M	D1-T1-WQ7-M	D1-T1-WQ8-M
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-016	ES2505325-017	ES2505325-018	ES2505325-019	ES2505325-020
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T1-WQ9-M	D1-T1-WQ10-M	D1-T1-WQ11-M	D1-T1-WQ12-M	D1-T2-WQ1-S
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-021	ES2505325-022	ES2505325-023	ES2505325-024	ES2505325-025
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T2-WQ2-S	D1-T2-WQ3-S	D1-T2-WQ4-S	D1-T2-WQ5-S	D1-T2-WQ6-S
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-026	ES2505325-027	ES2505325-028	ES2505325-029	ES2505325-030
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D1-T2-WQ7-S	D1-T2-WQ8-S	D1-T2-WQ9-S	D1-T2-WQ10-S	D1-T2-WQ11-S
				Sampling date / time	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-031	ES2505325-032	ES2505325-033	ES2505325-034	ES2505325-035
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T2-WQ12-S	D1-T2-WQ1-M	D1-T2-WQ2-M	D1-T2-WQ3-M	D1-T2-WQ4-M
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-036	ES2505325-037	ES2505325-038	ES2505325-039	ES2505325-040
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T2-WQ5-M	D1-T2-WQ6-M	D1-T2-WQ7-M	D1-T2-WQ8-M	D1-T2-WQ9-M
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-041	ES2505325-042	ES2505325-043	ES2505325-044	ES2505325-045
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D1-T2-WQ10-M	D1-T2-WQ11-M	D1-T2-WQ12-M	D2-T1-WQ1-S	D2-T1-WQ2-S
Sampling date / time				21-Feb-2025 00:00	21-Feb-2025 00:00	21-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-046	ES2505325-047	ES2505325-048	ES2505325-049	ES2505325-050
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	3	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D2-T1-WQ3-S	D2-T1-WQ4-S	D2-T1-WQ5-S	D2-T1-WQ6-S	D2-T1-WQ7-S
				Sampling date / time	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-051	ES2505325-052	ES2505325-053	ES2505325-054	ES2505325-055
					Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D2-T1-WQ8-S	D2-T1-WQ9-S	D2-T1-WQ10-S	D2-T1-WQ11-S	D2-T1-WQ12-S
				Sampling date / time	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-056	ES2505325-057	ES2505325-058	ES2505325-059	ES2505325-060
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D2-T1-WQ1-M	D2-T1-WQ2-M	D2-T1-WQ3-M	D2-T1-WQ4-M	D2-T1-WQ5-M
Sampling date / time				22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-061	ES2505325-062	ES2505325-063	ES2505325-064	ES2505325-065
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	16	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D2-T1-WQ6-M	D2-T1-WQ7-M	D2-T1-WQ8-M	D2-T1-WQ9-M	D2-T1-WQ10-M
Sampling date / time				22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-066	ES2505325-067	ES2505325-068	ES2505325-069	ES2505325-070
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	25	<1	1	8



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D2-T1-WQ11-M	D2-T1-WQ12-M	D2-T2-WQ1-S	D2-T2-WQ2-S	D2-T2-WQ3-S
				Sampling date / time	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-071	ES2505325-072	ES2505325-073	ES2505325-074	ES2505325-075
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		8	1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D2-T2-WQ4-S	D2-T2-WQ5-S	D2-T2-WQ6-S	D2-T2-WQ7-S	D2-T2-WQ8-S
Sampling date / time				22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-076	ES2505325-077	ES2505325-078	ES2505325-079	ES2505325-080
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D2-T2-WQ9-S	D2-T2-WQ10-S	D2-T2-WQ11-S	D2-T2-WQ12-S	D2-T2-WQ1-M
				Sampling date / time	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-081	ES2505325-082	ES2505325-083	ES2505325-084	ES2505325-085
					Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		15	<1	2	3	14



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D2-T2-WQ2-M	D2-T2-WQ3-M	D2-T2-WQ4-M	D2-T2-WQ5-M	D2-T2-WQ6-M
Sampling date / time				22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-086	ES2505325-087	ES2505325-088	ES2505325-089	ES2505325-090
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	2	2	3	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D2-T2-WQ7-M	D2-T2-WQ8-M	D2-T2-WQ9-M	D2-T2-WQ10-M	D2-T2-WQ11-M
Sampling date / time				22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00	22-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-091	ES2505325-092	ES2505325-093	ES2505325-094	ES2505325-095
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	30	1	35



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D2-T2-WQ12-M	D3-T1-WQ1-S	D3-T1-WQ2-S	D3-T1-WQ3-S	D3-T1-WQ4-S
				Sampling date / time	22-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-096	ES2505325-097	ES2505325-098	ES2505325-099	ES2505325-100
					Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		16	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D3-T1-WQ5-S	D3-T1-WQ6-S	D3-T1-WQ7-S	D3-T1-WQ8-S	D3-T1-WQ9-S
				Sampling date / time	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-101	ES2505325-102	ES2505325-103	ES2505325-104	ES2505325-105
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D3-T1-WQ10-S	D3-T1-WQ11-S	D3-T1-WQ12-S	D3-T1-WQ1-M	D3-T1-WQ2-M
Sampling date / time				23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-106	ES2505325-107	ES2505325-108	ES2505325-109	ES2505325-110
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D3-T1-WQ3-M	D3-T1-WQ4-M	D3-T1-WQ5-M	D3-T1-WQ6-M	D3-T1-WQ7-M
				Sampling date / time	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-111	ES2505325-112	ES2505325-113	ES2505325-114	ES2505325-115
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D3-T1-WQ8-M	D3-T1-WQ9-M	D3-T1-WQ10-M	D3-T1-WQ11-M	D3-T1-WQ12-M
				Sampling date / time	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-116	ES2505325-117	ES2505325-118	ES2505325-119	ES2505325-120
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D3-T2-WQ1-S	D3-T2-WQ2-S	D3-T2-WQ3-S	D3-T2-WQ4-S	D3-T2-WQ5-S
				Sampling date / time	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-121	ES2505325-122	ES2505325-123	ES2505325-124	ES2505325-125
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D3-T2-WQ6-S	D3-T2-WQ7-S	D3-T2-WQ8-S	D3-T2-WQ9-S	D3-T2-WQ10-S
				Sampling date / time	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-126	ES2505325-127	ES2505325-128	ES2505325-129	ES2505325-130
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



### Analytical Results

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

Sample ID

				D3-T2-WQ11-S	D3-T2-WQ12-S	D3-T2-WQ1-M	D3-T2-WQ2-M	D3-T2-WQ3-M
Sampling date / time				23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit	ES2505325-131	ES2505325-132	ES2505325-133	ES2505325-134	ES2505325-135
				Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

				Sample ID	D3-T2-WQ4-M	D3-T2-WQ5-M	D3-T2-WQ6-M	D3-T2-WQ7-M	D3-T2-WQ8-M
				Sampling date / time	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00
Compound	CAS Number	LOR	Unit		ES2505325-136	ES2505325-137	ES2505325-138	ES2505325-139	ES2505325-140
				Result	Result	Result	Result	Result	Result
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1



**Analytical Results**

Sub-Matrix: MARINE WATER  
 (Matrix: WATER)

			Sample ID	D3-T2-WQ9-M	D3-T2-WQ10-M	D3-T2-WQ11-M	D3-T2-WQ12-M	----
			Sampling date / time	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	23-Feb-2025 00:00	----
Compound	CAS Number	LOR	Unit	ES2505325-141	ES2505325-142	ES2505325-143	ES2505325-144	-----
				Result	Result	Result	Result	----
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	----



## QUALITY CONTROL REPORT

Work Order	: <b>ES2505325</b>	Page	: 1 of 5
Client	: <b>WORLEY CONSULTING PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Ms Megan Priestley	Contact	: Customer Services ES
Address	: 8-14 TELFORD STREET NEWCASTLE EAST NSW, AUSTRALIA 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Eden MOD3 Operational WQ Sampling	Date Samples Received	: 24-Feb-2025
Order number	: 311015-00687	Date Analysis Commenced	: 28-Feb-2025
C-O-C number	: ----	Issue Date	: 10-Mar-2025
Sampler	: Megan Priestley		
Site	: ----		
Quote number	: SY/162/22_V4		
No. of samples received	: 144		
No. of samples analysed	: 144		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

### Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



## General Comments

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

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :  
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot  
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
 LOR = Limit of reporting  
 RPD = Relative Percentage Difference  
 # = Indicates failed QC

## Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: WATER

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409708)</b>									
ES2505325-001	D1-T1-WQ1-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
ES2505325-010	D1-T1-WQ10-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409709)</b>									
ES2505325-021	D1-T1-WQ9-M	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
ES2505325-030	D1-T2-WQ6-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409710)</b>									
ES2505325-041	D1-T2-WQ5-M	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409796)</b>									
ES2505325-049	D2-T1-WQ1-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	3	<1	90.7	No Limit
ES2505325-058	D2-T1-WQ10-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409797)</b>									
ES2505325-069	D2-T1-WQ9-M	EA025-SW: Suspended Solids (SS)	----	1	mg/L	1	<1	0.0	No Limit
ES2505325-078	D2-T2-WQ6-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409798)</b>									
ES2505325-089	D2-T2-WQ5-M	EA025-SW: Suspended Solids (SS)	----	1	mg/L	3	<1	101	No Limit
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409804)</b>									
ES2505325-097	D3-T1-WQ1-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
ES2505325-106	D3-T1-WQ10-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409805)</b>									
ES2505325-117	D3-T1-WQ9-M	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit
ES2505325-126	D3-T2-WQ6-S	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit

Page : 3 of 5  
 Work Order : ES2505325  
 Client : WORLEY CONSULTING PTY LTD  
 Project : Eden MOD3 Operational WQ Sampling



Sub-Matrix: <b>WATER</b>				<i>Laboratory Duplicate (DUP) Report</i>					
<i>Laboratory sample ID</i>	<i>Sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Acceptable RPD (%)</i>
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QC Lot: 6409806)</b>									
ES2505325-137	D3-T2-WQ5-M	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.0	No Limit



### Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)
Method: Compound	CAS Number	LOR	Unit	Low				High
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409708)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	101	86.0	128
				<1	1000 mg/L	90.9	80.0	112
				<1	842 mg/L	104	83.0	118
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409709)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	96.0	86.0	128
				<1	1000 mg/L	90.9	80.0	112
				<1	842 mg/L	101	83.0	118
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409710)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	93.3	86.0	128
				<1	1000 mg/L	99.1	80.0	112
				<1	842 mg/L	99.6	83.0	118
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409796)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	96.0	86.0	128
				<1	1000 mg/L	89.5	80.0	112
				<1	842 mg/L	96.9	83.0	118
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409797)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	93.3	86.0	128
				<1	1000 mg/L	91.3	80.0	112
				<1	842 mg/L	104	83.0	118
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409798)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	109	86.0	128
				<1	1000 mg/L	99.8	80.0	112
				<1	842 mg/L	103	83.0	118
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409804)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	101	86.0	128
				<1	1000 mg/L	95.0	80.0	112
				<1	842 mg/L	109	83.0	118
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409805)</b>								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	98.7	86.0	128
				<1	1000 mg/L	90.9	80.0	112
				<1	842 mg/L	101	83.0	118



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound		CAS Number	LOR		Unit	Result	Spike Concentration	Spike Recovery (%) LCS
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C (QCLot: 6409806)</b>								
EA025-SW: Suspended Solids (SS)		----	1	mg/L	<1	150 mg/L	98.7	86.0 128
					<1	1000 mg/L	93.3	80.0 112
					<1	842 mg/L	101	83.0 118

### Matrix Spike (MS) Report

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

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**



## QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2505325	Page	: 1 of 6
Client	: WORLEY CONSULTING PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Ms Megan Priestley	Telephone	: +61-2-8784 8555
Project	: Eden MOD3 Operational WQ Sampling	Date Samples Received	: 24-Feb-2025
Site	: ----	Issue Date	: 10-Mar-2025
Sampler	: Megan Priestley	No. of samples received	: 144
Order number	: 311015-00687	No. of samples analysed	: 144

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

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

### Summary of Outliers

#### Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- For all regular sample matrices, where applicable to the methodology, **NO surrogate recovery outliers occur.**

#### Outliers : Analysis Holding Time Compliance

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

#### Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**



## Analysis Holding Time Compliance

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

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

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

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

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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C</b>								
<b>Clear Plastic Bottle - Natural (EA025-SW)</b>								
D1-T1-WQ1-S, D1-T1-WQ3-S, D1-T1-WQ5-S, D1-T1-WQ7-S, D1-T1-WQ9-S, D1-T1-WQ11-S, D1-T1-WQ1-M, D1-T1-WQ3-M, D1-T1-WQ5-M, D1-T1-WQ7-M, D1-T1-WQ9-M, D1-T1-WQ11-M, D1-T2-WQ1-S, D1-T2-WQ3-S, D1-T2-WQ5-S, D1-T2-WQ7-S, D1-T2-WQ9-S, D1-T2-WQ11-S, D1-T2-WQ1-M, D1-T2-WQ3-M, D1-T2-WQ5-M, D1-T2-WQ7-M, D1-T2-WQ9-M, D1-T2-WQ11-M,	D1-T1-WQ2-S, D1-T1-WQ4-S, D1-T1-WQ6-S, D1-T1-WQ8-S, D1-T1-WQ10-S, D1-T1-WQ12-S, D1-T1-WQ2-M, D1-T1-WQ4-M, D1-T1-WQ6-M, D1-T1-WQ8-M, D1-T1-WQ10-M, D1-T1-WQ12-M, D1-T2-WQ2-S, D1-T2-WQ4-S, D1-T2-WQ6-S, D1-T2-WQ8-S, D1-T2-WQ10-S, D1-T2-WQ12-S, D1-T2-WQ2-M, D1-T2-WQ4-M, D1-T2-WQ6-M, D1-T2-WQ8-M, D1-T2-WQ10-M, D1-T2-WQ12-M	21-Feb-2025	----	----	----	28-Feb-2025	28-Feb-2025	✓
<b>Clear Plastic Bottle - Natural (EA025-SW)</b>								



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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C - Continued</b>								
D2-T1-WQ1-S, D2-T1-WQ3-S, D2-T1-WQ5-S, D2-T1-WQ7-S, D2-T1-WQ9-S, D2-T1-WQ11-S, D2-T1-WQ1-M, D2-T1-WQ3-M, D2-T1-WQ5-M, D2-T1-WQ7-M, D2-T1-WQ9-M, D2-T1-WQ11-M, D2-T2-WQ1-S, D2-T2-WQ3-S, D2-T2-WQ5-S, D2-T2-WQ7-S, D2-T2-WQ9-S, D2-T2-WQ11-S, D2-T2-WQ1-M, D2-T2-WQ3-M, D2-T2-WQ5-M, D2-T2-WQ7-M, D2-T2-WQ9-M, D2-T2-WQ11-M,	D2-T1-WQ2-S, D2-T1-WQ4-S, D2-T1-WQ6-S, D2-T1-WQ8-S, D2-T1-WQ10-S, D2-T1-WQ12-S, D2-T1-WQ2-M, D2-T1-WQ4-M, D2-T1-WQ6-M, D2-T1-WQ8-M, D2-T1-WQ10-M, D2-T1-WQ12-M, D2-T2-WQ2-S, D2-T2-WQ4-S, D2-T2-WQ6-S, D2-T2-WQ8-S, D2-T2-WQ10-S, D2-T2-WQ12-S, D2-T2-WQ2-M, D2-T2-WQ4-M, D2-T2-WQ6-M, D2-T2-WQ8-M, D2-T2-WQ10-M, D2-T2-WQ12-M	22-Feb-2025	----	----	----	28-Feb-2025	01-Mar-2025	✓
Clear Plastic Bottle - Natural (EA025-SW)								



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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis				
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
<b>EA025: Total Suspended Solids in Saline Waters dried at 104°C ± 2°C - Continued</b>									
D3-T1-WQ1-S, D3-T1-WQ3-S, D3-T1-WQ5-S, D3-T1-WQ7-S, D3-T1-WQ9-S, D3-T1-WQ11-S, D3-T1-WQ1-M, D3-T1-WQ3-M, D3-T1-WQ5-M, D3-T1-WQ7-M, D3-T1-WQ9-M, D3-T1-WQ11-M, D3-T2-WQ1-S, D3-T2-WQ3-S, D3-T2-WQ5-S, D3-T2-WQ7-S, D3-T2-WQ9-S, D3-T2-WQ11-S, D3-T2-WQ1-M, D3-T2-WQ3-M, D3-T2-WQ5-M, D3-T2-WQ7-M, D3-T2-WQ9-M, D3-T2-WQ11-M,	D3-T1-WQ2-S, D3-T1-WQ4-S, D3-T1-WQ6-S, D3-T1-WQ8-S, D3-T1-WQ10-S, D3-T1-WQ12-S, D3-T1-WQ2-M, D3-T1-WQ4-M, D3-T1-WQ6-M, D3-T1-WQ8-M, D3-T1-WQ10-M, D3-T1-WQ12-M, D3-T2-WQ2-S, D3-T2-WQ4-S, D3-T2-WQ6-S, D3-T2-WQ8-S, D3-T2-WQ10-S, D3-T2-WQ12-S, D3-T2-WQ2-M, D3-T2-WQ4-M, D3-T2-WQ6-M, D3-T2-WQ8-M, D3-T2-WQ10-M, D3-T2-WQ12-M	23-Feb-2025	----	----	----	28-Feb-2025	02-Mar-2025	✓	



## Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Suspended Solids - Saline Water	EA025-SW	15	144	10.42	10.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Laboratory Control Samples (LCS)</b>							
Suspended Solids - Saline Water	EA025-SW	27	144	18.75	15.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Method Blanks (MB)</b>							
Suspended Solids - Saline Water	EA025-SW	9	144	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard



## Brief Method Summaries

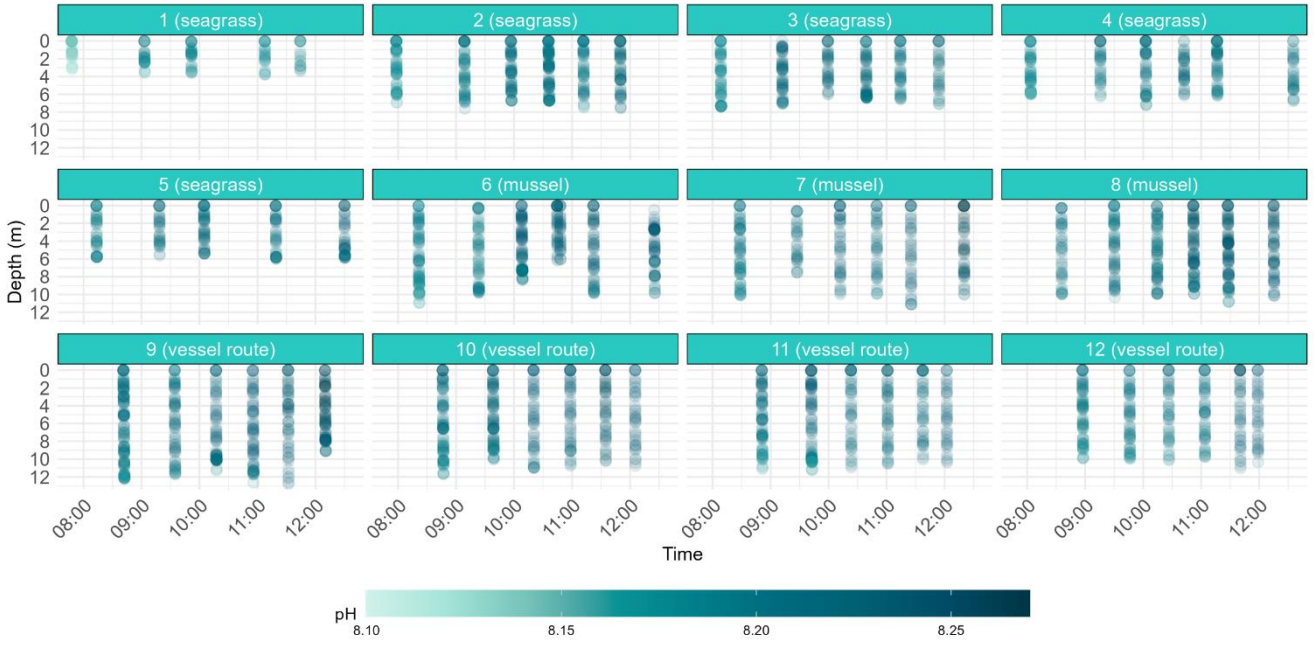
The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)

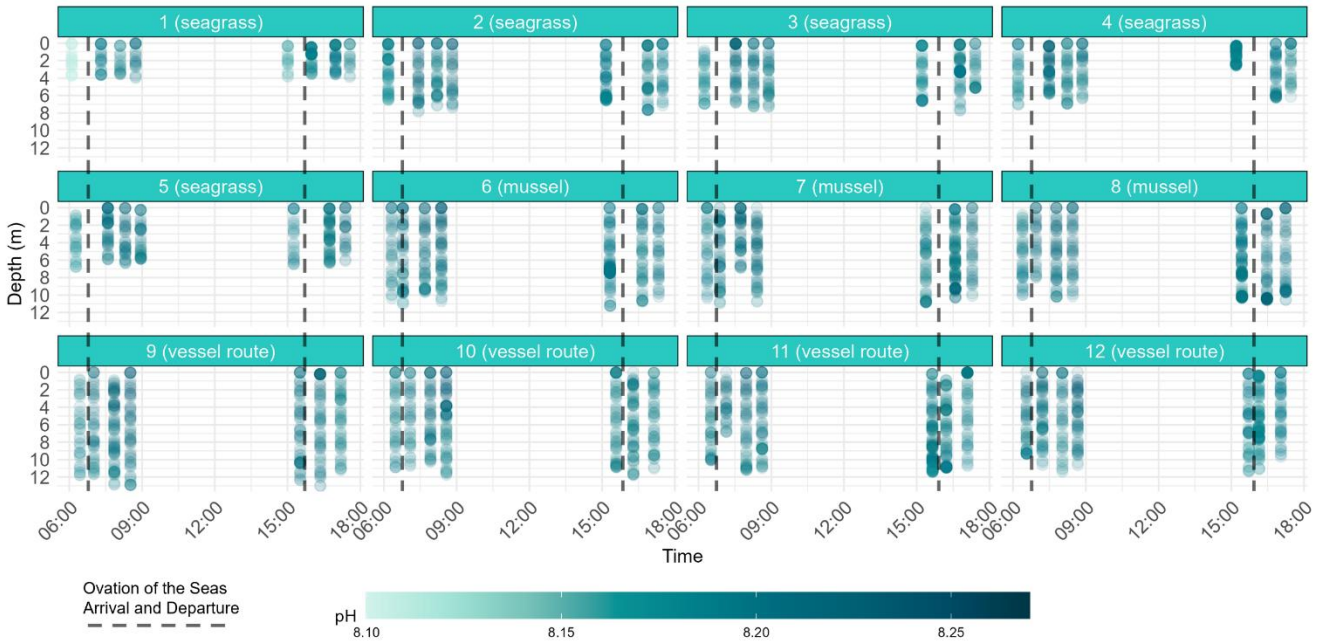
## **Appendix E. Raw Data (see separate data file)**

## **Appendix F. Additional Water Quality Plots**

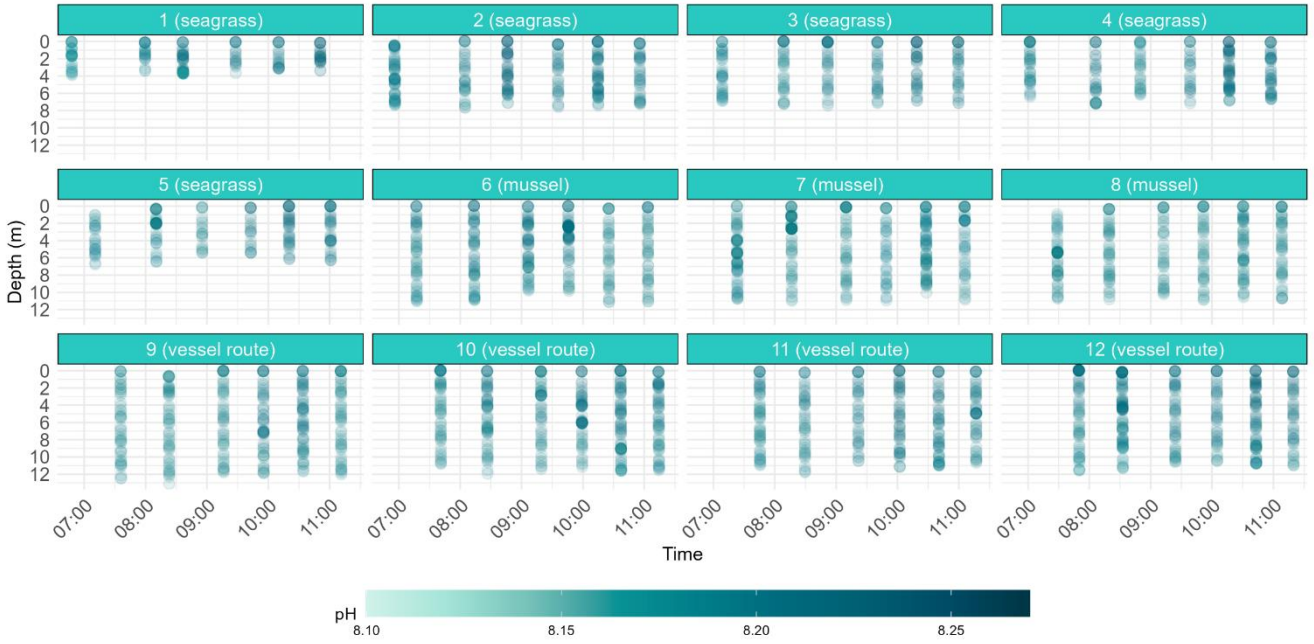
21 Feb 2025 (Day prior)



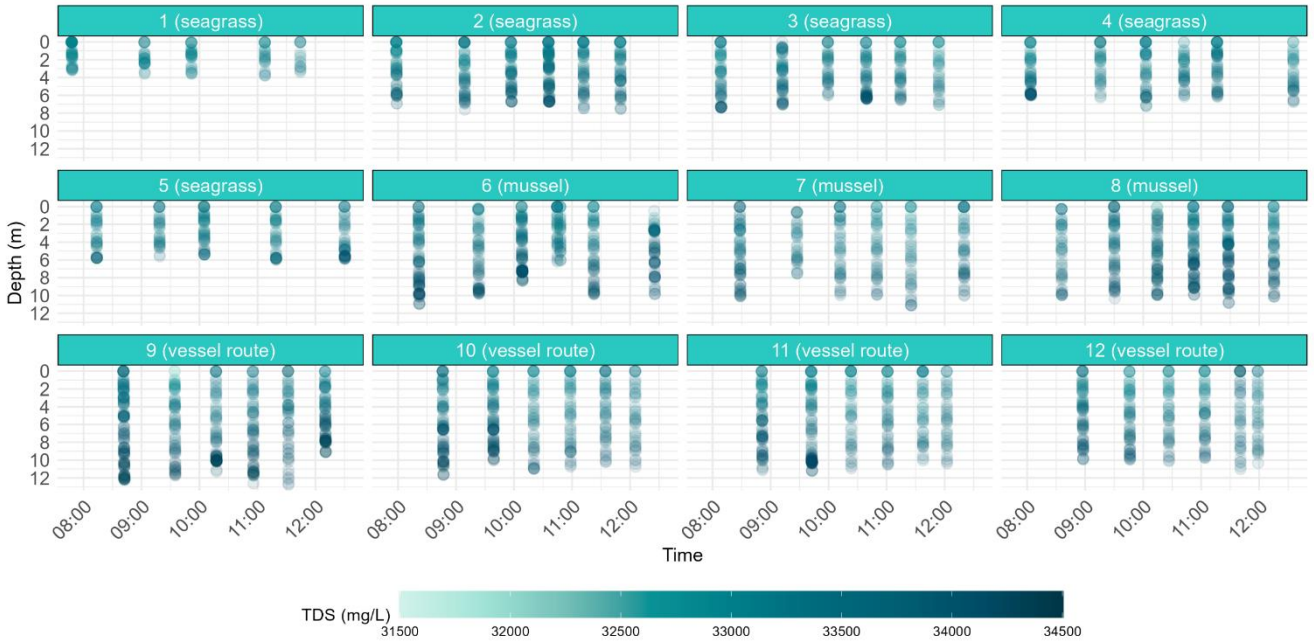
22 Feb 2025 (Cruise day)



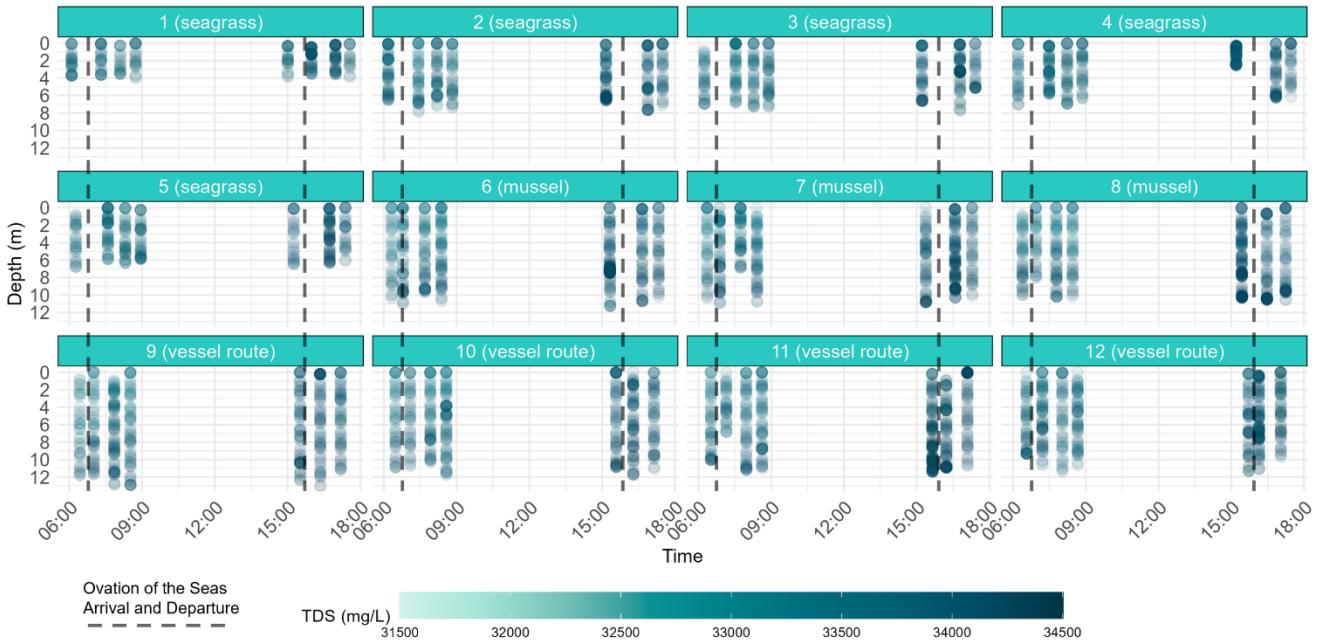
23 Feb 2025 (Day following)



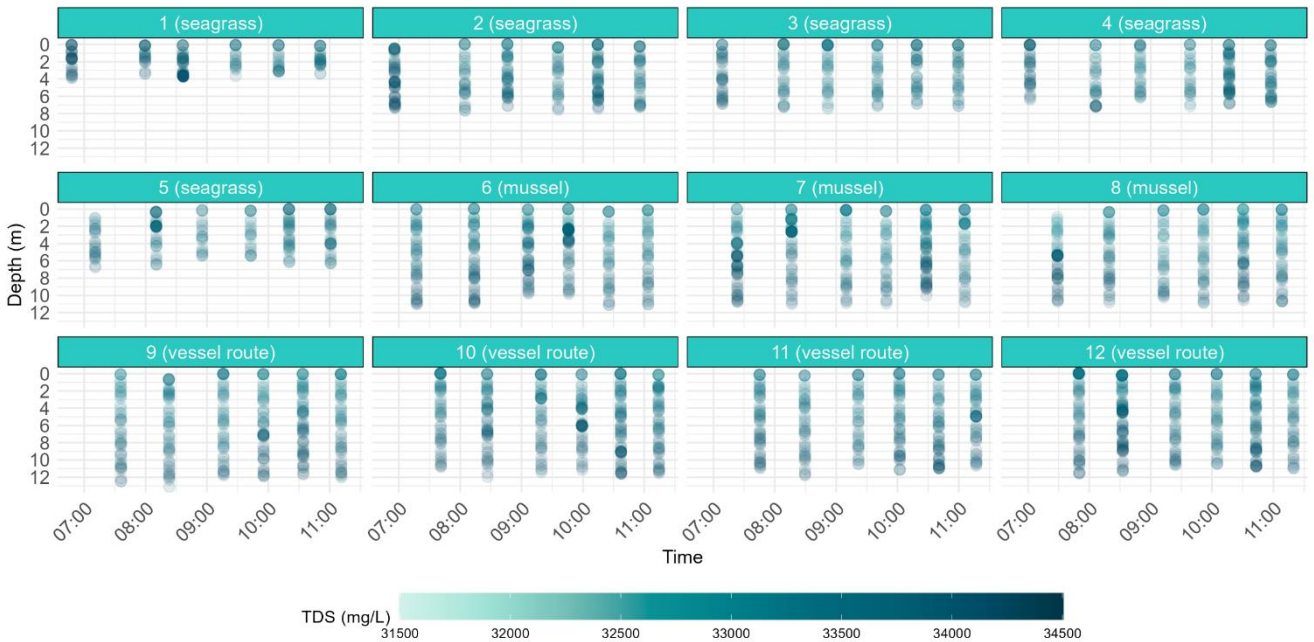
21 Feb 2025 (Day prior)



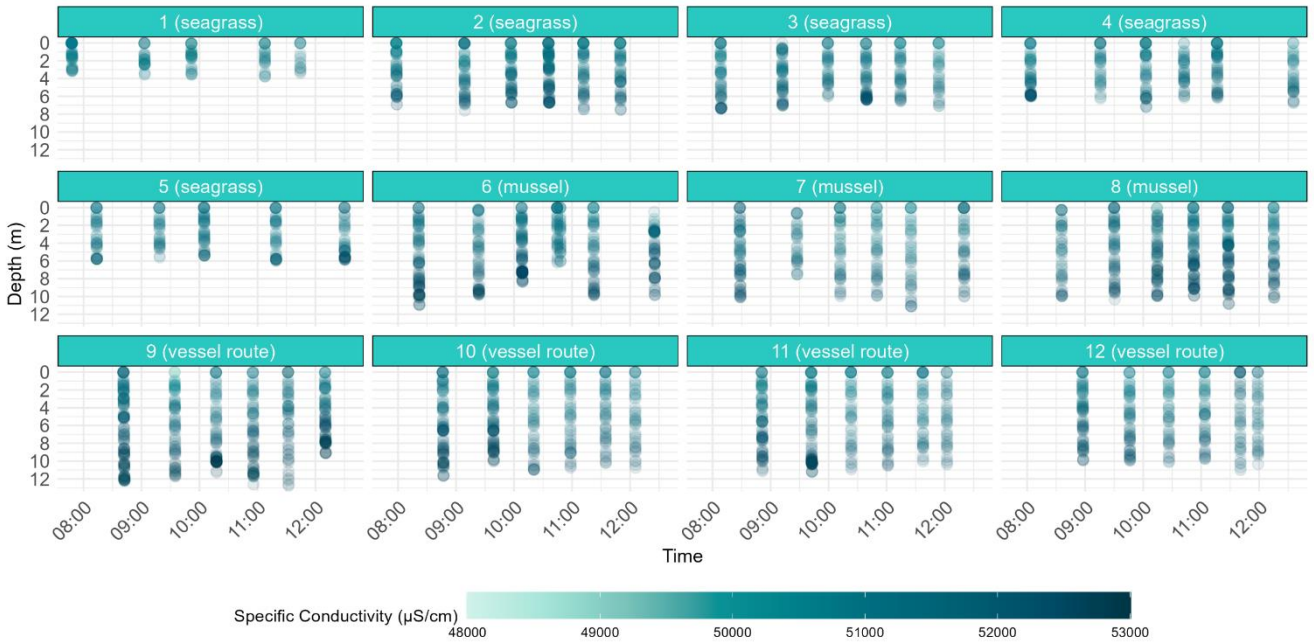
22 Feb 2025 (Cruise day)



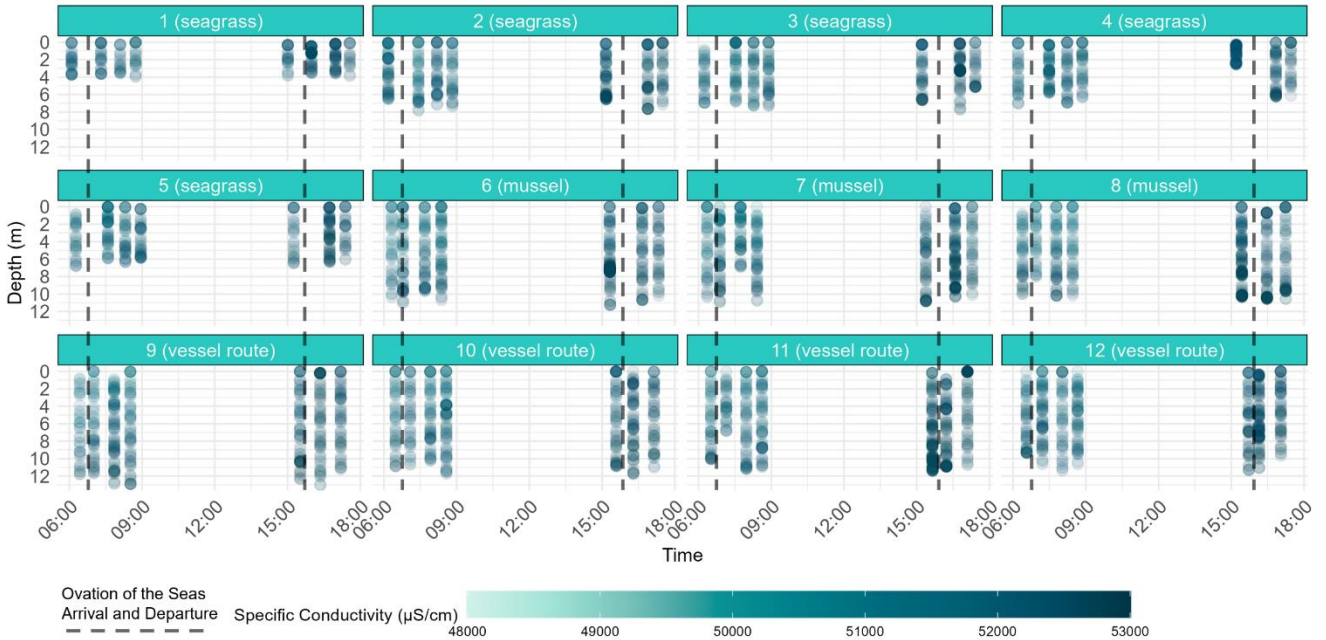
23 Feb 2025 (Day following)



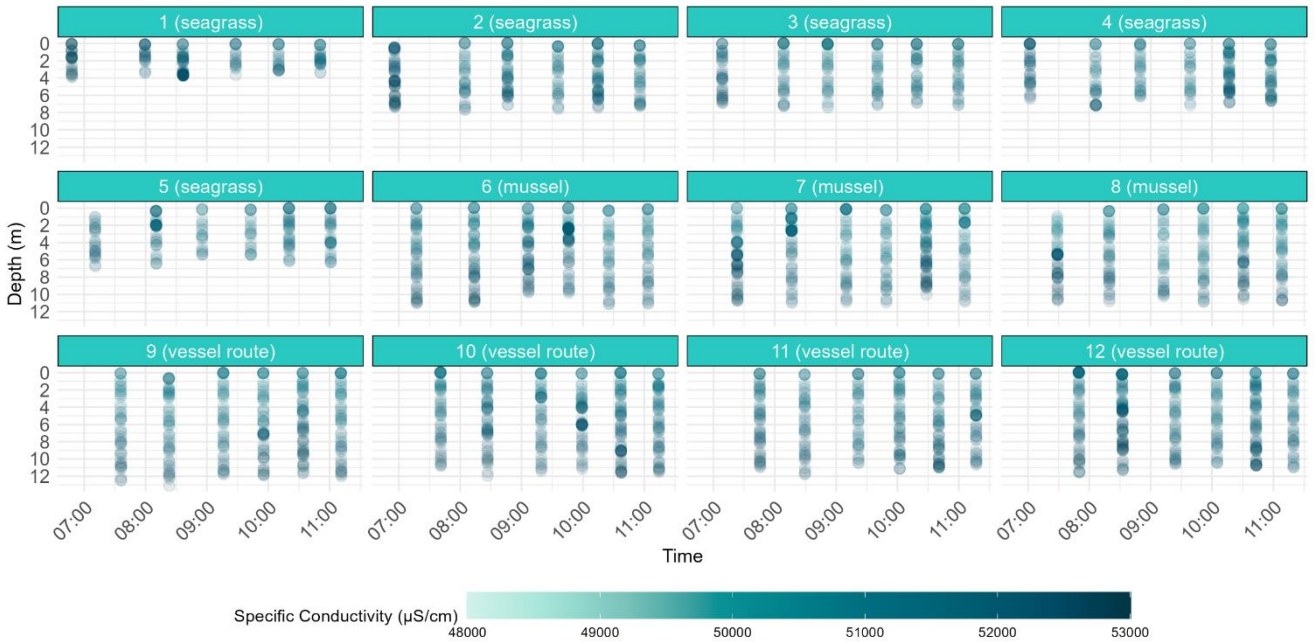
21 Feb 2025 (Day prior)



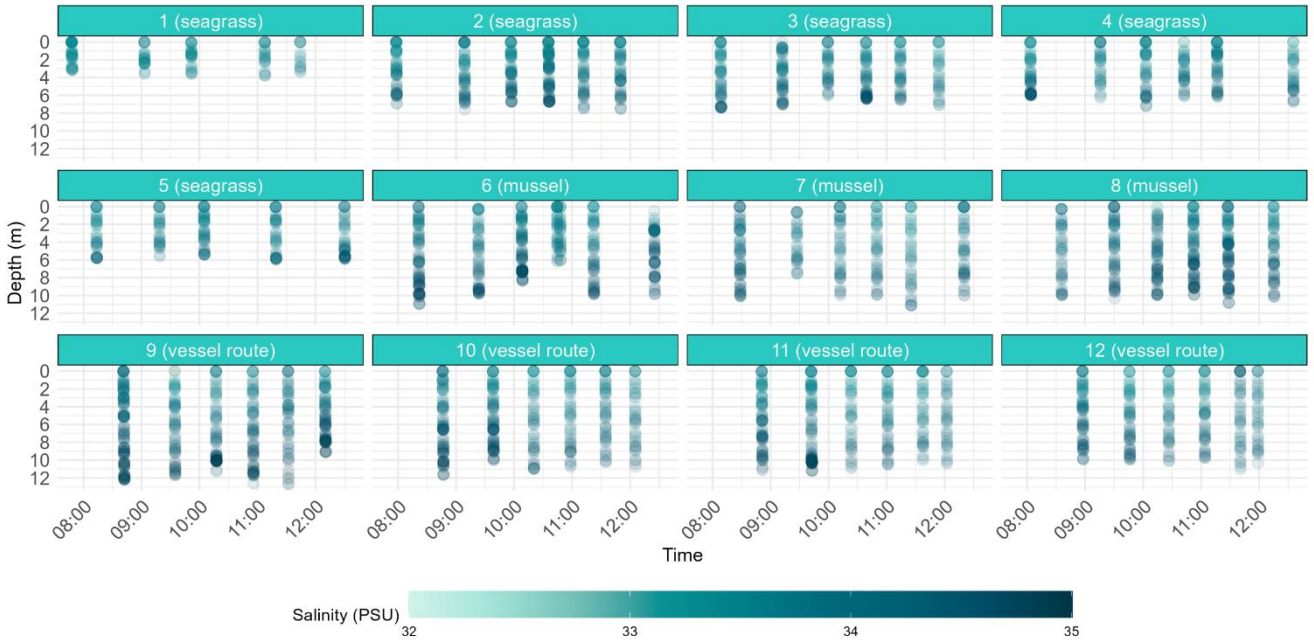
22 Feb 2025 (Cruise day)



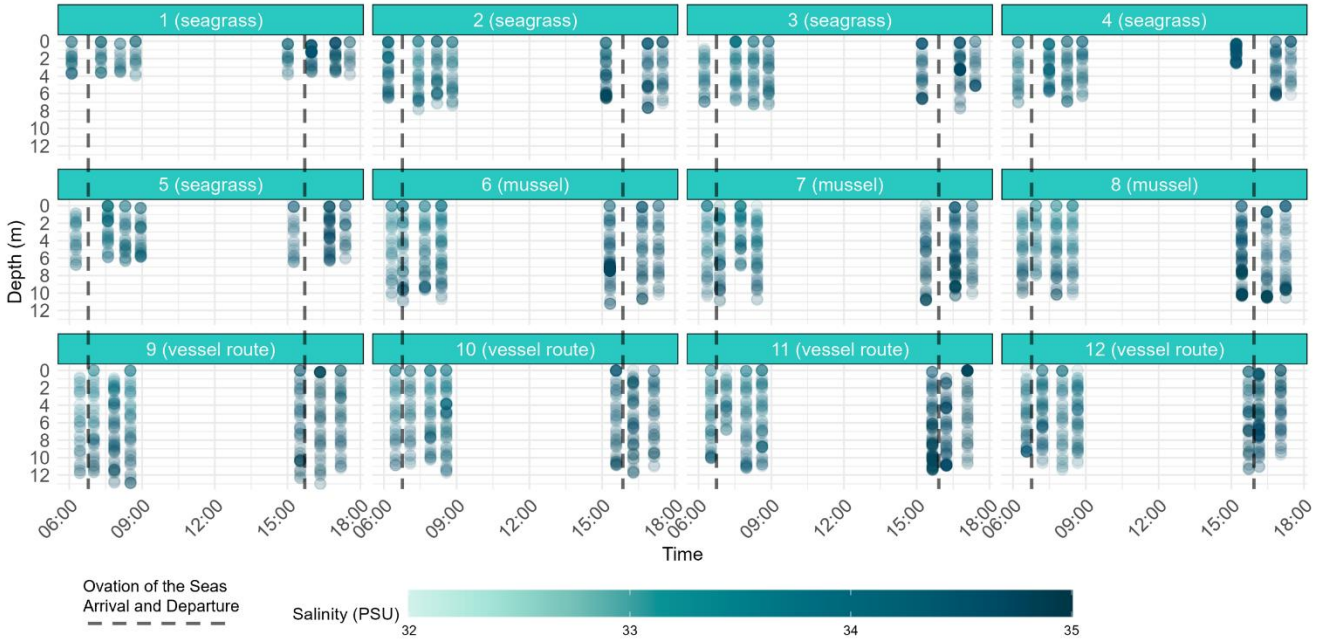
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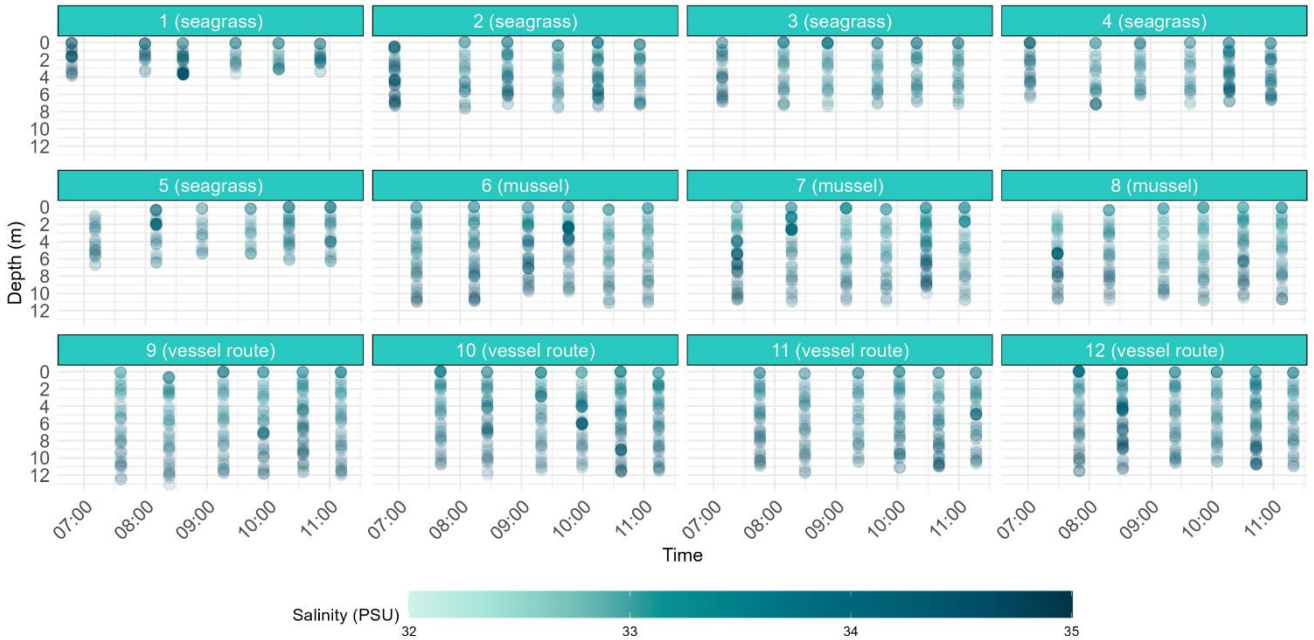
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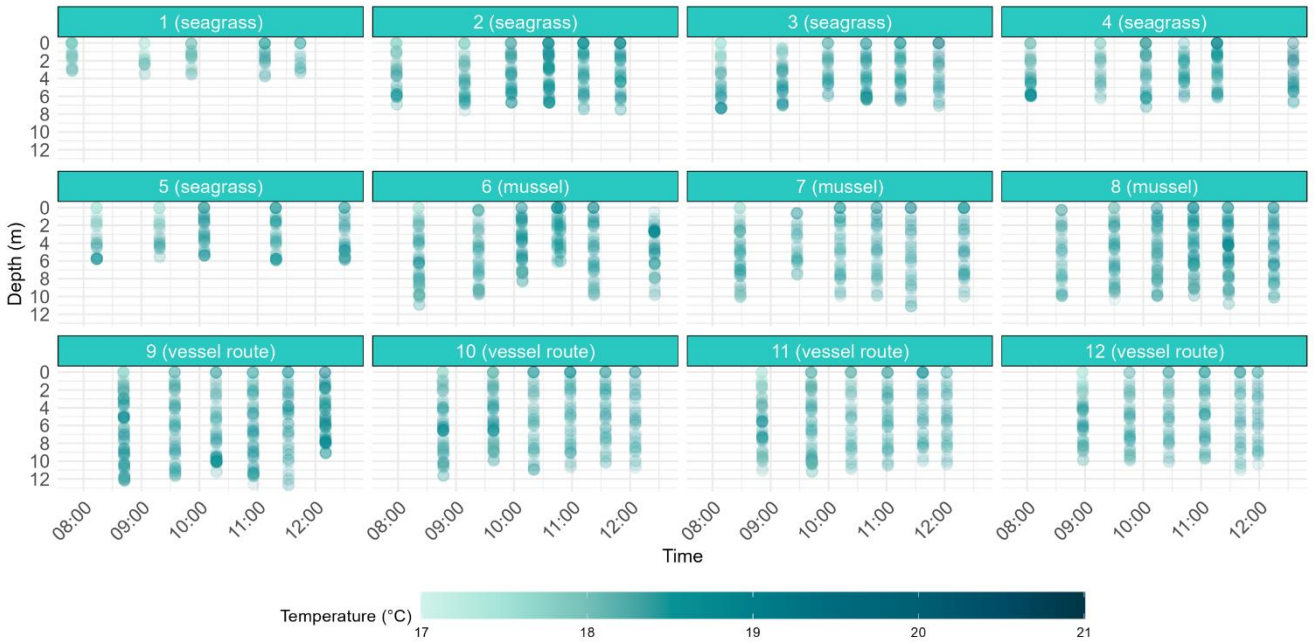
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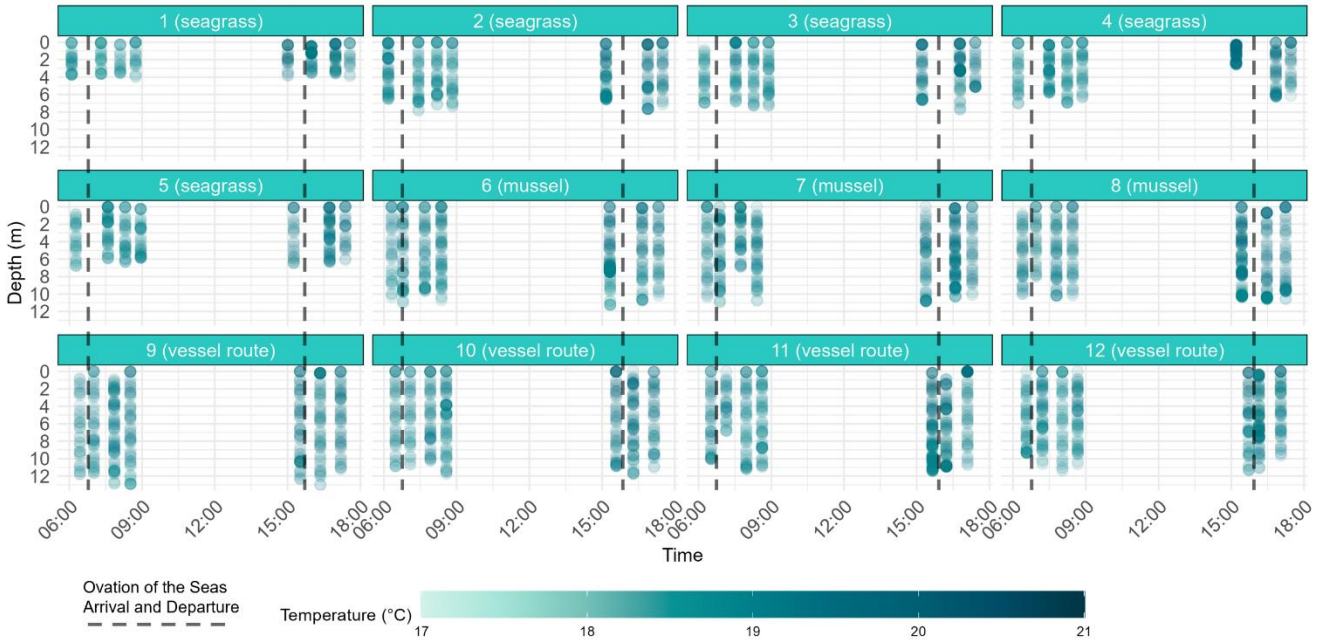
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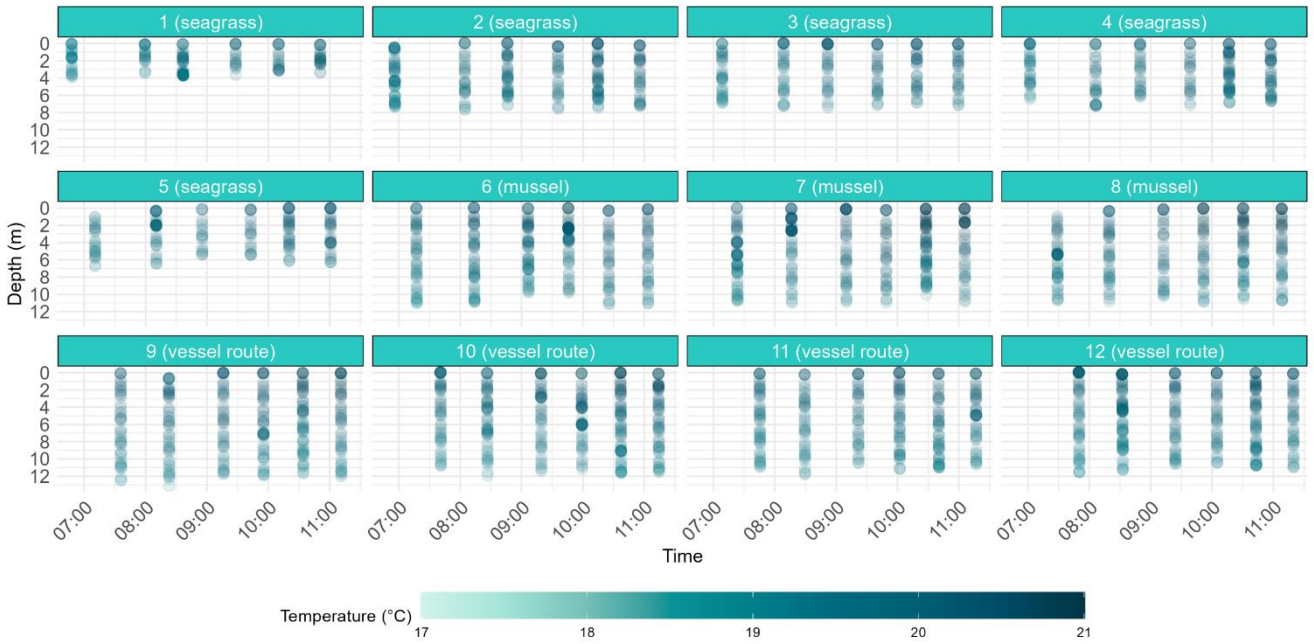
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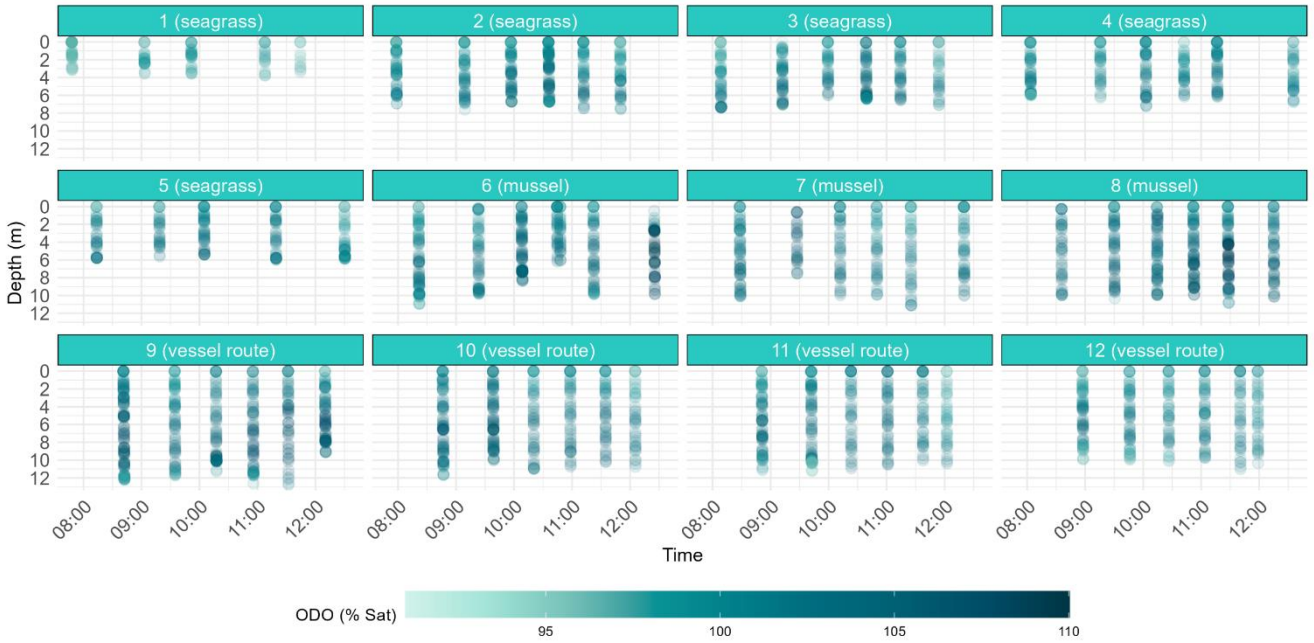
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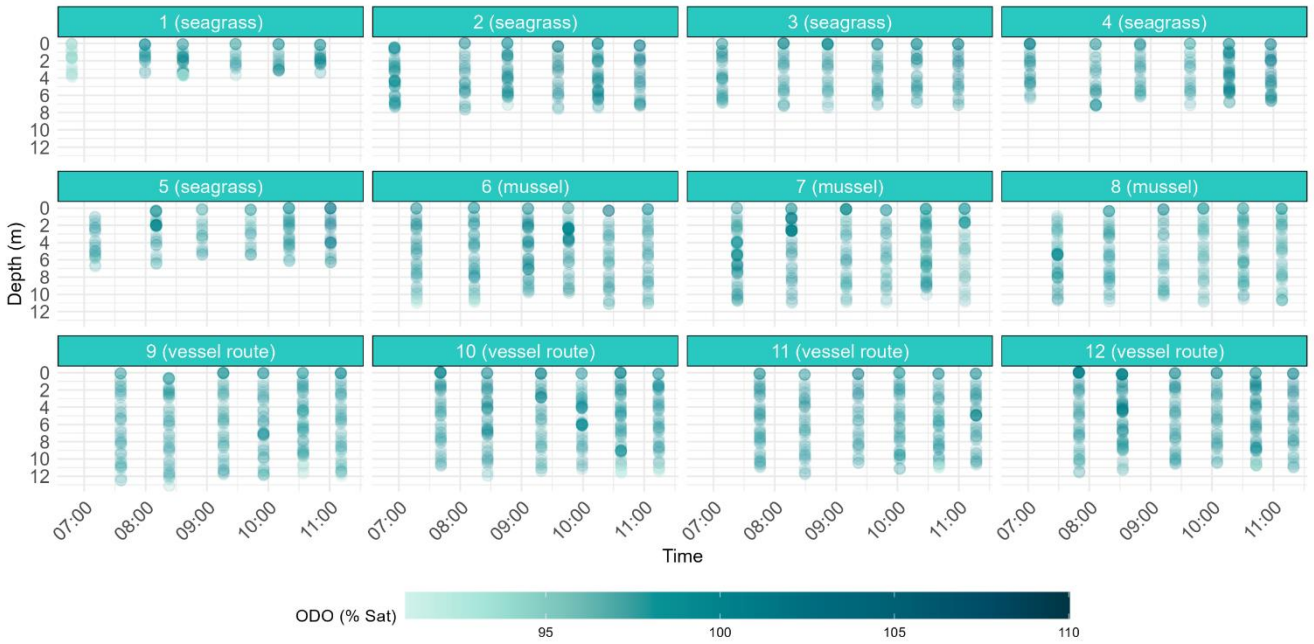
23 Feb 2025 (Day following)



21 Feb 2025 (Day prior)



23 Feb 2025 (Day following)



22 Feb 2025 (Cruise day)

