EPBC 2019/8520
Port Hedland Spoilbank Marina
Annual Compliance Report 2025/2026

Prepared for:
Department of Transport and Major Infrastructure

Prepared by:
[redacted]

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Executive Summary

This document forms the Annual Compliance Report (ACR) for the Spoilbank Marina Project development activities undertaken between June 2025 to June 2026 (the Reporting Period), as required under Condition 14 of *Environment Protection and Biodiversity Conservation Act 1999* approval (EPBC 2019/8520).

This ACR has been prepared by Stantec on behalf of the Department of Transport and Major Infrastructure (DTMI) (previously Department of Transport (DoT)), the current approval holder for the Spoilbank Marina Project. Responsibility for the Marina was transferred to DTMI from the previous approval holder, Pilbara Ports Authority, on July 9 2024.

Before the Reporting Period, the Marina's construction activities included works on the inner revetment walls and outer breakwaters, the excavation of the marina basin, dredging activities, marine piling, completion and opening of the boat pens and boat ramp, completion of all landscape, landside amenities and car park. The Marina officially opened on 29 November 2024, with boat pens opened in March 2025.

During this Reporting Period, two significant cyclones (Mitchell and Narelle) passed near Port Hedland in December 2025 and March 2026 respectively, interrupting activities but not causing any major damage to the facility. Although both cyclones did reach category 3 status when north of Port Hedland, they did not come within 100km of the Spoilbank Marina. As such, post cyclone monitoring was not required under the sediment management plan following both cyclone events. The extreme weather did cause some minor surface runoff damage on the west side of the marina close to the fishing platform, which has since been remediated by the Town of Port Hedland.

The EPBC 2019/8520 comprises of 26 conditions. Over the Reporting Period, compliance was met for all 26 conditions including the components described in Condition 5a, b and c. The artificial light monitoring around the marina was fulfilled as part of condition 5a, the sediment management monitoring around the adjacent beaches was fulfilled as part of 5b as well as the water and sediment monitoring requirements were fulfilled in 2025/26 as per Condition 5c.

This ACR was prepared in accordance with the Department's Annual Compliance Report Guidelines (2014) and will be published on DTMI's website following submission to DCCEEW.

Signed: [redacted]

Full Name: [redacted]
Position: Director Maritime Assets
Organisation: Department of Transport and Major Infrastructure
Date: 14/08/2026

1 Introduction

Pilbara Ports was the nominated Developer of the Port Hedland Spoilbank Marina (the Project), a government initiative originally led by DTMI in partnership with the Town of Port Hedland. On 27 June 2024, Pilbara Ports submitted a Deed of Agreement to the Department of Climate Change, Energy, the Environment and Water (the Department) to enable the transfer of the Project Commonwealth environmental approval (EPBC 2019/8520) back to DTMI. The deed was executed by the Department and the approval transferred on 9 July 2024.

The Project is located in Port Hedland, Western Australia, on the western side of the spoil bank sand formation, which is a man-made coastal landform created in the late-1960s and early-1970s as a result of disposing dredge material associated with Port Hedland's inner harbour development.

The Project included the development of a marina basin, rock armoured breakwaters, a dredged access channel, boat pens, a boat ramp and landside infrastructure such as carparks, amenities, public open space, lighting, paths, and landscaping. The implementation of the Project began in 2021 with the commencement of the mobilisation of equipment to the construction site on the 8 June 2021 (commencement date), with first ground disturbance activities commencing soon after.

During the 2024-2025 reporting year, all of the marine side construction activities for the marina and all land-based activities including landscaping, amenities and a carpark were completed. The Spoilbank Marina was officially opened on 29 November 2024.

This report has been prepared to meet Condition 14 of EPBC 2019/8520, whereby the approval holder must prepare an Annual Compliance Report (ACR) for each 12-month period following the date of commencement of the action. As the approval holder of EPBC 2019/8520, DTMI has prepared an ACR for the Project's activities undertaken during the period 8 June 2025 to 7 June 2026.

This ACR will be made publicly available and published on DTMI's website, as the approval holder for the Reporting Period.

2 Compliance Audit Table and Current Compliance Status

During the Reporting Period (8 June 2025 to 7 June 2026), DTMI was responsible for ensuring compliance with the implementation conditions of EPBC 2019/8520. **Table 1** presents a summary of DTMI's compliance with each of the implementation conditions for the Reporting Period. Many of the implementation conditions of EPBC 2019/8520 relate to the construction activities of the Project, which were all complete prior to this Reporting Period. In that instance, many of the conditions were found to be compliant or not applicable within this Reporting Period.

Under Condition 5c, a Marine Environment and Water Quality Management Plan (MEWQMP) must be implemented as part of the Operational Environmental Management Plan (OEMP). The MEWQMP specifies the quality indicators to be monitored and timing of monitoring to prevent impacts to protected matters, including specific trigger criteria and limits, and corrective actions that will be implemented to prevent impacts to protected matters should trigger criteria and limits be reached.

In fulfilment of this condition, marine environmental quality sampling was conducted over the Reporting Period, comprising of quarterly monitoring and reporting. **Table 3** provides a summary of the approval holder's performance against the trigger criteria over the Reporting Period. Further details are provided in **Appendix A** to **Appendix D**.

Table 1: EPBC 2019/8520 Spoilbank Marina – Annual Compliance Report 2025/2026.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
Environment Protection and Biodiversity Conservation Act 1999 (Cth) Approval Decision Notice (2019/8520) – Conditions			
C1	Condition 1 To minimise impacts to protected matters, the approval holder must not remove or modify more than: a) 15 ha of Flatback Turtle inter-nesting habitat; b) 2.3 ha of Green Turtle foraging habitat; and c) 10 ha of Green Sawfish foraging habitat, within the project area	Not Applicable	All marine construction activities ceased prior to the Reporting Period. The entire footprint of the Spoilbank Marina project does not remove or modify more than the area shown in conditions a, b, & c. No marine construction works were conducted outside of the permitted area.
C2A	Condition 2A To minimise impacts to protected matters, the approval holder must not undertake any marine construction activities during the following dates and times for the period of the approval: a) Flatback Turtle peak nesting period, between 1 December and 31 March. b) Green Sawfish key movement period, between the hours of 19:00 and 07:00.	Not Applicable	All marine construction activities ceased prior to the Reporting Period. a) No marine construction activities occurred during Flatback Turtle peak nesting period, between 1 December and 31 March of the Reporting Period. b) No marine construction activities occurred during Green Sawfish key movement period, between the hours of 19:00 and 07:00.
C3	Condition 3 To minimise impacts to protected matters, the approval holder must not dredge outside of the dredge area. If any dredge material is disposed of offshore, this must be undertaken in accordance with all requirements of a Permit issued under the *Environmental Protection (Sea Dumping) Act 1981*.	Not Applicable	All marine construction activities, including dredging, ceased prior to the Reporting Period.
C4	Condition 4 To ensure that marine construction activities and construction do not significantly impact protected matters, the approval holder must implement the Dredging Environmental Management Plan (DEMP) and Construction Environmental Management Plan (CEMP).	Not Applicable	All dredging and construction activities ceased prior to this Reporting Period. The DEMP and CEMP were implemented throughout the dredging and construction campaign with regular inspections and audits.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C5	Condition 5 The approval holder must submit an Operational Environment Management Plan (OEMP), at least three months prior to the anticipated commencement of the operation of the marina, for the Minister's approval to ensure that the operation of the marina does not significantly impact protected matters. The OEMP must: a) Include an Artificial Lighting Management Plan (ALMP) that ensures artificial lighting associated with the operation of the marina does not impact upon Flatback Turtle nesting on Cemetery Beach. The ALMP must be consistent with the Department's National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds (2020) and include: i. the finalised artificial lighting design of the marina; ii. justification of how the proposed design will prevent impacts to Flatback Turtle hatchlings on Cemetery Beach; iii. a monitoring and reporting program, which includes baseline data that monitoring and reporting will be evaluated against, to be undertaken for a minimum length of two years post commencement of operation of the marina to provide certainty that the artificial lighting of the marina is not impacting Flatback Turtle hatchlings or nesting on Cemetery Beach; and iv. management measures and corrective actions to be implemented should monitoring indicate that the marina's artificial lighting is likely to impact Flatback Turtle hatchlings on Cemetery Beach. b) Include a Sediment Management Plan (SMP) that ensures anthropogenic activities of the action do not result in, or contribute to, the denuding of Cemetery Beach. The SMP must	Compliant	The OEMP was submitted by DTMI to the DCCEEW on 16 August 2024 and was approved by the Minister in writing on 20 September 2024. The public boat ramp became operational on 20 January 2024 in alignment with Condition 5A, and the marina officially opened on 29 November 2024. The OEMP includes: a) Artificial Light Management Plan (ALMP), i. As per the monitoring schedule, annual light monitoring and hatchling orientation monitoring were undertaken in January 2026 and the report completed on 8 June 2026 during the Reporting Period (Appendix E). ii. ~~An updated~~ light audit of ~~new~~ lighting around the marina was recently undertaken (29 June 2026). As this was conducted outside the Reporting Period, the report will be included within the ACR for the next reporting period (2026-2027). b) Sediment Management Plan (SMP); i. Monitoring and reporting under the SMP were conducted in September 2025 (Appendix F). c) Marine Environment and Water Quality Management Plan (MEWQMP). i. Quarterly internal reports outlining the monitoring results in line with the trigger criteria, and the corrective actions implemented where trigger criteria exceeded, were produced during the Reporting Period (Appendix A; Appendix B; Appendix C; Appendix D). A summary of quarterly results against the trigger criteria for MEQ indicators across the Reporting Period are outlined in Table 3.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
	include measures to monitor for denuding of Cemetery Beach and specify intervention measures to be implemented should denuding of Cemetery Beach be predicted or detected as a result of: i. anthropogenic activities; and/or ii. environmental factors in combination with anthropogenic activities. c) Include a Marine Environment and Water Quality Management Plan (MEWQMP) that addresses how marine water quality, sediment quality and accumulation of marine debris will be monitored and managed to prevent impacts to protected matters from the operation of the marina. The MEQWMP must specify and justify the quality indicators to be monitored and timing of monitoring to prevent impacts to protected matters, including specific trigger criteria and limits, and clear, detailed corrective actions that will be implemented to prevent impacts to protected matters should trigger criteria and limits be reached.		

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C5A	Condition 5A The approval holder may enable use of the public boat ramp prior to operation of the marina, subject to meeting the commitments of the Construction Environmental Management Plan. In enabling use of the public boat ramp the approval holder must: a) fully comply with the Construction Environmental Management Plan (CEMP); b) during each period commencing on 1 December and ending on 31 March in the same financial year, prevent use of the public boat ramp after 6.00 pm each day and until 6.00 am the next day; c) not provide or permit any artificial lighting in the vicinity of the public boat ramp; d) install gates and close them to prevent the use of the public boat ramp outside the period between 6.00 am and 6.00 pm each day; and e) erect clear signage at the public boat ramp prohibiting its use outside the period between 6.00 am and 6.00pm each day.	Not Applicable	The public boat ramp opened to the public prior to the Reporting Period (20 January 2024) and is currently in operation.
C6	Condition 6 The approval holder must not commence operation of the marina unless the Minister has approved the OEMP in writing. If the Minister approves the OEMP then the approved OEMP must be implemented.	Compliant	The public boat ramp became operational on 20 January 2024 in alignment with Condition 5A, and the marina officially opened on 29 November 2024. The OEMP was submitted to the DCCEEW on 16 August 2024 and was approved by the Minister in writing on 20 September 2024. For the 2025/206 monitoring period, all components of the OEMP, including the ALMP, SMP and MEWQMP in line with Condition 5, have all been implemented. DCCEEW was notified by DTMI via email on 26 February 2025 to inform on the status of these surveys.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C7	Condition 7 All plans required under these conditions must be consistent with the Department's Environmental Management Plan Guidelines, and must include: a) The environmental objectives, relevant protected matters and a reference to EPBC Act approval conditions to which the plan refers; b) A table of commitments made in the plan to achieve the objectives, and a reference to where the commitments are detailed in the plan; c) Reporting and review mechanisms, and documentation standards to demonstrate compliance with the commitments made in the plan; d) An assessment of risks to achieving the environmental objectives and risk management strategies that will be applied; e) Impact avoidance, mitigation and/or repair measures, and their timing; and f) A monitoring program, which must include: i. measurable performance indicators; ii. trigger values for corrective actions; iii. the timing and frequency of monitoring to detect trigger values and changes in the performance indicators; and iv. proposed corrective actions, if trigger values are reached.	Compliant	The CEMP, DEMP and OEMP have been submitted to the Department and subsequently have been approved for use on the Spoilbank Marina Project. The appendices to the OEMP are the Marine Environmental Quality Management Plan (MEQMP), Artificial Light Management Plan (ALMP), and Cemetery Beach Sediment Management Plan (SMP) which are being implemented as described in Item C5 above.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
Part B – Standard administrative conditions Notification of date of commencement of the action			
C8	Condition 8 The approval holder must notify the Department in writing of the date of commencement of the action within 10 business days after the date of commencement of the action. The approval holder must notify the Department in writing of the date of commencement of the operation of the marina within 10 business days after the date of commencement of the operation of the marina.	Compliant	The Department was notified of the commencement of action via letter on 17 June 2021. Acknowledgement of commencement was received from the Department on 21 June 2021. As reported in the 24/25 ACR the Department was notified by email of the commencement of operation on 26 February 2025. No acknowledgement of commencement of the operation from the Department was received by DTMI.
C9	Condition 9 If the commencement of the action does not occur within 5 years from the date of this approval, then the approval holder must not commence the action without the prior written agreement of the Minister.	Compliant	The action commenced on 8 June 2021, within the approval timeframe.
Compliance records			
C10	Condition 10 The approval holder must maintain accurate and complete compliance records.	Compliant	Stantec, under contract with DTMI, collects compliance records for inclusion in the ACR. DTMI maintains these records and tracks compliance obligations through its environmental management system.
C11	Condition 11 If the Department makes a request in writing, the approval holder must provide electronic copies of compliance records to the Department within the timeframe specified in the request.	Compliant	No requests were made by the Department during the Reporting Period.
Submission and publication of plans			

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C12	Condition 12 The approval holder must: a) submit **plans** electronically to the **Department;** b) unless otherwise agreed to in writing by the **Minister**, publish each **plan** on the **website** within 20 **business days** of the date: i. of this approval, if the version of the **plan** to be implemented is specified in these conditions; or ii. that the **plan** is submitted to the **Department**, if the **plan** does not require the approval of the **Minister** but was not finalised before the date of this approval; or iii. that the **plan** has been approved by the **Minister** in writing, if the **plan** requires the approval of the **Minister**; c) exclude or redact **sensitive ecological data** from **plans** published on the **website** or provided to a member of the public; and d) keep **plans** published on the **website** until the end date of this approval.	Compliant	a) The CEMP, DEMP and OEMP have been submitted to the Department and subsequently approved for use on the Spoilbank Marina Project. b) DTMI published the OEMP on the website: Spoilbank Marina | Transport WA. c) There is no sensitive ecological data redacted from the plans. d) All plans will remain published on DTMI's website until the end date of this approval.
C13	Condition 13 The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps, and other spatial and metadata required under a plan, is prepared in accordance with the Department's *Guidelines for biological survey and mapped data* (2018) and submitted electronically to the Department in accordance with the requirements of the plan.	Compliant	No sensitive ecological data was recorded during the Reporting Period. All monitoring and spatial data within monitoring reports were prepared in accordance with the Department's *Guidelines for biological survey and mapped data* (2018) and are available upon request.
Annual compliance reporting			

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C14	Condition 14 The approval holder must prepare a compliance report for each 12 month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must: a) publish each compliance report on the website within 60 business days following the relevant 12 month period; b) notify the Department by email that a compliance report has been published on the website and provide the weblink and documentary evidence providing proof of the date of publication for the compliance report within five business days of the date of publication; c) keep all compliance reports publicly available on the website until this approval expires; d) exclude or redact sensitive ecological data from compliance reports published on the website; and e) where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.	Compliant	The action commenced on 8 June 2021. a) The first Annual Compliance Report (ACR) was published on the Pilbara Ports website on 26 August 2022. The second ACR was published on the Pilbara Ports website on 25 August 2023. The third ACR was published on the Pilbara Ports website by 31 August 2024. The fourth ACR was published on the DTMI Website on 29 October 2025. b) The Department was notified that the ACR was published on the website by 29 October 2025. c) Previous ACRs prior to DTMI being proponent were published on the Pilbara Ports website. On 9 July 2024, the approval holder of EPBC 2019/8520 was transferred from Pilbara Ports to DTMI. This is the second ACR since DTMI became the approval holder, and this ACR will be published on DTMI's website once submitted. d) There has not been any sensitive ecological data excluded or redacted from previous ACRs.
Reporting non-compliance			

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C15	Condition 15 The approval holder must notify the Department in writing of any: incident; non-compliance with the conditions; or non-compliance with the commitments made in plans. The notification must be given as soon as practicable, and no later than two business days after becoming aware of the incident or non-compliance. The notification must specify: a) any condition which is or may be in breach; b) a short description of the incident and/or non-compliance; and c) the location (including co-ordinates), date, and time of the incident and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.	Compliant	No instances of non-compliance or potential non-compliance were identified or reported during the Reporting Period.
C16	The approval holder must provide to the Department the details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying: a) any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b) the potential impacts of the incident or non-compliance; and c) the method and timing of any remedial action that will be undertaken by the approval holder.	Compliant	No instances of non-compliance or potential non-compliance were identified or reported during the Reporting Period.
Independent audit			
C17	The approval holder must ensure that independent audits of compliance with the conditions are conducted as requested in writing by the Minister.	Not Applicable	No requests were made by the Minister for auditing.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C18	For each independent audit, the approval holder must: a) provide the name and qualifications of the independent auditor and the draft audit criteria to the Department; b) only commence the independent audit once the audit criteria have been approved in writing by the Department; and c) submit an audit report to the Department within the timeframe specified in the approved audit criteria.	Not Applicable	No requests were made by the Minister for auditing.
C19	The approval holder must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of this approval.	Not Applicable	No requests were made by the Minister for auditing.
Revision of action management plans			
C20	Condition 20 The approval holder may, at any time, apply to the Minister for a variation to an action management plan approved by the Minister under conditions 4 and 5, or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the EPBC Act. If the Minister approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous action management plan.	Not Applicable	No application under section 143A of the EPBC Act was made.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C21	Condition 21 The approval holder may choose to revise an action management plan approved by the Minister under conditions 4 and 5 or as subsequently revised in accordance with these conditions, without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the RAMP would not be likely to have a new or increased impact.	Compliant	A variation to an action management plan (the OEMP) was applied for during the Reporting Period and submitted to DCCEEW on 7 April 2026. The proposed variation application is still under review.
C22	Condition 22 If the approval holder makes the choice under condition 21 to revise an action management plan without submitting it for approval, the approval holder must: a) notify the Department in writing that the approved action management plan has been revised and provide the Department with: i. an electronic copy of the RAMP; ii. an electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP; iii. an explanation of the differences between the approved action management plan and the RAMP; iv. the reasons the approval holder considers that taking the action in accordance with the RAMP would not be likely to have a new or increased impact; and v. written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at least 20 business days after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the Department. b) subject to condition 24 implement the RAMP from the RAMP implementation date.	Compliant	The proposed variation application for the OEMP is still under review and not yet approved by the Minister.

ITEM	COMMITMENT	COMPLIANCE	EVIDENCE
C23	Condition 23 The approval holder may revoke their choice to implement a RAMP under condition 21 at any time by giving written notice to the Department. If the approval holder revokes the choice under condition 21, the approval holder must implement the action management plan in force immediately prior to the revision undertaken under condition 21.	Not Applicable	Within this Reporting Period, DTMI has not revoked their choice to implement a RAMP.
C24	Condition 24 If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the RAMP would be likely to have a new or increased impact, then: a) condition 21 does not apply, or ceases to apply, in relation to the RAMP; and b) the approval holder must implement the action management plan specified by the Minister in the notice.	Not Applicable	No notice has been given by the Minister to the approval holder that the Minister is satisfied that the taking of the action in accordance with the RAMP would be likely to have a new or increased impact.
C25	Condition 25 At the time of giving the notice under condition 24, the Minister may also notify that for a specified period of time, condition 21 does not apply for one or more specified action management plans.	Not Applicable	No notice has been given by the Minister to the approval holder that the Minister is satisfied that the taking of the action in accordance with the RAMP would be likely to have a new or increased impact.
Completion of the action			
C26	Condition 26 Within 20 business days after the completion of the action, the approval holder must notify the Department in writing and provide completion data.	Not Applicable	The action (operation of the Project) is not expected to be completed until the end of the approval on 19 February 2065.

3 Marine Environmental Quality

The results of the quarterly monitoring conducted for the MEWQMP are summarised in **Table 3** against the relevant Environmental Quality Guidelines (EQG) and Environmental Quality Standards (EQS). EQGs are threshold numerical values or narrative statements, which if exceeded, indicate an uncertainty of not achieving the environmental quality objective (EQO), whereas exceedance of EQSs indicates a significant risk the EQO may not be achieved. If both are met, the EQO is considered to have been achieved. A summary of which EQGs trigger values were met for EQO1 *'Maintenance of ecosystem integrity'* are presented in **Table 3**.

In respect of EQO1, EQGs have been derived for the following environmental indicators:

- Physical and chemical stressors in water;
- Toxicants in water; and
- Toxicants in sediments.

Table 2: Summary of the legend for the results of the 2025/2026 Reporting Period.

Outcome	Legend
EQG met (continue monitoring)	
EQG not met (continue monitoring for EQS criteria exceedance, management response may be required)	
EQS not met (management response and corrective actions required)	

Table 3: Summary of quarterly MEQ monitoring results.

Indicator	Environmental Quality Guideline				Result				Context
	Moderate Protection		High Protection						
	Summer	Winter	Summer	Winter	Q1	Q2	Q3	Q4	
Physical and chemical stressors in water									
DO Saturation (%)	>74.3	>97.3	>74.3	>99.6					Values exceeded the EQGs at both the MEPA and HEPA (Q1 and Q4)
Temperature (°C)	27.5-31.3	20.9-25.5	27.5-31.0	21.4-24.0					Values exceeded the EQGs, however the values were below the EQG range at both the MEPA and HEPA (Q1 and Q4)
Salinity (o/oo)	35.2-38.8	32.8-38.9	36.2-38.8	32.9-38.9					
pH µg/L	7.34-8.28	7.9-8.35	7.41-8.21	8.17-8.35					Values exceeded the EQGs, however the values were below the EQG range at the MEPA (Q1)
Turbidity (NTU)	<9.1	<9.1	<6.7	<6.7			-	-	Values exceeded the EQG at the MEPA only (Q2)
Chlorophyll-a (µg/L)	<0.0020	<0.0020	<0.0010	<0.0010					Values exceeded the EQG at the HEPA (Q3)
Toxicants in water – dissolved metals (mg/L)									
As	0.003		0.003						Values exceeded the EQGs at both the MEPA and HEPA (Q3)
Cd	0.014		0.0007						
Cr (III)	0.049		0.0077						
Cr (VI)	0.020		0.00014						
Cu	0.003		0.0003						
Pb	0.0066		0.0022						

Indicator	Environmental Quality Guideline				Result				Context
	Moderate Protection		High Protection						
	Summer	Winter	Summer	Winter	Q1	Q2	Q3	Q4	
Hg	0.0007		0.0001						
Ni	0.2		0.007						
Zn	0.012		0.0033						Values exceeded the EQG at the HEPA only (Q4)
Toxicants in water – hydrocarbons (mg/L)									
TRH-Silica C6-C14	0.025		0.025						
TRH-Silica C15-C36	0.1		0.1						
Benzene	0.9		0.5						
Toluene	0.23		0.11						
Ethylbenzene	0.11		0.05						
Xylene	0.1		0.05						
Napthalene	0.09		0.05						
Toxicants in sediment – metals (mg/kg)									
Al	9100		9100						Aluminium concentrations exceeded the EQG at both the MEPA and HEPA
As	20		20						
Cd	1.5		1.5						

Indicator	Environmental Quality Guideline				Result				Context
	Moderate Protection		High Protection						
	Summer	Winter	Summer	Winter	Q1	Q2	Q3	Q4	
Cr (III/VI)	80		80						
Cu	65		65						
Pb	50		50						
Hg	0.15		0.15						
Ni	21		21						Nickel concentrations exceeded the EQG at the MEPA
Zn	200		200						
Toxicants in sediment – hydrocarbons (mg/L)									
Total TRH	250		250						
TRH C6-C14	25		25						
TRH C15-C36	100		100						
Low Molecular weight PAHs	0.55		0.55						
High Molecular weight PAHs	1.7		1.7						
Total PAHs	4		4						

4 Discussion

As part of the MEWQMP, some exceedances occurred against the EQGs, as summarised in **Table 3**. However, these exceedances were not considered ecologically significant, as they did not exhibit a consistent spatial or temporal pattern and were not indicative of an ongoing deterioration in water quality. The isolated exceedances were considered to be attributed to natural environmental variability, potential instrument drift, and/or sampling timing effects rather than project-related impacts. Therefore, the EQO was achieved and DTMI are compliant with the implementation of the MEWQMP as part of the OEMP, in relation to Conditions 5 and 6.

Furthermore, water quality results from each survey were assessed against both the legacy OEMP trigger values and EPA-derived trigger values, with the EPA triggers established using the 80th and 95th percentiles of the combined reference-site dataset. During the Reporting Period, where exceedances of the legacy OEMP EQG triggers occurred, the respective EPA EQG triggers were met or just marginally exceeded. The EPA trigger values are considered more representative of local baseline conditions and are less likely to yield false positive results (falsely concluding there has been an exceedance) than the legacy OEMP triggers. As part of the variation of the OEMP submitted by DTMI, the revised OEMP will include assessment against the EPA trigger values, as they are considered more appropriate than the legacy OEMP triggers. The assessment of these false positive results can be found in **Appendix A to Appendix D**.

5 Conclusion

As per Condition 6, DTMI is required to implement the OEMP, as specified in Condition 5, comprising of an Artificial Light Management Plan (Condition 5a), a Sediment Management Plan (Condition 5b) and a Marine Environment and Water Quality Management Plan (Condition 5c).

DTMI implemented all required management plans to remain compliant with all conditions. No further action is required on DTMI's behalf for this reporting period in 2025/2026.

6 Public Availability and Future Annual Compliance Reports

DTMI will make a copy of this report publicly available on its website for Spoilbank Marina (Spoilbank Marina | Transport WA). All future ACRs for the Project will be the responsibility of DTMI to make publicly available as the approval holder of EPBC 2019/8520.

Appendices

Appendix A Spoilbank Marina MEWQMP Summary Report Q1

Port Hedland Spoilbank Marina Project: MEWQMP Summary Report – Q1

Prepared for: Department of Transport

Date: 01/10/2025

Prepared by: [redacted]

Project: 304501863

Stantec Australia Pty Ltd

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
A01	01/10/2025	Q1 Report	JM	JD	GS	TS

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1 Introduction

1.1 Background

The Spoilbank Marina, located on the western extent of the spoil bank sand formation in Port Hedland, was developed to replace the Richardson Street boat ramp and to redirect recreational boating traffic away from the commercial shipping channel within the inner harbour. Federal environmental approval for the project was granted by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) on 19 February 2021 (EPBC 2019/8520).

On 9 July 2024, DCCEEW approved the transfer of proponent responsibilities from Pilbara Ports (PP) to the Department of Transport and Major Infrastructure (DoTMI) (Previously Department of Transport (DoT)). As the new proponent, DoTMI has assumed full operational responsibility for the Spoilbank Marina, including ongoing environmental management, monitoring, and maintenance in accordance with the approved Operational Environmental Management Plan (OEMP).

Within the OEMP a Marine Environment and Water Quality Management Plan (MEWQMP) outlines how the new proponent (DoTMI) will monitor marine water quality, sediment quality and accumulation of marine debris and how impacts to protected matters via the operation of the marina will be managed (O2Marine 2024).

1.2 Objectives

This report is submitted in partial fulfillment of Condition C6 of the Approval Decision Notice (2019/8520), that states: “If the Minister approves the OEMP then the approved OEMP must be implemented”. It provides a summary of the water sampling outcomes conducted in alignment with the MEWQMP during the fourth round of implementation completed on 28 July 2025.

2 Methods

2.1 Sample Collection and Locations

Water quality samples for the targeted testing of dissolved metals, hydrocarbons and chlorophyll-a, and physiochemical profiling of the water column were taken in accordance with the MEWQMP and completed on 28 July 2025. Sampling was undertaken at one site in the Moderate Ecological Protection Area (MEPA), one site at the boundary of the MEPA and High Ecological Protection Area, and four Reference sites: three located approximately 100 to 1500 m north of the marina, and one (a legacy site) located several kilometers to the west. Reference sites 1, 2 and 3 are new to the program as of Q4 of the 2024/2025 monitoring year.

Sampling locations are presented in **Figure 1** with corresponding coordinates in **Table 1**.

Table 1. Water quality sampling conducted at the Port Hedland Spoilbank Marina.

Site	Site Type	Latitude	Longitude	Metals (As, Cr, Cu, Pb, Ni, Cd, Hg, Zn, Al)	Chromium speciation (III, VI)	Chlorophyl-a	TPH aliphatic/aromatic (>C16-C35)	TRH - Silica gel clean up (NEPM Fractions) + BTEXN	Inorganics (NH3, NOx, FRP, NO2, TN, TP, TN)
SBM1	Impact (MEPA)	20° 18'25.19"S	118° 35'25.15"E	✓	✓	✓	✓	✓	✓
SBM2	Impact (HEPA)	20° 18'11.32"S	118° 35'12.56"E	✓	✓	✓	✓	✓	✓
REF1	Reference	20° 17'56.44"S	118° 35'11.69"E	✓	✓	✓	✓	✓	✓
REF2	Reference	20° 17'50.52"S	118° 35'14.20"E	✓	✓	✓	✓	✓	✓
REF3	Reference	20° 17'44.51"S	118° 35'16.75"E	✓	✓	✓	✓	✓	✓
REF4	Reference	20° 17'15.08"S	118° 30'52.82"E	✓	✓	✓	✓	✓	✓

Figure 1. Water quality sampling sites at the Port Hedland Spoilbank Marina.

2.2 Data Analysis

Data collected during the Q1 sampling event were cleaned and analysed as follows:

- Profile data were first cleaned to remove spurious measurements in the top 0.5 and the lower 0.5 of the water column. Data at these levels were affected by microbubbles in the turbulent surface layers, and the contact with sediments in the lower strata of the water column.
- Temperature, Turbidity, Conductivity, Salinity, Dissolved Oxygen and pH data were fitted to depth profile plots in MATLAB, to check for the presence of gradients.
- Median values for each profile were calculated and compared against the numerical EQGs in EPA (2017) and the EQGs in Table 9 of Appendix A of the OEMP where appropriate.
- Laboratory water quality results were tabulated and compared against the numerical EQGs in EPA (2017).

2.3 QA/QC

- Manual QA/QC checks were completed on the physiochemical data refinement and outlier removal process.
- Field sampling included duplicate samples and met sample holding time requirements.
- All laboratory water quality analysis was completed at a NATA accredited laboratory and abides by QA/QC requirements as part of the accreditation.

3 Results

3.1 Physicochemical Stressors

Results of the physico-chemical profiling and chlorophyll-a sampling events on the 28 July 2025 are detailed in **Table 2** and summarised briefly below.

- Chlorophyll-a concentrations were consistently below the LOR and met the EQGs (both those listed in Table 9 of Appendix A of the OEMP (O2Marine 2023) and EPA (2017).
- Median temperature readings exceeded the winter EQGs as listed in Table 9 of Appendix A of the OEMP, and marginally exceeded the EPA EQGs. While water temperatures were between 0.2 to 0.6^{o}C lower than the Reference sites, they were not considered unusual for the Pilbara in July and were not considered to pose a risk to marine wildlife or broader ecosystem processes.
- DO concentrations exceeded the EQGs as listed in Table 9 of Appendix A of the OEMP, but met the EPAs EQG for a high level of ecosystem protection.
- pH values of 8.0 to 8.05 are within the normal range for Pilbara waters. The pH of 8.0 recorded at MEPA site was sufficient to exceed the EPA EQG for a moderate level of ecosystem protection, but met the legacy OEMP EQG trigger.
- The measured values for salinity and turbidity on the 28 July 2025 met the respective OEMP and EPA EQG trigger values.

The EQGs for physicochemical stressors were not met. See Section 4 for comments on the need for contingency monitoring against the EQS.

Table 2. Median physico-chemical measurements obtained on the 28 July 2025 against the respective OEMP (O2 Marine 2024) and EPA (2017) environmental quality guidelines.

	OEMP EQG (MEPA)[1]	OEMP EQG (HEPA)[1]	EPA EQG (MEPA)[2]	EPA EQG (HEPA)[2]	LOR	Unit	SBM1 (MEPA)	SBM2 (HEPA)	REF1	REF2	REF3	REF4
Chlorophyll-a	0.001	0.001	< 0.001	< 0.001	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Temperature	20.9 - 25.5	21.4 - 24.0	18.8-19.0	18.9-19.0	-	°C	18.6*	18.5*	19	19	19.1	18.8
DO	>97.3	>99.6	80	90	-	%	96.5	95.3	96.5	97.7	96.9	95.4
EC	N/A	N/A	54999-55312	55134-55297	-	uS/cm	55310	55184	55254	55284	55317	54955
Salinity	32.8 – 38.9	32.9 – 38.9	36.5-36.7	36.6-36.7	-	PPT	36.64	36.7	36.7	36.7	36.7	36.4
pH	7.9 – 8.35	8.17 – 8.35	8.05-8.06	8.05-8.06	-	pH	8.0*	8.03	8.05	8.06	8.05	8.06
Turbidity	9.1	6.7	4.67	4.64	-	NTU	2.9	5.8	4.28	4.62	4.68	3.63
Max Depth*	-	-	-	-	-	m	2.8	3.5	6.0	5.6	4.1	4.7

Notes: 1. Interim EQGs calculated from three-year data base from PHMEQSAP (O2 Marine 2023).; 2. EQGs as per the EPAs guidance (EPA 2017). The EPA EQGs for temperature, EC, salinity, pH and turbidity are the 80th percentile values of the combined reference sites (n=4). Orange and blue cells represent exceedances of the legacy OEMP HEPA and MEPA EQG triggers respectively, and bold highlighted text represent exceedances of the EPA EQG trigger values (of which there are none). The EPAs trigger values are considered more appropriate than the legacy OEMP triggers and are less likely to yield false positive results.

Results

Results of the water profiling for temperature, turbidity, conductivity, salinity, pH and dissolved oxygen, are plotted in **Figure 2** and summarised briefly below:

- Temperature profiles throughout the water column were consistent across all sites and both profile casts with no variation with depth.
- Turbidity increased with depth in both water column profiles at site SBM2 while a sharp increase in turbidity was observed at site REF1.
- Conductivity, salinity and pH water column profiles remained consistent across depth at all sites and in both depth profiles.
- Dissolved oxygen water column profiles remained consistent across depth at all sites. REF4 recorded differences in DO% between profile casts however both casts remained consistent with all other sites.

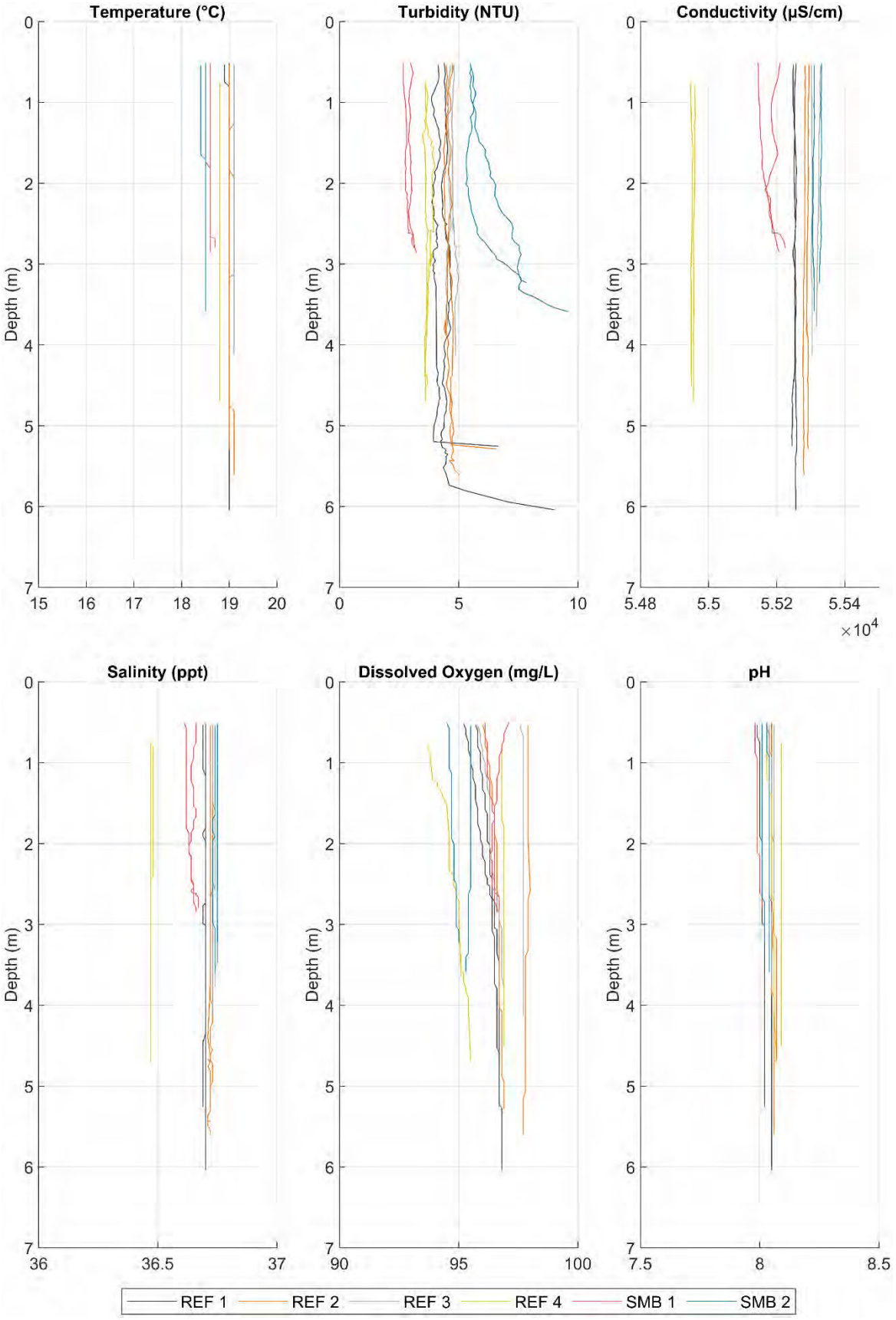

Figure 2. Physicochemical water column profiles displaying two casts from each site.

3.2 Toxicants in Water

3.2.1 Dissolved Metals

Results of the water quality sampling for heavy metals are detailed in **Table 3** and summarised briefly below. The laboratory certificate for the analysis is provided in **Appendix A**.

- Measurements of heavy metals at SBM 1, located inside the Marina, and SBM 2 located at the boundaries of the high and moderate ecological protection areas, met their respective EQGs.
- The EQGs for As and Zn were exceeded at one of the reference sites, but no further exceedances were recorded.

The EQGs for dissolved metals were met. There was therefore no requirement to conduct further monitoring against the EQS.

3.2.2 Hydrocarbons

Results of the water quality sampling for hydrocarbons are detailed in **Table 4** and summarised briefly below. Laboratory certificate for analysis is provided in **Appendix A.**

- None of the measured hydrocarbon concentrations measured on the 28 July 2025 exceeded the EQGs listed in Table 9 of Appendix A of the OEMP.
- With the exception of 4-bromofluorobenzene (surr.), all other measurements were below the laboratory limit of reporting (LOR).
- There were no differences in 4-bromofluorobenzene (surr.) between the marina and the reference sites indicating the measured concentrations were of natural origin.

The EQGs for hydrocarbons were met. There was therefore no requirement to conduct further monitoring against the EQS.

Results

Table 3. Heavy metal concentrations recorded on the 28 July 2025 compared against the respective OEMP (O2 Marine 2024) environmental quality guidelines.

Metal	EQG (MEPA)	EQG (HEPA)	LOR	Unit	SBM1	SBM1 Duplicate	SBM2	REF1	REF2	REF3	REF4
Aluminium	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05
Arsenic	0.003^	0.003^	0.001	mg/L	0.002	0.003	0.002	0.003	0.015	0.002	0.002
Cadmium	0.014	0.0007	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0001	< 0.0001
Chromium (VI)	0.049	0.0077	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chromium (III)	0.02	0.00014	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002
Copper	0.003	0.0003	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.001
Lead	0.0066	0.0022	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.001
Mercury	0.0007	0.0001	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.0001	< 0.0001
Nickel	0.2	0.007	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.001
Zinc*	0.012	0.0033	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	0.066	< 0.005	< 0.005

Notes: 1. EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQG triggers respectively.

Table 4. Hydrocarbon concentrations recorded on the 28 July 2025 compared against the respective OEMP (O2 Marine 2024) environmental quality guidelines.

Hydrocarbon	EQG (MEPA)	EQG (HEPA)	LOR	Unit	SBM1	SBM1 Duplicate	SBM2	REF1	REF2	REF3	REF4
TRH - 1999 NEPM Fractions											
TRH C6-C9	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C15-C28	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
TRH C29-C36	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
TRH C10-C36	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
BTEX											
Benzene	0.9	0.5	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.23	0.11	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.11	0.05	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	-	-	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	-	-	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.1	0.05	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	-	-	1	%	85	83	86	84	80	86	84
TRH - 2013 NEPM Fractions											
Naphthalene^{N02}	0.09	0.05	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TRH >C10-C16 less Naphthalene(F2)	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total)	-	-	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10 less BTEX (F1)^{N04}	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C16-C34	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C34-C40	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total)	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aro/Ali Split of TPH Water											

Results

Hydrocarbon	EQG (MEPA)	EQG (HEPA)	LOR	Unit	SBM1	SBM1 Duplicate	SBM2	REF1	REF2	REF3	REF4
Aliphatic >C16-C35	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04

Notes: 1. EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQG triggers respectively.

3.3 Nutrients in Water

Results of the water quality sampling for nutrients are **Table 5** and summarised briefly below.

- With the exception of ammonia, all nutrient concentrations met their respective EQGs.
- Ammonia concentrations on the 28 July 2025 ranged between 0.16 and 0.19 ug/L.
- Of the two samples obtained at SBM1, one of the samples exceeded the EQG.
- The exceedance in this case however was marginal, at just 0.01 ug/L above the trigger, and within the range of the other reference sites.
- Based on this, the exceedance in this instance was not considered of ecological significance.

The EQGs for nutrients were met with the exception of ammonia. The EQG for ammonia was exceeded at SBM1 following comparison with the EQG for moderate ecosystem protection. See Section 4 for comments on the need for contingency monitoring against the EQS.

Table 5. Nutrient concentrations recorded on the 28 July 2025 compared against the respective EPA (EPA 2017) environmental quality guidelines.

Nutrient	EPA EQG (MEPA)	EPA EQG (HEPA)	LOR	Unit	SBM1	SBM1 Duplicate	SBM2	REF1	REF2	REF3	REF4
Ammonia (as N)	0.18	0.17	0.02	mg/L	0.19	0.17	0.16	0.17	0.19	0.17	0.16
Nitrate (as N)	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrite (as N)	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
NOx (as N)	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	1.46	0.74	0.2	mg/L	0.9	0.9	0.6	< 0.2	< 0.2	< 0.2	1.7
Total Nitrogen	1.46	0.74	0.2	mg/L	0.9	0.9	0.6	< 0.2	< 0.2	< 0.2	1.7
Total Phosphorus	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Filterable Reactive Phosphorus	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes: 1. EQGs as per the EPAs guidance (EPA 2017). The EPA EQGs nutrients are the 80th percentile values of the combined reference sites (n=4). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQG triggers respectively.

4 Discussion

4.1 Physicochemical Stressors in Water

Water temperatures at the MEPA (SBM1) and HEPA (SBM2) sites (18.5-18.8^{o}C) were 0.0 to 0.6^{o}C lower than the reference sites (18.8-19.1^{o}C). While these differences were sufficient to exceed the winter EQGs as listed in the OEMP and the EPA EQGs, they were marginal and well within the range expected of Pilbara near-shore waters in late July (EPA 2019). The observed exceedances in water temperatures are likely false positives and an artefact of the timing of sampling, which at SBM1 and 2 commenced in the early morning, relative to the other sites which were sampled later in the day.

DO values at the MEPA (SBM1) and HEPA (SBM2) sites (96.5-95.3%) were between 0.1-1.2% lower than the reference sites (95.4-97.7%). Based on these results, the DO values at SBM1 and SBM2 were sufficient to exceed the EQGs for a moderate and high level of ecological protection respectively. However, as in the results for water temperature, DO values of between 94.5 and 97.7 are within the tolerance limits of flora and fauna of the Pilbara and are therefore not of ecological significance (EPA 2019).

While reduced hydrodynamic mixing in semi-enclosed marinas may result in lower DO relative to external, more exposed waters, the results in this case are likely due to natural variability or instrument drift. Further sampling is expected to improve the understanding of the spatiotemporal variability and reduce the probability of making Type I inference errors (falsely concluding there has been an exceedance).

Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

4.2 Toxicants in Water

Measurements of heavy metals at SBM 1, located inside the Marina, and SBM 2 located at the boundaries of the high and moderate ecological protection areas, met their respective EQGs. Only reference sites 2 (REF2) recorded metal concentrations above the LOR. Metal concentrations in water were otherwise below the laboratory limit of reporting.

None of the measured hydrocarbon concentrations measured on the 28 July 2025 exceeded the EQGs listed in Table 9 of Appendix A of the OEMP. With the exception of 4-bromofluorobenzene (surr.), all other measurements were below the limit of reporting (LOR).

Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

4.3 Nutrients in Water

Commencing in Q3 2025, nutrient monitoring is a new addition to the Spoilbank Marina OEMP. The EQGs for nutrients were developed based on EPA (2017) which advocates the use of the 80th and 95th percentiles of the reference sites as triggers for a moderate and high level of ecosystem protection respectively.

Except for ammonia, nutrient levels SBM1 and 2 met their respective EQGs. Ammonia values at SBM1 and SBM2 were marginally elevated relative to the reference sites, which in the case of SBM1 was sufficient to exceed the EQG. The exceedance in this case however was marginal, at just 0.01 ug/L above the trigger, and within the range of the other reference sites.

While the EQGs for nutrients have been set based on the 80th and 95th percentile of reference sites, we note that the EPAs triggers for nutrient enrichment are based on chlorophyll-a, which in Q1 were consistently below detection limit. Based on these results, water quality within the marina met the EPAs criteria for a high level of ecosystem protection.

Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

5 Conclusion

Water quality within the marina is of an acceptable quality and within the range expected for Pilbara waters in the Australia winter. Based on these results, there was no requirement to conduct further monitoring against the EQS. EQO1 was achieved.

Appendices

Appendix A Laboratory Results Certificate

Stantec Australia Pty Limited
6F 226,Adelaide Terrace
Perth
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NATA Accredited
Accreditation Number 2377
Site Number 2370 & 2554

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **ALL INVOICES**

Report **1249689-W**
Project name DOT
Project ID 304501863
Received Date Jul 29, 2025

Client Sample ID			**SMB1**	**SMB1 DUP**	**SMB2**	**REF1**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**L25-JI0076849**	**L25-JI0076850**	**L25-JI0076851**	**L25-JI0076852**
Date Sampled			**Jul 28, 2025**	**Jul 28, 2025**	**Jul 28, 2025**	**Jul 28, 2025**
Test/Reference	LOR	Unit				
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	0.19	0.17	0.16	0.17
Chlorophyll-a	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Filterable Reactive Phosphorus	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
NOx (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	0.9	0.9	0.6	< 0.2
Total Nitrogen	0.2	mg/L	0.9	0.9	0.6	< 0.2
Total Phosphorus	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Chromium (III) (filtered)*	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	85	83	86	84
Total Recoverable Hydrocarbons						
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05

Client Sample ID			SMB1	SMB1 DUP	SMB2	REF1
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L25-JI0076849	L25-JI0076850	L25-JI0076851	L25-JI0076852
Date Sampled			Jul 28, 2025	Jul 28, 2025	Jul 28, 2025	Jul 28, 2025
Test/Reference	LOR	Unit				
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water						
Aliphatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Heavy Metals						
Aluminium	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Metals M8						
Arsenic	0.001	mg/L	0.002	0.003	0.002	0.003
Cadmium	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chromium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			REF2	REF3	REF4
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L25-JI0076853	L25-JI0076854	L25-JI0076855
Date Sampled			Jul 28, 2025	Jul 28, 2025	Jul 28, 2025
Test/Reference	LOR	Unit			
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	0.19	0.17	0.16
Chlorophyll-a	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chromium (VI)	0.002	mg/L	< 0.002	< 0.002	< 0.002
Filterable Reactive Phosphorus	0.01	mg/L	< 0.01	< 0.01	< 0.01
Nitrate (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
NOx (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	< 0.2	< 0.2	1.7
Total Nitrogen	0.2	mg/L	< 0.2	< 0.2	1.7
Total Phosphorus	0.01	mg/L	< 0.01	< 0.01	< 0.01
Chromium (III) (filtered)*	0.002	mg/L	[G01]< 0.01	< 0.002	< 0.002
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02
BTEX					
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001

Client Sample ID			REF2	REF3	REF4
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L25-JI0076853	L25-JI0076854	L25-JI0076855
Date Sampled			Jul 28, 2025	Jul 28, 2025	Jul 28, 2025
Test/Reference	LOR	Unit			
BTEX					
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	80	86	84
Total Recoverable Hydrocarbons					
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH - 2013 NEPM Fractions (after silica gel clean-up)					
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH - 1999 NEPM Fractions (after silica gel clean-up)					
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water					
Aliphatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04
Heavy Metals					
Aluminium	0.05	mg/L	< 0.5	< 0.05	< 0.05
Metals M8					
Arsenic	0.001	mg/L	0.015	0.002	0.002
Cadmium	0.0001	mg/L	< 0.002	< 0.0001	< 0.0001
Chromium	0.001	mg/L	[G01]< 0.01	0.001	< 0.001
Copper	0.001	mg/L	< 0.01	< 0.001	< 0.001
Lead	0.001	mg/L	< 0.01	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.01	< 0.001	< 0.001
Zinc	0.005	mg/L	0.066	< 0.005	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Naphthalene	Welshpool	Jul 29, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Welshpool	Jul 29, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Welshpool	Jul 29, 2025	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Welshpool	Jul 29, 2025	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Ammonia (as N)	Welshpool	Jul 29, 2025	28 Days
- Method: ARL303 - Ammonia in Water by Discrete Analyser			
Filterable Reactive Phosphorus	Welshpool	Jul 29, 2025	28 Days
- Method: ARL309 - Filterable Reactive Phosphorus in Water by Discrete Analyser			
Nitrate (as N)	Welshpool	Jul 29, 2025	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Nitrite (as N)	Welshpool	Jul 29, 2025	2 Days
- Method: ARL311 - Nitrite in Water by Discrete Analyser			
NOx (as N)	Welshpool	Jul 29, 2025	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Total Kjeldahl Nitrogen	Welshpool	Jul 29, 2025	28 Day
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Nitrogen	Welshpool	Jul 29, 2025	28 Days
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Phosphorus	Welshpool	Jul 29, 2025	28 Days
- Method: ARL308 - Total Phosphorus in Water by Discrete Analyser			
Chlorophyll-a	Welshpool	Jul 29, 2025	28 Days
- Method: ARL141 - Chlorophyll-a and Pheophytin-a in Water			
Chromium (VI)	Welshpool	Jul 29, 2025	1 Day
- Method: ARL316 - Hexavalent Chromium in Water by Discrete Analyser			
Chromium (III) (filtered)*	Welshpool	Jul 29, 2025	180 Days
- Method: ARL402/403 - Metals in Water by ICPOES/ICPMS			
Aro/Ali Split of TPH Water	Welshpool	Jul 29, 2025	7 Days
- Method: ARL111 - Aliphatic/Aromatic Split of TPH			
Heavy Metals	Welshpool	Jul 30, 2025	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Welshpool	Jul 29, 2025	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: DOT
Project ID: 304501863

Order No.: 304501863
Report #: 1249689
Phone: 0458 839 200
Fax:

Received: Jul 29, 2025 10:20 AM
Due: Aug 5, 2025
Priority: 5 Day
Contact Name: ALL INVOICES

Eurofins Analytical Services Manager : [redacted]

Sample Detail						Chlorophyll-a	Chromium (III) (filtered)*	Chromium (VI)	Metals M8	Aro/Ali Split of TPH Water	Eurofins Suite B19E	Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN
Perth Laboratory - NATA # 2377 Site # 2370 & 2554						X	X	X	X	X	X	X
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	SMB1	Jul 28, 2025		Water	L25-JI0076849	X	X	X	X	X	X	X
2	SMB1 DUP	Jul 28, 2025		Water	L25-JI0076850	X	X	X	X	X	X	X
3	SMB2	Jul 28, 2025		Water	L25-JI0076851	X	X	X	X	X	X	X
4	REF1	Jul 28, 2025		Water	L25-JI0076852	X	X	X	X	X	X	X
5	REF2	Jul 28, 2025		Water	L25-JI0076853	X	X	X	X	X	X	X
6	REF3	Jul 28, 2025		Water	L25-JI0076854	X	X	X	X	X	X	X
7	REF4	Jul 28, 2025		Water	L25-JI0076855	X	X	X	X	X	X	X
Test Counts						7	7	7	7	7	7	7

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Naphthalene	mg/L	< 0.001			0.001	Pass	
Ammonia (as N)	mg/L	< 0.02			0.02	Pass	
Chromium (VI)	mg/L	< 0.002			0.002	Pass	
Filterable Reactive Phosphorus	mg/L	< 0.01			0.01	Pass	
Nitrate (as N)	mg/L	< 0.01			0.01	Pass	
Nitrite (as N)	mg/L	< 0.01			0.01	Pass	
NOx (as N)	mg/L	< 0.01			0.01	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.02			0.02	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.02			0.02	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.04			0.04	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.04			0.04	Pass	
Method Blank							
Aro/Ali Split of TPH Water							
Aliphatic >C16-C35	mg/L	< 0.04			0.04	Pass	
Aromatic >C16-C35	mg/L	< 0.04			0.04	Pass	
Method Blank							
Heavy Metals							
Aluminium	mg/L	< 0.05			0.05	Pass	
Method Blank							
Metals M8							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0001			0.0001	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Total Nitrogen	mg/L	< 0.2			0.2	Pass	
Method Blank							
Total Nitrogen	mg/L	< 0.2			0.2	Pass	
Method Blank							
Total Phosphorus	mg/L	< 0.01			0.01	Pass	
Method Blank							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Phosphorus	mg/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Naphthalene	%	75			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	108			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	114			70-130	Pass	
Toluene	%	93			70-130	Pass	
Ethylbenzene	%	86			70-130	Pass	
m&p-Xylenes	%	95			70-130	Pass	
o-Xylene	%	90			70-130	Pass	
Xylenes - Total*	%	93			70-130	Pass	
LCS - % Recovery							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	83			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	85			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	91			80-120	Pass	
LCS - % Recovery							
Metals M8							
Arsenic	%	102			80-120	Pass	
Cadmium	%	102			80-120	Pass	
Chromium	%	104			80-120	Pass	
Copper	%	103			80-120	Pass	
Lead	%	101			80-120	Pass	
Mercury	%	97			80-120	Pass	
Nickel	%	105			80-120	Pass	
Zinc	%	101			80-120	Pass	
LCS - % Recovery							
Aro/Ali Split of TPH Water							
Aliphatic >C16-C35	%	104			60-120	Pass	
Aromatic >C16-C35	%	108			60-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Naphthalene	L25-JI0077712	NCP	%	75			70-130	Pass	
Total Nitrogen	L25-JI0075771	NCP	%	95			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	L25-JI0077712	NCP	%	102			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	L25-JI0077712	NCP	%	100			70-130	Pass	
Toluene	L25-JI0077712	NCP	%	91			70-130	Pass	
Ethylbenzene	L25-JI0077712	NCP	%	85			70-130	Pass	
m&p-Xylenes	L25-JI0077712	NCP	%	92			70-130	Pass	
o-Xylene	L25-JI0077712	NCP	%	87			70-130	Pass	
Xylenes - Total*	L25-JI0077712	NCP	%	91			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1					
TRH >C10-C16 (after silica gel clean-up)	L25-JI0077712	NCP	%	81			70-130	Pass	
Spike - % Recovery									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1					
TRH C10-C14 (after silica gel clean-up)	L25-JI0077712	NCP	%	82			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	L25-JI0076849	CP	%	98			75-125	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Cadmium	L25-JI0076849	CP	%	92			75-125	Pass	
Chromium	L25-JI0076849	CP	%	80			75-125	Pass	
Lead	L25-JI0076849	CP	%	82			75-125	Pass	
Mercury	L25-JI0076849	CP	%	92			75-125	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	L25-JI0076850	CP	%	88			80-120	Pass	
Chromium (VI)	L25-JI0076850	CP	%	99			80-120	Pass	
Filterable Reactive Phosphorus	L25-JI0076850	CP	%	113			80-120	Pass	
Nitrate (as N)	L25-JI0076850	CP	%	90			70-130	Pass	
Nitrite (as N)	L25-JI0076850	CP	%	100			80-120	Pass	
NOx (as N)	L25-JI0076850	CP	%	94			80-120	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	L25-JI0076851	CP	%	78			75-125	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Arsenic	L25-JI0076851	CP	%	106			75-125	Pass	
Cadmium	L25-JI0076851	CP	%	82			75-125	Pass	
Chromium	L25-JI0076851	CP	%	79			75-125	Pass	
Lead	L25-JI0076851	CP	%	77			75-125	Pass	
Mercury	L25-JI0076851	CP	%	80			75-125	Pass	
Nickel	L25-JI0076851	CP	%	77			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	L25-JI0076849	CP	mg/L	0.19	0.19	<1	20%	Pass	
Chromium (VI)	L25-JI0076849	CP	mg/L	< 0.002	< 0.002	<1	20%	Pass	
Filterable Reactive Phosphorus	L25-JI0076849	CP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
Nitrate (as N)	L25-JI0076849	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Nitrite (as N)	L25-JI0076849	CP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
NOx (as N)	L25-JI0076849	CP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
Duplicate									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH >C10-C16 (after silica gel clean-up)	L25-JI0077710	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C16-C34 (after silica gel clean-up)	L25-JI0077710	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C34-C40 (after silica gel clean-up)	L25-JI0077710	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	

Duplicate									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH C10-C14 (after silica gel clean-up)	L25-JI0077710	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C15-C28 (after silica gel clean-up)	L25-JI0077710	NCP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C29-C36 (after silica gel clean-up)	L25-JI0077710	NCP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C10-C36 (Total) (after silica gel clean-up)	L25-JI0077710	NCP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Naphthalene	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Total Nitrogen	L25-JI0076852	CP	mg/L	< 0.2	< 0.2	<1	30%	Pass	
Total Phosphorus	L25-JI0076852	CP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	L25-JI0076852	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	L25-JI0076852	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	L25-JI0076852	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	L25-JI0076852	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Cadmium	L25-JI0076852	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Chromium	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	L25-JI0076852	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	L25-JI0076852	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	L25-JI0076852	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	L25-JI0076853	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Cadmium	L25-JI0076853	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chromium	L25-JI0076853	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Copper	L25-JI0076853	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Lead	L25-JI0076853	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Mercury	L25-JI0076853	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Nickel	L25-JI0076853	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Zinc	L25-JI0076853	CP	mg/L	0.066	< 0.05	200	30%	Fail	Q15

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q05	The matrix spike concentration is less than five times the background concentration in the sample - therefore the spike recovery cannot be determined
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

[redacted]

[redacted]

General Manager

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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Appendix B Spoilbank Marina MEWQMP Summary Report Q2

Port Hedland Spoilbank Marina Project: MEWQMP Summary Report – Q2

Prepared for: Department of Transport

Date: 23/10/2025

Prepared by: [redacted]

Project: 304501863

Stantec Australia Pty Ltd

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
A01	23/10/2025	Q2 Report	JJ	JD	GS	TS

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1 Introduction

1.1 Background

The Spoilbank Marina, located on the western extent of the spoil bank sand formation in Port Hedland, was developed to replace the Richardson Street boat ramp and to redirect recreational boating traffic away from the commercial shipping channel within the inner harbour. Federal environmental approval for the project was granted by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) on 19 February 2021 (EPBC 2019/8520).

On 9 July 2024, DCCEEW approved the transfer of proponent responsibilities from Pilbara Ports (PP) to the Department of Transport and Major Infrastructure (DoTMI) (previously Department of Transport (DoT)). As the new proponent, DoTMI has assumed full operational responsibility for the Spoilbank Marina, including ongoing environmental management, monitoring, and maintenance in accordance with the approved Operational Environmental Management Plan (OEMP).

Within the OEMP, Marine Environment and Water Quality Management Plan (MEWQMP) outlines how the new proponent (DoTMI) will monitor marine water quality, sediment quality and accumulation of marine debris and how impacts to protected matters via the operation of the marina will be managed (O2Marine 2024). Monitoring frequency of physicochemical, toxicants and nutrients in marine water require quarterly sampling to satisfy the requirements of MEWQMP outlined in the OEMP.

1.2 Objectives

This report is submitted in partial fulfillment of Condition C6 of the Approval Decision Notice (2019/8520), which requires DOTMI to implement the OEMP. Specifically, this document summarises the outcomes of the second round of quarterly water quality sampling, completed on 25 September 2025, against the relevant trigger values set out in Section 3.

2 Methods

2.1 Sample Collection and Locations

Water quality samples for the testing of dissolved metals, hydrocarbons and chlorophyll-a, and physiochemical profiling of the water column were taken in accordance with the MEWQMP on 25 September 2025. Sampling was undertaken at two impact sites: one Moderate Ecological Protection Area (MEPA) site; one High Ecological Protection Area (HEPA) site; and four reference sites (**Figure 1**, **Table 1**). Three of the reference sites are situated approximately 100 to 1500m north of the marina, while the fourth legacy reference site is located roughly 7.7 kilometres west of the marina. Reference sites 1, 2 and 3 were added to the program in Q4 of 2025.

Table 1. Water quality sampling conducted at the Port Hedland Spoilbank Marina.

Site	Site Type	Latitude	Longitude	Metals (As, Cr, Cu, Pb, Ni, Cd, Hg, Zn, Al)	Chromium speciation (III, VI)	Chlorophyl-a	TPH aliphatic/aromatic (>C16-C35)	TRH - Silica gel clean up (NEPM Fractions) + BTEXN	Inorganics (NH3, NOx, FRP, NO2, TN, TP, TN)
SBM1	Impact (MEPA)	20° 18'25.19"S	118° 35'25.15"E	✓	✓	✓	✓	✓	✓
SBM2	Impact (HEPA)	20° 18'11.32"S	118° 35'12.56"E	✓	✓	✓	✓	✓	✓
REF1	Ref	20° 17'56.44"S	118° 35'11.69"E	✓	✓	✓	✓	✓	✓
REF2	Ref	20° 17'50.52"S	118° 35'14.20"E	✓	✓	✓	✓	✓	✓
REF3	Ref	20° 17'44.51"S	118° 35'16.75"E	✓	✓	✓	✓	✓	✓
REF4	Ref	20° 17'15.08"S	118° 30'52.82"E	✓	✓	✓	✓	✓	✓

Figure 1. Water quality sampling sites at the Port Hedland Spoilbank Marina.

2.2 Data Processing

Field data collected were subjected to standard data processing procedures prior to analysis as follows:

- Profile data were first filtered to remove spurious measurements in the top 0.5m and the lower 0.5m of the water column. Data at these levels were affected by microbubbles in the turbulent surface layers, and the contact with sediments in the lower strata of the water column.
- Median values for each profile were calculated and compared against the numerical EQGs in EPA (2017) and the EQGs in Table 9 of Appendix A of the OEMP where appropriate.
- Laboratory water quality results were tabulated and compared against the numerical EQGs in EPA (2017).

2.3 QA/QC

Processed data was subjected to standard quality assurance procedures prior to the analysis as follows:

- Manual QA/QC checks were completed on the physiochemical data refinement and outlier removal process.
- Field sampling included duplicate samples and met sample holding time requirements.
- All laboratory water quality analysis was completed at a NATA accredited laboratory and abides by QA/QC requirements as part of the accreditation.
- 4-bromofluorobenzene (surr.) (BFB) is employed as a surrogate standard in environmental laboratory analysis, particularly in methods involving volatile organic compounds (VOCs). It is added to samples prior to extraction and analysis to monitor the performance of the analytical process. BFB is not naturally present in environmental matrices, making it ideal for assessing method accuracy and recovery efficiency. Its consistent recovery confirms that sample preparation, instrument calibration, and analytical conditions are functioning correctly, thereby validating the reliability of the reported results.

3 Results

3.1 Physicochemical Stressors

Results of the physico-chemical profiling and chlorophyll-a sampling events on 25 September 2025 are detailed in **Table 2** and summarised briefly below.

- Chlorophyll-a concentrations were consistently below the LOR and met the EQGs (both those listed in Table 9 of Appendix A of the OEMP (O2Marine 2023) and EPA (2017).
- The median water temperature marginally exceeded the EPA's EQGs. Although temperatures at the marina site were 0.3 to 0.8 °C lower than those recorded at the reference sites, the values were within the expected seasonal range for the Pilbara in September and do not present a risk to marine fauna or broader ecosystem functioning.
- EC concentrations exceeded the EPA's EQGs. Justification as to why this does not pose a risk to marine wildlife and the broader ecosystems is provided in **section 4.1.**
- pH values of 8.13 to 8.32 were within the normal range for Pilbara waters. The pH value of 8.13 recorded at the MEPA site marginally exceeded the EPA's EQG for a moderate level of ecological protection but remained compliant with the legacy OEMP EQG trigger.
- Salinity marginally exceeded the EPA's EQG trigger values, however remained complaint with the legacy OEMP salinity triggers. This marginal salinity increase from EPA EQG's triggers, does not pose any risks to marine life or broader ecosystems.
- Turbidity concentrations exceeded the EPA's EQGs at both the MEPA and HEPA sites. The exceedance at SBM2 was marginal and remained lower than the values recorded at three of the reference sites. In contrast, turbidity at SBM1 exceeded both the legacy OEMP trigger and the EPA's EQGs.

Exceedances of physicochemical stressor EQGs were observed in some instances. These exceedances may be attributed to the timing of sampling, coinciding with seasonal conditions typical of September in Port Hedland—characterised by warm, dry weather during the late dry season in the Pilbara region. For further discussion on contingency monitoring requirements in relation to the EQS, refer to Section 4.

Table 2. Median physico-chemical measurements obtained on the 25 September 2025 against the respective OEMP and EPA environmental quality guidelines.

	OEMP EQG (MEPA)[1]	OEMP EQG (HEPA)[1]	EPA EQG (MEPA)[2]	EPA EQG (HEPA)[2]	LOR	Unit	SBM1 (MEPA)	SBM2 (HEPA)	REF1	REF2	REF3	REF4
Chlorophyll-a	0.001	0.001	< 0.001	< 0.001	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Temperature	20.90 - 25.50	21.40 - 24.0	22.06 - 22.20	22.02 - 22.20	-	°C	21.70	21.40	22.00	22.20	22.20	22.10
DO	>97.3	>99.6	80	90	-	%	94.20	97.90	97.90	97.80	98.30	97.60
EC	N/A	N/A	52946.40 - 53200.20	52829.85 – 53221.80	-	uS/cm	52739.50	52527.50	53050	53181	53229	52791
Salinity	32.8 - 38.9	32.9 - 38.9	37.31 - 37.42	37.20 – 37.43	-	PPT	37.48	37.59	37.43	37.40	37.42	37.17
pH	7.9 - 8.35	8.17 - 8.35	8.20 – 8.22	8.19 – 8.24	-	pH	8.13	8.21	8.20	8.20	8.19	8.25
Turbidity	9.1	6.7	4.67	4.64	-	NTU	10.76	5.63	6.75	6.73	7.39	3.23

Notes: 1. Interim EQGs calculated from three-year data base from PHMEQSAP (O2 Marine 2023).; 2. EQGs as per the EPA's guidance (EPA 2017). The EPA's EQGs for temperature, EC, salinity, pH and turbidity are the 80th and 95th percentile values of the combined reference sites (n=4). Only the 20th and 5th percentile values were used for DO. Orange and blue cells represent exceedances of the HEPA and MEPA triggers respectively. The EPA's trigger values are considered more appropriate than the legacy OEMP triggers and are less likely to yield false positive results.

3.2 Toxicants in Water

3.2.1 Dissolved Metals

Results of the water quality sampling for heavy metals are detailed in **Table 3** and summarised briefly below. The laboratory certificate for the analysis is provided in **Appendix A**.

- Measurements of heavy metals at both SBM 1 (MEPA) and SBM 2 (HEPA) met their respective EQGs.

The EQGs for dissolved metals were met. There was therefore no requirement to conduct further monitoring against the EQS.

3.2.2 Hydrocarbons

Results of the water quality sampling for hydrocarbons are detailed in **Table 4** and summarised briefly below. Laboratory certificate for analysis is provided in **Appendix A.**

- None of the measured hydrocarbon concentrations measured exceeded the EQGs listed in Table 9 of Appendix A of the OEMP.

The EQGs for hydrocarbons were met. There was therefore no requirement to conduct further monitoring against the EQS.

Results

Table 3. Heavy metal concentrations recorded on the 25 September 2025 compared against the respective OEMP environmental quality guidelines.

Metal	EQG (MEPA)	EQG (HEPA)	LOR	Unit	SBM1 (MEPA)	SBM2 (HEPA)	REF1	REF2	REF2 Duplicate	REF3	REF4
Aluminium	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05
Arsenic	0.003	0.003	0.001	mg/L	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Cadmium	0.014	0.0007	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chromium (VI)	0.049	0.0077	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chromium (III)	0.02	0.00014	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002
Copper	0.003	0.0003	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Lead	0.0066	0.0022	0.001	mg/L	0.003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Mercury	0.0007	0.0001	0.0001	mg/L	< 0.0001	< 0.001*	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001*
Nickel	0.2	0.007	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Zinc*	0.012	0.0033	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP MEPA and HEPA EQG triggers respectively.

*The LORs have been raised due to matrix interference

Table 4. Hydrocarbon concentrations recorded on the 25 September 2025 compared against the respective OEMP environmental quality guidelines.

Hydrocarbon	EQG (MEPA)	EQG (HEPA)	LOR	Unit	SBM1	SBM2	REF1	REF2	REF2 Duplicate	REF3	REF4
TRH - 1999 NEPM Fractions											
TRH C6-C9	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C15-C28	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
TRH C29-C36	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
TRH C10-C36	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
BTEX											
Benzene	0.9	0.5	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.23	0.11	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.11	0.05	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	-	-	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	-	-	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.1	0.05	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	-	-	1	%	86	79	90	92	95	96	92
TRH - 2013 NEPM Fractions											
Naphthalene^{N02}	0.09	0.05	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TRH >C10-C16 less Naphthalene(F2)	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total)	-	-	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10 less BTEX (F1)^{N04}	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C16-C34	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C34-C40	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total)	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aro/Ali Split of TPH Water											

Results

Hydrocarbon	EQG (MEPA)	EQG (HEPA)	LOR	Unit	SBM1	SBM2	REF1	REF2	REF2 Duplicate	REF3	REF4
Aliphatic >C16-C35	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04

Notes: 1. EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQG triggers respectively.

3.3 Nutrients in Water

Results of the water quality sampling for nutrients are provided in **Table 5** and summarised briefly below.

- With the exception of Total Kjeldahl Nitrogen (TKN) and Total nitrogen (TN), all nutrient concentrations met their respective EQGs.
- TKN and TN concentrations exceeded their respective EQG trigger values at SBM2.
- The exceedance for TKN and TN was marginal, at just 0.04 ug/L above the trigger, and within the range of the other reference sites.
- Based on this, the exceedance was not considered of ecological significance.

The EQGs for nutrients were met with the exception of TKN and TN. The exceedances for TKN and TN were restricted to SBM2. See Section 4 for comments on the need for contingency monitoring against the EQS.

Table 5. Nutrient concentrations recorded on the 28 September 2025 compared against the respective EPA environmental quality guidelines.

Nutrient	EPA EQG (MEPA)	EPA EQG (HEPA)	LOR	Unit	SBM1 (MEPA)	SBM2 (HEPA)	REF 1	REF2	REF2 Duplicate	REF3	REF4
Ammonia (as N)	0.136	0.094	0.02	mg/L	0.08	0.05	0.03	0.08	< 0.02	< 0.02	0.15
Nitrate (as N)	-	-	0.01	mg/L	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrite (as N)	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
NOx (as N)	-	-	0.01	mg/L	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	1.26	1.14	0.2	mg/L	1.1	1.3	1.3	0.8	0.8	1.1	0.8
Total Nitrogen	1.26	1.14	0.2	mg/L	1.1	1.3	1.3	0.8	0.8	1.1	0.8
Total Phosphorus	-	-	0.01	mg/L	0.04	0.04	0.03	0.03	0.04	0.03	0.03
Filterable Reactive Phosphorus	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorophyll -a	0.0005	0.0005	0.01	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Notes: 1. EQGs as per the EPAs guidance (EPA 2017). The EPA EQG nutrient thresholds correspond to the 95th percentile for MEPA and the 80th percentile for HEPA, based on (n=5) from the combined reference sites. Orange and blue cells indicate exceedances of the OEMP EQG trigger values for HEPA and MEPA, respectively.

4 Discussion

4.1 Physicochemical Stressors in Water

Water temperatures at the MEPA (SBM1) and HEPA (SBM2) sites (21.40 - 21.70 ^{o}C) were 0.3 to 0.8^{o}C lower than those recorded at the reference sites (22.02 - 22.20^{o}C). While these differences were sufficient to exceed the winter EQGs as listed in the OEMP and the EPA's EQGs, they were marginal and well within the range expected of Pilbara near-shore waters in late September (Beggs et al, 2020). The observed exceedances in water temperatures are likely an artefact of the timing of sampling, which at SBM1 and SBM2 commenced in the early morning, relative to the other sites which were sampled later in the day.

Turbidity at the two impact sites, SBM1 and SBM2, ranged from 5.63 to 10.76 NTU, exceeding both the legacy OEMP and the EPA's EQGs. Notably, turbidity at SBM2 was lower than at three of the four reference sites, which recorded values between 6.39 and 6.73 NTU. The elevated turbidity recorded at SBM1 is likely a result of the reduced flushing capacity within the marina channel relative to the more open-water conditions at SBM2 and the reference sites. This effect may be further enhanced by vessel traffic within the channel and by a sampling artefact associated with sediment resuspension caused by vessel movement during collection.

EC values recorded at SBM1 (52,739.50 µS/cm) and SBM2 (52,527.50 µS/cm) were marginally below the EPA's EQG trigger values. The exceedance range for the MEPA and HEPA EQGs was 206.9 to 418.9 µS/cm, indicating that although the deviation was relatively small, it was sufficient to exceed the lower bound of the EC guideline threshold. In coastal Western Australia, especially in the Pilbara and Kimberley regions, conductivity can vary slightly due to temperature fluctuations freshwater inflows from rivers or rainfall and evaporation in shallow coastal areas. Marine waters in coastal Western Australia typically exhibit EC values between 50,000 and 60,000 µS/cm, reflecting the naturally high salinity of semi-enclosed, shallow, and warm environments such as Port Hedland's inner harbour (Qasem et al., 2023). The EC levels at both SBM1 and SBM2 fall within the tolerance limits of local marine flora and fauna, and are therefore considered not ecologically significant (EPA, 2019).

4.2 Toxicants in Water

Measurements of heavy metals at SBM1 and SBM 2 met their respective EQGs. None of the measured hydrocarbon concentrations measured on the 25 September 2025 exceeded the EQGs listed in Table 9 of Appendix A of the OEMP. All other measurements were below the limit of reporting (LOR). 4-bromofluorobenzene (surr.) (BFB) is employed as a surrogate standard in environmental laboratory analysis, prior to extraction and is used to monitor the performance of the analytical process. BFB is not naturally present in environmental matrices, making it ideal for assessing method accuracy and recovery efficiency.

Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

4.3 Nutrients in Water

Nutrient monitoring is a new addition to the Spoilbank Marina OEMP, continuing from the previous sampling round and completed on 28 July 2025. The EQGs for nutrients were developed based on EPA (2017) which advocates the use of the 80th and 95th percentiles of the reference sites as triggers for a moderate and high level of ecosystem protection respectively.

Except for TKN and TN, nutrient concentrations at SBM1 and SBM2 met their respective EQGs. Although the TKN and TN values at SBM2 were within the range of the reference sites, they marginally exceeded the EQG by 0.04 µg L^{-1}. While the EQGs for nutrients are set using the 80th and 95th percentile of reference data, it is noted that the EPA's primary trigger for nutrient enrichment is chlorophyll-a, which remained below detection in all Q2 samples. On this basis, water quality within the marina was considered to meet the EPA criteria for a high level of ecosystem protection, and no further monitoring or assessment against the EQSs was required.

If future monitoring shows repeated exceedances of TKN and TN above the 80th-percentile site-specific trigger value, this may indicate emerging nutrient enrichment at the site. Consistent with the ANZG (2018) water quality guidelines, any such exceedance should be evaluated using a weight-of-evidence framework. Recommended actions include:

1. Conduct additional monitoring to determine whether elevated TKN and TN concentrations are persistent and whether they vary spatially or seasonally.
2. Although chlorophyll-a remained below the site-specific trigger at SBM2, complementary indicators such as dissolved oxygen and biological responses (for example, macroinvertebrate assemblages) should be assessed to determine whether ecological effects are occurring.
3. Investigate potential nitrogen sources, including catchment land use, stormwater inflows and any relevant point-source discharges, to better understand the origin of elevated TKN and TN.

These steps would provide a more robust basis for evaluating ecological risk and informing any management measures required to maintain or improve water quality.

5 Conclusion

Water quality within the marina is of an acceptable quality and within the range expected for Pilbara waters in the Australia spring. Based on these results, there was no requirement to conduct further monitoring against the EQS. EQO1 was achieved.

6 References

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Appendices

Appendix A Laboratory Results Certificate

Stantec Australia Pty Limited
6F 226,Adelaide Terrace
Perth
WA 6000

NATA Accredited
Accreditation Number 2377
Site Number 2370 & 2554

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: [redacted]

Report **1273330-W**
Project name DOT
Project ID 304501863
Received Date Sep 26, 2025

Client Sample ID			**SMB1**	**SMB2**	**REF1**	**REF2**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**L25-Se0084246**	**L25-Se0084247**	**L25-Se0084248**	**L25-Se0084249**
Date Sampled			**Sep 25, 2025**	**Sep 25, 2025**	**Sep 25, 2025**	**Sep 25, 2025**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	86	79	90	92
BTEX and Naphthalene						
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Recoverable Hydrocarbons						
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	0.08	0.05	0.03	0.08
Chlorophyll-a	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Filterable Reactive Phosphorus	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate (as N)	0.01	mg/L	0.03	< 0.01	< 0.01	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
NOx (as N)	0.01	mg/L	0.03	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	1.1	1.3	1.3	0.8
Total Nitrogen	0.2	mg/L	1.1	1.3	1.3	0.8
Total Phosphorus	0.01	mg/L	0.04	0.04	0.03	0.03
Chromium (III) (filtered)*	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05

Client Sample ID			SMB1	SMB2	REF1	REF2
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L25-Se0084246	L25-Se0084247	L25-Se0084248	L25-Se0084249
Date Sampled			Sep 25, 2025	Sep 25, 2025	Sep 25, 2025	Sep 25, 2025
Test/Reference	LOR	Unit				
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water						
Aliphatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Metals M8 filtered						
Arsenic (filtered)	0.001	mg/L	0.003	0.003	0.002	0.002
Cadmium (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	0.003	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	[G01]< 0.001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Heavy Metals (filtered)						
Aluminium (filtered)	0.05	mg/L	-	< 0.05	< 0.05	< 0.05

Client Sample ID			REF2 DUP	REF3	REF4
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L25-Se0084250	L25-Se0084251	L25-Se0084252
Date Sampled			Sep 25, 2025	Sep 25, 2025	Sep 25, 2025
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02
BTEX					
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	95	96	92
BTEX and Naphthalene					
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001
Total Recoverable Hydrocarbons					
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	< 0.02	< 0.02	0.15
Chlorophyll-a	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chromium (VI)	0.002	mg/L	< 0.002	< 0.002	< 0.002
Filterable Reactive Phosphorus	0.01	mg/L	< 0.01	< 0.01	< 0.01
Nitrate (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01

Client Sample ID			REF2 DUP	REF3	REF4
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L25-Se0084250	L25-Se0084251	L25-Se0084252
Date Sampled			Sep 25, 2025	Sep 25, 2025	Sep 25, 2025
Test/Reference	LOR	Unit			
NOx (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	0.8	1.1	0.8
Total Nitrogen	0.2	mg/L	0.8	1.1	0.8
Total Phosphorus	0.01	mg/L	0.04	0.03	0.03
Chromium (III) (filtered)*	0.002	mg/L	< 0.002	< 0.002	< 0.002
TRH - 2013 NEPM Fractions (after silica gel clean-up)					
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH - 1999 NEPM Fractions (after silica gel clean-up)					
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water					
Aliphatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04
Metals M8 filtered					
Arsenic (filtered)	0.001	mg/L	0.002	0.002	0.002
Cadmium (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	[G01] < 0.001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005
Heavy Metals (filtered)					
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
BTEX	Welshpool	Sep 30, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX and Naphthalene	Welshpool	Sep 30, 2025	N/A
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Welshpool	Sep 30, 2025	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Welshpool	Sep 30, 2025	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Ammonia (as N)	Welshpool	Sep 30, 2025	28 Days
- Method: ARL303 - Ammonia in Water by Discrete Analyser			
Filterable Reactive Phosphorus	Welshpool	Sep 30, 2025	28 Days
- Method: ARL309 - Filterable Reactive Phosphorus in Water by Discrete Analyser			
Nitrate (as N)	Welshpool	Sep 30, 2025	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Nitrite (as N)	Welshpool	Sep 30, 2025	2 Days
- Method: ARL311 - Nitrite in Water by Discrete Analyser			
NOx (as N)	Welshpool	Sep 30, 2025	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Total Kjeldahl Nitrogen	Welshpool	Sep 26, 2025	28 Day
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Nitrogen	Welshpool	Sep 30, 2025	28 Days
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Phosphorus	Welshpool	Sep 30, 2025	28 Days
- Method: ARL308 - Total Phosphorus in Water by Discrete Analyser			
Chlorophyll-a	Welshpool	Sep 30, 2025	28 Days
- Method: ARL141 - Chlorophyll-a and Pheophytin-a in Water			
Chromium (VI)	Welshpool	Sep 30, 2025	1 Day
- Method: ARL316 - Hexavalent Chromium in Water by Discrete Analyser			
Chromium (III) (filtered)*	Welshpool	Sep 26, 2025	180 Days
- Method: ARL402/403 - Metals in Water by ICPOES/ICPMS			
Aro/Ali Split of TPH Water	Welshpool	Sep 30, 2025	7 Days
- Method: ARL111 - Aliphatic/Aromatic Split of TPH			
Metals M8 filtered	Welshpool	Sep 30, 2025	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Welshpool	Sep 30, 2025	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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WA 6000

Project Name: DOT
Project ID: 304501863

Order No.:
Report #: 1273330
Phone: 0458 839 200
Fax:

Received: Sep 26, 2025 10:35 AM
Due: Oct 6, 2025
Priority: 5 Day
Contact Name: [redacted]

Eurofins Analytical Services Manager : [redacted]

Sample Detail						Aluminium	Chlorophyll-a	Chromium (III)*	Chromium (VI)	Metals M8	Aro/Ali Split of TPH Water	Eurofins Suite B19E	Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN
Perth Laboratory - NATA # 2377 Site # 2370 & 2554						X	X	X	X	X	X	X	X
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	SMB1	Sep 25, 2025		Water	L25-Se0084246	X	X	X	X	X	X	X	X
2	SMB2	Sep 25, 2025		Water	L25-Se0084247	X	X	X	X	X	X	X	X
3	REF1	Sep 25, 2025		Water	L25-Se0084248	X	X	X	X	X	X	X	X
4	REF2	Sep 25, 2025		Water	L25-Se0084249	X	X	X	X	X	X	X	X
5	REF2 DUP	Sep 25, 2025		Water	L25-Se0084250	X	X	X	X	X	X	X	X
6	REF3	Sep 25, 2025		Water	L25-Se0084251	X	X	X	X	X	X	X	X
7	REF4	Sep 25, 2025		Water	L25-Se0084252	X	X	X	X	X	X	X	X
Test Counts						7	7	7	7	7	7	7	7

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
BTEX and Naphthalene							
Naphthalene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.02			0.02	Pass	
Chromium (VI)	mg/L	< 0.002			0.002	Pass	
Filterable Reactive Phosphorus	mg/L	< 0.01			0.01	Pass	
Nitrate (as N)	mg/L	< 0.01			0.01	Pass	
Nitrite (as N)	mg/L	< 0.01			0.01	Pass	
NOx (as N)	mg/L	< 0.01			0.01	Pass	
Total Nitrogen	mg/L	< 0.2			0.2	Pass	
Total Phosphorus	mg/L	< 0.01			0.01	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.02			0.02	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.02			0.02	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.04			0.04	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.04			0.04	Pass	
Method Blank							
Aro/Ali Split of TPH Water							
Aliphatic >C16-C35	mg/L	< 0.04			0.04	Pass	
Aromatic >C16-C35	mg/L	< 0.04			0.04	Pass	
Method Blank							
Metals M8 filtered							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0001			0.0001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals (filtered)							
Aluminium (filtered)	mg/L	< 0.05			0.05	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C9	%	106			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	106			70-130	Pass	
Toluene	%	99			70-130	Pass	
Ethylbenzene	%	93			70-130	Pass	
m&p-Xylenes	%	102			70-130	Pass	
o-Xylene	%	87			70-130	Pass	
Xylenes - Total*	%	97			70-130	Pass	
LCS - % Recovery							
BTEX and Naphthalene							
Naphthalene	%	81			70-130	Pass	
LCS - % Recovery							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	119			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	114			70-130	Pass	
LCS - % Recovery							
Aro/Ali Split of TPH Water							
Aliphatic >C16-C35	%	96			60-120	Pass	
Aromatic >C16-C35	%	90			60-120	Pass	
LCS - % Recovery							
Metals M8 filtered							
Arsenic (filtered)	%	109			80-120	Pass	
Cadmium (filtered)	%	100			80-120	Pass	
Chromium (filtered)	%	109			80-120	Pass	
Copper (filtered)	%	104			80-120	Pass	
Lead (filtered)	%	100			80-120	Pass	
Mercury (filtered)	%	110			80-120	Pass	
Nickel (filtered)	%	106			80-120	Pass	
Zinc (filtered)	%	110			80-120	Pass	
LCS - % Recovery							
Heavy Metals (filtered)							
Aluminium (filtered)	%	110			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	L25-Se0084246	CP	%	105			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	L25-Se0084246	CP	%	108			70-130	Pass	
Toluene	L25-Se0084246	CP	%	98			70-130	Pass	
Ethylbenzene	L25-Se0084246	CP	%	92			70-130	Pass	
m&p-Xylenes	L25-Se0084246	CP	%	102			70-130	Pass	
o-Xylene	L25-Se0084246	CP	%	89			70-130	Pass	
Xylenes - Total*	L25-Se0084246	CP	%	98			70-130	Pass	
Spike - % Recovery									
BTEX and Naphthalene				Result 1					
Naphthalene	L25-Se0084246	CP	%	96			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Nitrogen	L25-Se0084246	CP	%	110			70-130	Pass	
Total Phosphorus	L25-Se0082238	NCP	%	105			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Metals M8 filtered				Result 1					
Arsenic (filtered)	L25-Se0084246	CP	%	140			75-125	Fail	Q08
Cadmium (filtered)	L25-Se0084246	CP	%	101			75-125	Pass	
Chromium (filtered)	L25-Se0084246	CP	%	92			75-125	Pass	
Copper (filtered)	L25-Se0084246	CP	%	70			75-125	Fail	Q08
Lead (filtered)	L25-Se0084246	CP	%	84			75-125	Pass	
Mercury (filtered)	L25-Se0084246	CP	%	89			75-125	Pass	
Nickel (filtered)	L25-Se0084246	CP	%	74			75-125	Fail	Q08
Zinc (filtered)	L25-Se0084246	CP	%	77			75-125	Pass	
Spike - % Recovery									
Heavy Metals (filtered)				Result 1					
Aluminium (filtered)	L25-Se0084246	CP	%	130			75-125	Fail	Q08
Spike - % Recovery									
				Result 1					
Ammonia (as N)	L25-Se0084247	CP	%	88			80-120	Pass	
Chromium (VI)	L25-Se0084247	CP	%	104			80-120	Pass	
Filterable Reactive Phosphorus	L25-Se0084247	CP	%	103			80-120	Pass	
Nitrate (as N)	L25-Se0084247	CP	%	97			70-130	Pass	
Nitrite (as N)	L25-Se0084247	CP	%	98			80-120	Pass	
NOx (as N)	L25-Se0084247	CP	%	97			80-120	Pass	
Spike - % Recovery									
Metals M8 filtered				Result 1					
Mercury (filtered)	L25-Se0084247	CP	%	81			75-125	Pass	
Spike - % Recovery									
Metals M8 filtered				Result 1					
Arsenic (filtered)	L25-Se0084252	CP	%	113			75-125	Pass	
Cadmium (filtered)	L25-Se0084252	CP	%	115			75-125	Pass	
Chromium (filtered)	L25-Se0084252	CP	%	121			75-125	Pass	
Lead (filtered)	L25-Se0084252	CP	%	98			75-125	Pass	
Mercury (filtered)	L25-Se0084252	CP	%	89			75-125	Pass	
Nickel (filtered)	L25-Se0084252	CP	%	111			75-125	Pass	
Spike - % Recovery									
Heavy Metals (filtered)				Result 1					
Aluminium (filtered)	L25-Se0084252	CP	%	112			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	L25-Se0083694	NCP	mg/L	0.05	0.05	<1	20%	Pass	
Chromium (VI)	L25-Se0084246	CP	mg/L	< 0.002	< 0.002	<1	20%	Pass	
Filterable Reactive Phosphorus	L25-Se0084246	CP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
Nitrate (as N)	L25-Se0084246	CP	mg/L	0.03	0.03	3.0	30%	Pass	
Nitrite (as N)	L25-Se0084246	CP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
NOx (as N)	L25-Se0084246	CP	mg/L	0.03	0.03	3.0	20%	Pass	
Total Nitrogen	L25-Se0083359	NCP	mg/L	0.3	0.3	1.0	30%	Pass	
Total Phosphorus	L25-Se0083359	NCP	mg/L	0.03	0.03	1.0	20%	Pass	
Duplicate									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH >C10-C16 (after silica gel clean-up)	L25-Se0084248	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C16-C34 (after silica gel clean-up)	L25-Se0084248	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C34-C40 (after silica gel clean-up)	L25-Se0084248	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	

Duplicate									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH C10-C14 (after silica gel clean-up)	L25-Se0084248	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C15-C28 (after silica gel clean-up)	L25-Se0084248	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C29-C36 (after silica gel clean-up)	L25-Se0084248	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C10-C36 (Total) (after silica gel clean-up)	L25-Se0084248	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	L25-Se0084252	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	L25-Se0084252	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	L25-Se0084252	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
BTEX and Naphthalene				Result 1	Result 2	RPD			
Naphthalene	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH >C10-C16 (after silica gel clean-up)	L25-Se0084252	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C16-C34 (after silica gel clean-up)	L25-Se0084252	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C34-C40 (after silica gel clean-up)	L25-Se0084252	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH C10-C14 (after silica gel clean-up)	L25-Se0084252	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C15-C28 (after silica gel clean-up)	L25-Se0084252	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C29-C36 (after silica gel clean-up)	L25-Se0084252	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C10-C36 (Total) (after silica gel clean-up)	L25-Se0084252	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
Duplicate									
Metals M8 filtered				Result 1	Result 2	RPD			
Arsenic (filtered)	L25-Se0084252	CP	mg/L	0.002	0.002	3.0	30%	Pass	
Cadmium (filtered)	L25-Se0084252	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Chromium (filtered)	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	L25-Se0084252	CP	mg/L	< 0.001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	L25-Se0084252	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	L25-Se0084252	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals (filtered)				Result 1	Result 2	RPD			
Aluminium (filtered)	L25-Se0084252	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.

Authorised by:

[redacted]

[redacted]

[redacted]

General Manager

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

Stantec

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Appendix C Spoilbank Marina MEWQMP Summary Report Q3

Port Hedland Spoilbank Marina Project: MEQMP Summary Report – Q3

Prepared for: Department of Transport and Major Infrastructure

Date: 27/03/2026

Project: 304501863

Prepared by: [redacted]

Stantec Australia Pty Ltd

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
A01	27/03/2026	Q3 Report	JJ	JD	ET	TS

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1 Introduction

1.1 Background

The Spoilbank Marina, located on the western extent of the spoil bank sand formation in Port Hedland, was developed to replace the Richardson Street boat ramp and to redirect recreational boating traffic away from the commercial shipping channel within the inner harbour. Federal environmental approval for the project was granted by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) on 19 February 2021 (EPBC 2019/8520).

On 9 July 2024, DCCEEW approved the transfer of proponent responsibilities from Pilbara Ports (PP) to the Department of Transport and Major Infrastructure (DoTMI) (previously Department of Transport (DoT)). As the new proponent, DoTMI has assumed full operational responsibility for the Spoilbank Marina, including ongoing environmental management, monitoring, and maintenance in accordance with the approved Operational Environmental Management Plan (OEMP).

Within the OEMP, the Marine Environmental Quality Management Plan (MEQMP) outlines how the new proponent (DoTMI) will monitor marine water quality, sediment quality and accumulation of marine debris and how impacts to protected matters via the operation of the marina will be managed (O2Marine 2024). Monitoring frequency of physicochemical, toxicants and nutrients in marine water require quarterly sampling to satisfy the requirements of MEQMP outlined in the OEMP.

1.2 Objectives

This report is submitted in partial fulfillment of Condition C6 of the Approval Decision Notice (2019/8520), which requires DoTMI to implement the OEMP. Specifically, this document summarises the outcomes of the third round of quarterly water quality analysis and the annual sediment quality analysis, completed on 20 February 2026, against the relevant EQGs set out in Section 3.

2 Methods

2.1 Sample Collection and Locations

Water quality samples for the testing of dissolved metals, hydrocarbons and chlorophyll-a, and physiochemical profiling of the water column were taken in accordance with the MEQMP on 20 February 2026. Similarly, sediment quality samples were collected for the testing of dissolved metals and hydrocarbons in accordance with the MEQMP.

Sampling for both sediment and water was undertaken at two impact sites: one Moderate Ecological Protection Area (MEPA) site; one High Ecological Protection Area (HEPA) site; and four reference sites (**Figure 1**, **Table 2-1**,**Table 2-2**). Three of the reference sites are situated approximately 100 to 1500 m north of the marina, while the fourth legacy reference site is located roughly 7.7 km west of the marina. Reference sites 1, 2 and 3 were added to the program in Q4 of 2025.

Table 2-1. Water quality sampling conducted at the Port Hedland Spoilbank Marina.

Site	Site Type	Latitude	Longitude	Metals (As, Cr, Cu, Pb, Ni, Cd, Hg, Zn, Al)	Chromium speciation (III, VI)	Chlorophyl-a	TPH aliphatic/aromatic (>C16-C35)	TRH - Silica gel clean up (NEPM Fractions) + BTEXN	Inorganics (NH3, NOx, FRP, NO2, TN, TP, TN)
SBM1	Impact (MEPA)	20° 18'25.19"S	118° 35'25.15"E	✓	✓	✓	✓	✓	✓
SBM2	Impact (HEPA)	20° 18'11.32"S	118° 35'12.56"E	✓	✓	✓	✓	✓	✓
REF1	Ref	20° 17'56.44"S	118° 35'11.69"E	✓	✓	✓	✓	✓	✓
REF2	Ref	20° 17'50.52"S	118° 35'14.20"E	✓	✓	✓	✓	✓	✓
REF3	Ref	20° 17'44.51"S	118° 35'16.75"E	✓	✓	✓	✓	✓	✓
REF4	Ref	20° 17'15.08"S	118° 30'52.82"E	✓	✓	✓	✓	✓	✓

Table 2-2: Sediment quality sampling conducted at the Port Hedland Spoilbank Marina.

Site	Site Type	Latitude	Longitude	Metals (As, Ca, Cr, Cu, Pb, Hg, Ni, Zn, Al)	TRH C6-C36 (NEPM Fractions) + BTEX	PAH (Low Molecular Weight)*	PAH (High Molecular Weight)*	PAH (Total)
SBM1	Impact (MEPA)	20° 18'25.19"S	118° 35'25.15"E	✓	✓	✓	✓	✓
SBM2	Impact (HEPA)	20° 18'11.32"S	118° 35'12.56"E	✓	✓	✓	✓	✓
REF1	Ref	20° 17'56.44"S	118° 35'11.69"E	✓	✓	✓	✓	✓
REF2	Ref	20° 17'50.52"S	118° 35'14.20"E	✓	✓	✓	✓	✓
REF3	Ref	20° 17'44.51"S	118° 35'16.75"E	✓	✓	✓	✓	✓
REF4	Ref	20° 17'15.08"S	118° 30'52.82"E	✓	✓	✓	✓	✓

*Notes: *Low molecular weight PAHs is the sum of acenaphthalene, anthracene, fluorene, 2-methylnaphthalene, naphthalene and phenanthrene; High molecular weight PAHs is the sum of benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a.h)anthracene, fluoranthene and pyrene.*

Figure 1. Water and sediment quality sampling sites at the Port Hedland Spoilbank Marina.

2.2 Data Processing

Field data collected were subjected to standard data processing procedures prior to analysis as follows:

- Physicochemical profile data were first filtered to remove spurious measurements in the top 0.5 m and the lower 0.5 m of the water column. Data at these levels were affected by microbubbles in the turbulent surface layers, and the contact with sediments in the lower strata of the water column.
- Median values for each physicochemical profile were calculated and compared against the numerical EQGs in EPA (2017) and the legacy EQGs in Table 9 of Appendix A of the OEMP where appropriate.
- Laboratory results for toxicants in water and sediment were tabulated and compared against the numerical EQGs in EPA (2017), and the legacy EQGs in Table 9 of Appendix A of the OEMP where appropriate.

2.3 QA/QC

Processed data was subjected to standard quality assurance procedures prior to the analysis as follows:

- Manual QA/QC checks were completed on the physiochemical data refinement and outlier removal process.
- Field sampling included duplicate samples and met sample holding time requirements.
- All laboratory water and sediment quality analysis was completed at a NATA accredited laboratory and abides by QA/QC requirements as part of the accreditation.
- 4-bromofluorobenzene (surr.) (BFB) is employed as a surrogate standard in environmental laboratory analysis, particularly in methods involving volatile organic compounds (VOCs). It is added to samples prior to extraction and analysis to monitor the performance of the analytical process. BFB is not naturally present in environmental matrices, making it ideal for assessing method accuracy and recovery efficiency. Its consistent recovery confirms that sample preparation, instrument calibration, and analytical conditions are functioning correctly, thereby validating the reliability of the reported results.

3 Results

3.1 Physicochemical Stressors in Water

Results of the physicochemical profiling and chlorophyll-a sampling events on 20 February 2026 are detailed in **Table 3-1** and summarised briefly below.

- Chlorophyll-a concentrations met the EPA EQGs and the legacy MEPA EQG (listed in Table 9 of Appendix A of the OEMP (O2Marine 2024)). Chlorophyll-a concentrations at SBM2 marginally exceeded the HEPA legacy EQG, however, they met the EPA EQGs and were similar to the results collected at the four reference sites.
- The median water temperature, DO, electrical conductivity, salinity and pH were compliant and met both legacy OEMP EQGs and the EPA EGQs.

The EQGs for physicochemical stressor were met, with the exemption of chlorophyll-a at SBM2. The chlorophyll-a concentrations recorded was similar to results recorded at the four reference sites. There was therefore no requirement to conduct further monitoring against the EQS.

Table 3-1: Median physicochemical measurements obtained on the 20 February 2026 against the respective OEMP and EPA environmental quality guidelines.

	OEMP EQG (MEPA)[1]	OEMP EQG (HEPA)[1]	EPA EQG (MEPA)[2]	EPA EQG (HEPA)[2]	LOR	Unit	SBM1 (MEPA)	SBM1 Duplicate	SBM2 (HEPA)	REF1	REF2	REF3	REF4
Chlorophyll-a	0.002	0.001	0.002	0.002	0.001	mg/L	0.002	0.001	0.002	0.002	0.002	0.002	0.002
Temperature	27.5 - 31.3	27. - 31	30.3 -30.7	30.3 -30.7	-	°C	30.6	n/a	30.6	30.7	30.7	30.7	30.3
DO	>74.3	>74.3	91.2	91.7	-	%	91.2	n/a	97.3	96.9	97	96.8	91.3
EC	N/A	N/A	54471.05-55884	55720.8 - 55865	-	uS/cm	55574	n/a	55722	55881	55814.5	55783.5	55757
Salinity	35.2 - 38.8	36.2 - 38.8	35.81 - 36.92	36.81 - 36.91	-	PPT	36.70	n/a	36.81	36.92	36.87	36.85	36.84
pH	7.34 - 8.28	7.41 - 8.21	7.84 - 8.01	7.9 – 8.01	-	pH	7.98	n/a	8.01	8	7.99	7.99	7.9
Turbidity[3]	<9.1	<6.7	n/a	n/a	-	NTU	-	-	-	-	-	-	-

Notes: 1. Interim EQGs calculated from three-year data base from PHMEQSAP (O2 Marine 2023).; 2. EQGs as per the EPA's guidance (EPA 2017). The EPA's EQGs for temperature, EC, salinity, pH and turbidity are the 80th and 95th percentile values of the combined reference sites (n=4). Only the 20th and 5th percentile values were used for DO. Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQGs respectively. The EPA's EQG values are considered more appropriate than the legacy OEMP EQGs and are less likely to yield false positive results.; 3. EPA EQGs for turbidity (NTU) could not be calculated due to a technical issue with the logging instrument during deployment.

3.2 Toxicants in Water

3.2.1 Dissolved Metals

Results of the water quality sampling for heavy metals are detailed in **Table 3-2** and summarised briefly below. The laboratory certificate for the analysis is provided in **Appendix A**.

- Measurements of heavy metals at both SBM1 (MEPA) and SBM2 (HEPA) met their respective EQGs, except for arsenic and zinc.
- Although an exceedance of 0.003 mg/L for arsenic at both SBM1 (MEPA) and SBM2 (HEPA) respectively against the OEMP legacy EQG, similar results were recorded at all four reference sites, suggesting the results are not of ecological significance.

The EQGs for dissolved metals were met, with the exception of arsenic and zinc. Arsenic and zinc concentrations exceeded the MEPA and HEPA EQGs across all sites, including the four reference sites. There was therefore no requirement to conduct further monitoring against the EQS.

3.2.2 Hydrocarbons

Results of the water quality sampling for hydrocarbons are detailed in **Table 3-3** and summarised briefly below. Laboratory certificate for analysis is provided in **Appendix A.**

- None of the measured hydrocarbon concentrations measured exceeded the EQGs listed in Table 9 of Appendix A of the OEMP.

The EQGs for hydrocarbons were met. There was therefore no requirement to conduct further monitoring against the EQS.

Table 3-2: Heavy metal concentrations in water recorded on the 20 February 2026 compared against the respective OEMP and EPA environmental quality guidelines.

Metal	EPA EQG (MEPA)	EPA EQG (HEPA)	OEMP EQG (MEPA)	OEMP EQG (HEPA)	LOR	Unit	SBM1 (MEPA)	SBM1 Duplicate	SBM2 (HEPA)	REF1	REF2	REF3	REF4
Arsenic	0.006	0.006	0.003	0.003	0.001	mg/L	0.006	0.006	0.006	0.006	0.005	0.005	0.006
Cadmium			0.014	0.0007	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chromium (VI)	0.002	0.002	0.049	0.0077	0.001	mg/L	0.001	0.001	0.001	0.002	0.001	0.001	0.001
Chromium (III)	-	-	0.02	0.00014	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	-	-	0.003	0.0003	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Lead	-	-	0.0066	0.0022	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Mercury	-	-	0.0007	0.0001	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	-	-	0.20	0.007	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	0.036	0.026	0.023	0.007	0.005	mg/L	0.020	0.016	0.017	0.016	0.040	0.015	0.016

Notes: EQGs as per the OEMP (O2 Marine 2024) and EPA 2017. Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQGs respectively.

Table 3-3: Hydrocarbon concentrations in water recorded on the 20 February 2026 compared against the respective OEMP environmental quality guidelines.

Hydrocarbon	OEMP EQG (MEPA)	OEMP EQG (HEPA)	LOR	Unit	SBM1 (MEPA)	SBM1 Duplicate	SBM2 (HEPA)	REF1	REF2	REF3	REF4
TRH - 1999 NEPM Fractions											
TRH C6-C9	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C15-C28	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
TRH C29-C36	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
TRH C10-C36	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
BTEX											
Benzene	0.9	0.5	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.23	0.11	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.11	0.05	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	-	-	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	-	-	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.1	0.05	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	-	-	1	%	80	88	87	86	87	85	82
TRH - 2013 NEPM Fractions											
Naphthalene^{N02}	0.09	0.05	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TRH >C10-C16 less Naphthalene(F2)	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total)	-	-	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10 less BTEX (F1)^{N04}	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	-	-	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C16-C34	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C34-C40	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total)	-	-	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Results

Hydrocarbon	OEMP EQG (MEPA)	OEMP EQG (HEPA)	LOR	Unit	SBM1 (MEPA)	SBM1 Duplicate	SBM2 (HEPA)	REF1	REF2	REF3	REF4
Aro/Ali Split of TPH Water											
Aliphatic >C16-C35	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	-	-	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04

Notes: 1. EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQG's respectively. EPA EQGs were unable to be determined due to values being less than the reported LoR.

3.2.3 Nutrients in Water

Results of the water quality sampling for nutrients are provided in **Table 3-4** and summarised briefly below.

- With the exception of ammonia, all nutrient concentrations met their respective EQGs.
- Ammonia concentrations exceeded their respective EQGs at SBM1.
- The exceedance for ammonia was marginal, at just 0.06 mg/L above the EQG, and within the range of the other reference sites. Duplicate SBM1 met the respective EQG for ammonia.
- Based on this, the exceedance was not considered of ecological significance, and likely an artefact of sampling.

The EQGs for nutrients were met with the exception of ammonia. The exceedance for ammonia was restricted to SBM1 and not the duplicate site. Refer to Section 4 for comments on the need for contingency monitoring against the EQS.

Table 3-4: Nutrient concentrations in water recorded on the 20 February 2026 compared against the respective EPA environmental quality guidelines.

Nutrient	EPA EQG (MEPA)	EPA EQG (HEPA)	LOR	Unit	SBM1 (MEPA)	SBM1 Duplicate	SBM2 (HEPA)	REF1	REF2	REF3	REF4
Ammonia (as N)	0.68	0.67	0.02	mg/L	0.74	0.4	0.67	0.65	0.69	0.2	0.63
Nitrate (as N)	-	-	0.01	mg/L	0.05	0.06	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrite (as N)	-	-	0.01	mg/L	<0.01	<0.01	<0.01	< 0.01	< 0.01	0.01	< 0.01
NOx (as N)	-	-	0.01	mg/L	0.06	0.07	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Total Kjeldahl Nitrogen	6.79	4.94	0.2	mg/L	1.6	0.4	1.1	7.4	0.2	< 0.2	3.3
Total Nitrogen	6.79	4.94	0.2	mg/L	1.7	0.5	1.1	7.4	0.2	< 0.2	3.3
Total Phosphorus	0.14	0.13	0.01	mg/L	0.07	0.09	0.03	<0.01	0.14	0.12	0.04
Filterable Reactive Phosphorus	-	-	0.01	mg/L	0.03	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.01

Notes: 1. EQGs as per the EPAs guidance (EPA 2017). The EPA EQG nutrient thresholds correspond to the 95th percentile for MEPA and the 80th percentile for HEPA, based on (n=4) from the combined reference sites. Orange and blue cells indicate exceedances of the OEMP EQGs for the HEPA and MEPA, respectively.

3.3 Toxicants in Sediment

3.3.1 Dissolved Metals

Results of the sediment sampling for heavy metals are detailed in **Table 3-5** and summarised briefly below. The laboratory certificate for the analysis is provided in **Appendix A**.

- Both arsenic and nickel exceeded the OEMP legacy EQGs only at SBM1, as well as REF2 for nickel. The exceedance for arsenic was only limited to the duplicate site. Nickel had exceeded the OEMP legacy EQGs for both SBM1 and the duplicate. There were no exceedances recorded against the EPA EQG's.
- Aluminium exceeded both the legacy OEMP EQGs and EPA EQGs at the MEPA (SBM1) and the respective duplicate site. An exceedance also occurred at REF2 for aluminium.
- Measurements of the other heavy metals at both SBM1 (MEPA) and SBM2 (HEPA) met their respective EQGs.

The EQGs for dissolved metals in the sediment were met with the exception of arsenic, aluminium and nickel. The exceedances for these heavy metals were restricted to SBM1, however exceedances also occurred at REF2 for aluminium and nickel. The exceedance of arsenic was limited to the duplicate site. See Section 4 for comments on the need for contingency monitoring against the EQS.

3.3.2 Hydrocarbons

Results of the sediment quality sampling for hydrocarbons are detailed in **Table 3-6** and summarised briefly below. Laboratory certificate for analysis is provided in **Appendix A.**

- None of the measured hydrocarbon concentrations measured exceeded the EQGs listed in Table 9 of Appendix A of the OEMP.

The EQGs for hydrocarbons were met. There was therefore no requirement to conduct further monitoring against the EQS.

Table 3-5: Heavy metal concentrations in the sediment recorded on the 20 February 2026 compared against the respective OEMP and EPA environmental quality guidelines.

Metal	OEMP EGQ (MEPA)	OEMP EGQ (HEPA)	EPA EQG (MEPA)	EPA EQG (HEPA)	LOR	Unit	SBM1 (MEPA)	SBM1 Duplicate	SBM2 (HEPA)	REF1	REF2	REF3	REF4
Arsenic	20	20	17.70	16.80	2	mg/kg	19	24	14	14	18	14	16
Aluminium	9100	9100	7225	5100	20	mg/kg	12000	14000	6900	5100	10000	7600	810
Cadmium	1.5	1.5	-	-	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium (VI)	80	80	56.35	51.40	1	mg/kg	66	79	46	33	58	47	11
Copper	65	65	23.95	20.80	1	mg/kg	20	22	17	11	25	18	<1
Lead	50	50	7.53	6.72	1	mg/kg	9.8	11	6.3	4.1	7.8	6	1.1
Mercury	0.15	0.15	0.04	0.04	0.02	mg/kg	0.03	0.03	<0.02	0.02	0.04	0.04	0.02
Nickel	21	21	26.1	23.4	1	mg/kg	31	36	21	13	27	21	2.7
Zinc	200	200	45.35	40.4	5	mg/kg	33	37	33	26	47	36	<5

Notes: EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQGs respectively.; Red font represents exceedances of the EPA EGQs.

Table 3-6: Sediment hydrocarbon concentrations recorded on the 20 February 2026 compared against the respective OEMP environmental quality guidelines.

Hydrocarbon	OEMP EQG (MEPA)	OEMP EQG (HEPA)	LOR	Unit	SBM1	SBM1 Duplicate	SBM2	REF1	REF2	REF3	REF4
TRH - 1999 NEPM Fractions											
TRH C6-C9	25	25	20	mg/kg	<20	<20	<20	<20	<20	74	<20
TRH C10-C36 (total)	250	250	50	mg/kg	<50	<50	<50	<50	<50	<50	<50
TRH - 2013 NEPM Fractions											
TRH >C16-C34	100	100	100	mg/kg	<100	<100	<100	<100	<100	<100	<100
2-methylnaphthalene[1]	0.55	0.55	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene[1]	0.55	0.55	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene[1]	0.55	0.55	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene[2]	1.7	1.7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene[2]	1.7	1.7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene[2]	1.7	1.7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene[2]	1.7	1.7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene[2]	1.7	1.7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene[1]	0.55	0.55	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene[1]	0.55	0.55	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene[1]	0.55	0.55	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene[2]	1.7	1.7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total PAH	4.0	4.0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes: EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQGs respectively. Red font represents exceedances of the EPA EGQs.;[1] Low molecular weight PAHs (OEMP EQG = 0.55mg/kg) is the sum of acenaphthalene, anthracene, fluorene, 2-methylnaphthalene, naphthalene and phenanthrene;[2] High molecular weight PAHs (OEMP EGQ = 1.7mg/kg) is the sum of benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a.h)anthracene, fluoranthene and pyrene. A full suite of hydrocarbon concentrations can be found in ***Section 6.***

4 Discussion

4.1 Physicochemical Stressors in Water

Chlorophyll-a (0.002 mg/L) exceeded the legacy OEMP HEPA EQG by 0.001 mg/L at SBM2. While this is a marginal difference, it was sufficient to exceed the summer EQG as listed in the OEMP. However, this result was within the range of the four reference sites. Chlorophyll-a at SBM1 duplicate site was compliant to the OEMP legacy EQG, reinforcing this as an artifact of sampling. Chlorophyll-a concentrations remained complaint against the EPA MEPA and HEPA EQGs. There were no other exceedances against either the OEMP EQG or EPA EQG for the other measured physicochemical stressors.

4.2 Toxicants in Water

Heavy metal concentrations at SBM1 and SBM2 met their respective EQGs, with the exception of arsenic and zinc. The exceedances of arsenic and zinc were observed at both the MEPA and HEPA sites against the OEMP legacy EQGs. Similar results observed at the four reference sites suggest that the elevated results are not limited to the impact sites but are also present at the three reference sites north of the impact sites as well as the most eastern reference site from the marina. Although both analytes are elevated in concentration, ongoing quarterly monitoring of both analytes will determine if the results are of ecological significance or if the results are limited to temporal and seasonal variation. Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

None of the measured hydrocarbon concentrations measured on the 20 February 2026 exceeded the EQGs listed in Table 9 of Appendix A of the OEMP. All other measurements were below the limit of reporting (LOR).

Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

4.3 Nutrients in Water

Nutrient monitoring is a new addition to the Spoilbank Marina OEMP, continuing from the previous sampling round and completed on 25 September 2025. The EQGs for nutrients were developed based on EPA (2017) which advocates the use of the 80th and 95th percentiles of the reference sites as EQGs for a moderate and high level of ecosystem protection respectively.

Except for ammonia, nutrient concentrations at SBM1 and SBM2 met their respective EQGs. Although ammonia at SBM1 duplicate analysis was compliant with the EPA EQG, SBM1 marginally exceeded the EPA EQG by 0.06 mg/L.

If future monitoring shows repeated exceedances of ammonia above the 80th percentile site-specific EQG value, this may indicate emerging nutrient enrichment at the site. Consistent with the ANZG (2018) water

quality guidelines, any such exceedance should be evaluated using a weight-of-evidence framework. Recommended actions include:

1. Conduct additional monitoring to determine whether elevated ammonia concentrations are persistent and whether they vary spatially or seasonally.
2. Although chlorophyll-a remained below the EPA EQG at SBM2, complementary indicators such as dissolved oxygen and biological responses (for example, macroinvertebrate assemblages) should be assessed to determine whether ecological effects are occurring.
3. Investigate potential nitrogen sources, including catchment land use, stormwater inflows and any relevant point-source discharges, to better understand the origin of elevated ammonia.

These steps would provide a more robust basis for evaluating ecological risk and informing any management measures required to maintain or improve water quality.

4.4 Toxicants in the Sediment

Heavy metals in the sediment remained compliant to both the legacy OEMP EQGs and the EPA EQGs. However, this excluded arsenic, nickel and aluminium with the exceedances limited to SBM1 for all three analytes. Exceedances also occurred at REF2 for nickel and aluminium. Historic analysis for arsenic and nickel at SBM1 conducted in 2025 (02Marine 2025), indicated exceedances against the OEMP EQG at SBM1. Similar analysis conducted by 02Marine (2025), had also reported elevated levels of both arsenic and nickel within the port and adjacent creeks in Port Hedland. The four reference sites during this quarter of monitoring (February 2026) also recorded elevated concentrations of arsenic and nickel, supporting that the elevated concentrations are likely attributed to natural variability, and not from operational sources within the Spoilbank marina.

Whilst there were exceedances for aluminium at SMB1 and the duplicate site against the legacy OEMP EQGs and the EPA EQGs in the sediment, historic results from 2025 indicated similar results with elevated concentrations at both SBM1 (MEPA) and SBM2 (HEPA) sites. During this monitoring period (February 2026), elevated concentrations of aluminium were also recorded at three of the four reference sites closest to the MEPA and HEPA sites, indicating a localised elevation in concentrations.

Measurements of total hydrocarbons at SBM1 and SBM2 met their respective EQGs. None of the measured hydrocarbon concentrations measured on the 20 February 2026 exceeded the EQGs listed in Table 9 of Appendix A of the OEMP. Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

5 Conclusion

Both water quality and sediment quality within the marina is of an acceptable quality and within the range expected for Pilbara waters in the Australia summer. Based on these results, there was no requirement to conduct further monitoring against the EQS. EQO1 was achieved.

6 References

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Appendices

Appendix A Laboratory Results Certificate

Stantec Australia Pty Limited
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NATA Accredited
Accreditation Number 2377
Site Number 2370 & 2554

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: [redacted]

Report **1326865-W-V4**
Project name DOT
Project ID 3045012863
Received Date Feb 23, 2026

Client Sample ID			**REF4**	**REF 3**	**REF 2**	**REF 1**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**L26-Fe0066605**	**L26-Fe0066607**	**L26-Fe0066609**	**L26-Fe0066611**
Date Sampled			**Jan 20, 2026**	**Jan 20, 2026**	**Jan 20, 2026**	**Jan 20, 2026**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	82	85	87	86
BTEX and Naphthalene						
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Recoverable Hydrocarbons						
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	0.65	< 0.20	0.20	0.63
Chlorophyll-a	0.001	mg/L	0.002	0.002	0.002	0.002
Chromium (VI)	0.002	mg/L	0.003	< 0.002	< 0.002	< 0.002
Filterable Reactive Phosphorus	0.01	mg/L	0.01	< 0.01	< 0.01	< 0.01
Nitrate (as N)	0.01	mg/L	< 0.01	0.01	< 0.01	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
NOx (as N)	0.01	mg/L	< 0.01	0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	3.3	< 0.2	0.2	7.4
Total Nitrogen	0.2	mg/L	3.3	< 0.2	0.2	7.4
Total Phosphorus	0.01	mg/L	0.04	0.12	0.14	< 0.01
Chromium (III) (filtered)*	0.002	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05

Client Sample ID			REF4	REF 3	REF 2	REF 1
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L26-Fe0066605	L26-Fe0066607	L26-Fe0066609	L26-Fe0066611
Date Sampled			Jan 20, 2026	Jan 20, 2026	Jan 20, 2026	Jan 20, 2026
Test/Reference	LOR	Unit				
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water						
Aliphatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Metals M8						
Arsenic	0.001	mg/L	0.006	0.005	0.005	0.006
Cadmium	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chromium	0.001	mg/L	0.001	0.001	0.001	0.002
Copper	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	0.005	mg/L	0.016	0.015	0.040	0.016

Client Sample ID			SMB1	SMB1-DUP	SMB2
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L26-Fe0066613	L26-Fe0066615	L26-Fe0066617
Date Sampled			Jan 20, 2026	Jan 20, 2026	Jan 20, 2026
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02
BTEX					
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	80	88	87
BTEX and Naphthalene					
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001
Total Recoverable Hydrocarbons					
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	0.74	0.40	0.67
Chlorophyll-a	0.001	mg/L	0.002	0.001	0.002
Chromium (VI)	0.002	mg/L	< 0.002	0.003	< 0.002
Filterable Reactive Phosphorus	0.01	mg/L	0.03	< 0.01	0.02
Nitrate (as N)	0.01	mg/L	0.05	0.06	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
NOx (as N)	0.01	mg/L	0.06	0.07	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	1.6	0.4	1.1

Client Sample ID			SMB1	SMB1-DUP	SMB2
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L26-Fe0066613	L26-Fe0066615	L26-Fe0066617
Date Sampled			Jan 20, 2026	Jan 20, 2026	Jan 20, 2026
Test/Reference	LOR	Unit			
Total Nitrogen	0.2	mg/L	1.7	0.5	1.1
Total Phosphorus	0.01	mg/L	0.07	0.09	0.03
Chromium (III) (filtered)*	0.002	mg/L	< 0.01	< 0.01	< 0.01
TRH - 2013 NEPM Fractions (after silica gel clean-up)					
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH - 1999 NEPM Fractions (after silica gel clean-up)					
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water					
Aliphatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04
Aromatic >C16-C35	0.04	mg/L	< 0.04	< 0.04	< 0.04
Metals M8					
Arsenic	0.001	mg/L	0.006	0.006	0.005
Cadmium	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Chromium	0.001	mg/L	0.001	0.001	0.001
Copper	0.001	mg/L	< 0.001	< 0.001	< 0.001
Lead	0.001	mg/L	< 0.001	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.001	< 0.001	< 0.001
Zinc	0.005	mg/L	0.020	0.016	0.017

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
BTEX	Welshpool	Feb 24, 2026	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX and Naphthalene	Welshpool	Feb 24, 2026	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Welshpool	Feb 24, 2026	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Welshpool	Feb 24, 2026	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Ammonia (as N)	Welshpool	Feb 24, 2026	28 Days
- Method: LTM-INO-4200 Ammonia by Discrete Analyser			
Filterable Reactive Phosphorus	Welshpool	Feb 24, 2026	28 Days
- Method: ARL309 - Filterable Reactive Phosphorus in Water by Discrete Analyser			
Nitrate (as N)	Welshpool	Feb 24, 2026	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Nitrite (as N)	Welshpool	Feb 24, 2026	2 Days
- Method: LTM-INO-4350 Determination of NO2, NO3, NOx in Water by Discrete Analyser			
NOx (as N)	Welshpool	Feb 24, 2026	28 Days
- Method: LTM-INO-4350 Determination of NO2, NO3, NOx in Water by Discrete Analyser			
Total Kjeldahl Nitrogen	Welshpool	Feb 23, 2026	28 Day
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Nitrogen	Welshpool	Feb 24, 2026	28 Days
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Phosphorus	Welshpool	Feb 24, 2026	28 Days
- Method: ARL308 - Total Phosphorus in Water by Discrete Analyser			
Chlorophyll-a	Welshpool	Feb 24, 2026	28 Days
- Method: ARL141 - Chlorophyll-a and Pheophytin-a in Water			
Chromium (VI)	Welshpool	Feb 24, 2026	1 Day
- Method: ARL316 - Hexavalent Chromium in Water by Discrete Analyser			
Chromium (III) (filtered)*	Welshpool	Feb 23, 2026	180 Days
- Method: ARL402/403 - Metals in Water by ICPOES/ICPMS			
Aro/Ali Split of TPH Water	Welshpool	Feb 24, 2026	7 Days
- Method: ARL111 - Aliphatic/Aromatic Split of TPH			
Metals M8	Welshpool	Mar 20, 2026	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: DOT
Project ID: 3045012863

Order No.: 3045012863
Report #: 1326865
Phone: 0458 839 200
Fax:

Received: Feb 23, 2026 11:05 AM
Due: Mar 3, 2026
Priority: 5 Day
Contact Name: [redacted]

Eurofins Analytical Services Manager : [redacted]

Sample Detail						Chlorophyll-a	Chromium (III) (filtered)*	Chromium (VI)	HOLD	Metals M8	Aro/Ali Split of TPH Water	Eurofins Suite B19E	Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN
Perth Laboratory - NATA # 2377 Site # 2370 & 2554						X	X	X	X	X	X	X	X
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	REF4	Jan 20, 2026		Water	L26-Fe0066605	X	X	X		X	X	X	X
2	REF4	Jan 20, 2026		Soil	L26-Fe0066606				X				
3	REF 3	Jan 20, 2026		Water	L26-Fe0066607	X	X	X		X	X	X	X
4	REF 3	Jan 20, 2026		Soil	L26-Fe0066608				X				
5	REF 2	Jan 20, 2026		Water	L26-Fe0066609	X	X	X		X	X	X	X
6	REF 2	Jan 20, 2026		Soil	L26-Fe0066610				X				
7	REF 1	Jan 20, 2026		Water	L26-Fe0066611	X	X	X		X	X	X	X
8	REF 1	Jan 20, 2026		Soil	L26-Fe0066612				X				
9	SMB1	Jan 20, 2026		Water	L26-Fe0066613	X	X	X		X	X	X	X
10	SMB1	Jan 20, 2026		Soil	L26-Fe0066614				X				
11	SMB1-DUP	Jan 20, 2026		Water	L26-Fe0066615	X	X	X		X	X	X	X
12	SMB1-DUP	Jan 20, 2026		Soil	L26-Fe0066616				X				
13	SMB2	Jan 20, 2026		Water	L26-Fe0066617	X	X	X		X	X	X	X
14	SMB2	Jan 20, 2026		Soil	L26-Fe0066618				X				

eurofins

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Project Name: DOT
Project ID: 3045012863

Order No.: 3045012863
Report #: 1326865
Phone: 0458 839 200
Fax:

Received: Feb 23, 2026 11:05 AM
Due: Mar 3, 2026
Priority: 5 Day
Contact Name: [redacted]

Eurofins Analytical Services Manager : [redacted]

Sample Detail	Chlorophyll-a	Chromium (III) (filtered)*	Chromium (VI)	HOLD	Metals M8	Aro/Ali Split of TPH Water	Eurofins Suite B19E	Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN
Perth Laboratory - NATA # 2377 Site # 2370 & 2554	X	X	X	X	X	X	X	X
External Laboratory								
Test Counts	7	7	7	7	7	7	7	7

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.02			0.02	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.02			0.02	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.04			0.04	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.04			0.04	Pass	
Method Blank							
Metals M8							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0001			0.0001	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Aro/Ali Split of TPH Water							
Aliphatic >C16-C35	mg/L	< 0.04			0.04	Pass	
Aromatic >C16-C35	mg/L	< 0.04			0.04	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
BTEX and Naphthalene							
Naphthalene	mg/L	< 0.001			0.001	Pass	
LCS - % Recovery							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	125			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	103			70-130	Pass	
LCS - % Recovery							
Metals M8							
Arsenic	%	104			80-120	Pass	
Cadmium	%	97			80-120	Pass	
Chromium	%	105			80-120	Pass	
Copper	%	90			80-120	Pass	
Lead	%	96			80-120	Pass	
Mercury	%	104			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel			%	102			80-120	Pass	
Zinc			%	97			80-120	Pass	
LCS - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions									
TRH C6-C9			%	79			70-130	Pass	
LCS - % Recovery									
BTEX									
Benzene			%	82			70-130	Pass	
Toluene			%	84			70-130	Pass	
Ethylbenzene			%	91			70-130	Pass	
m&p-Xylenes			%	85			70-130	Pass	
o-Xylene			%	95			70-130	Pass	
Xylenes - Total*			%	88			70-130	Pass	
LCS - % Recovery									
BTEX and Naphthalene									
Naphthalene			%	82			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	L26-Fe0066605	CP	%	91			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	L26-Fe0066605	CP	%	94			70-130	Pass	
Toluene	L26-Fe0066605	CP	%	92			70-130	Pass	
Ethylbenzene	L26-Fe0066605	CP	%	81			70-130	Pass	
m&p-Xylenes	L26-Fe0066605	CP	%	92			70-130	Pass	
o-Xylene	L26-Fe0066605	CP	%	86			70-130	Pass	
Xylenes - Total*	L26-Fe0066605	CP	%	90			70-130	Pass	
Spike - % Recovery									
BTEX and Naphthalene				Result 1					
Naphthalene	L26-Fe0066605	CP	%	99			70-130	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Arsenic	L26-Fe0071525	NCP	%	105			75-125	Pass	
Cadmium	L26-Fe0071525	NCP	%	97			75-125	Pass	
Chromium	L26-Fe0071525	NCP	%	112			75-125	Pass	
Copper	L26-Fe0071525	NCP	%	98			75-125	Pass	
Lead	L26-Fe0071525	NCP	%	104			75-125	Pass	
Mercury	L26-Fe0071525	NCP	%	103			75-125	Pass	
Nickel	L26-Fe0071525	NCP	%	111			75-125	Pass	
Zinc	L26-Fe0071525	NCP	%	99			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	L26-Fe0067878	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	L26-Fe0067878	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	L26-Fe0067878	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	L26-Fe0067878	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	L26-Fe0067878	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	L26-Fe0067878	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	L26-Fe0067878	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	

Duplicate									
BTEX and Naphthalene				Result 1	Result 2	RPD			
Naphthalene	L26-Fe0067878	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH >C10-C16 (after silica gel clean-up)	L26-Fe0066605	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C16-C34 (after silica gel clean-up)	L26-Fe0066605	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C34-C40 (after silica gel clean-up)	L26-Fe0066605	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH C10-C14 (after silica gel clean-up)	L26-Fe0066605	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C15-C28 (after silica gel clean-up)	L26-Fe0066605	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C29-C36 (after silica gel clean-up)	L26-Fe0066605	CP	mg/L	< 0.04	< 0.04	<1	30%	Pass	

Comments

Report 1326865-W-V2 (amendment to report 1326865-W) has been issued with revised results for TN/TKN on sample Fe0066607, following repeat analysis.

Report 1326865-W-V3 (amendment to report 1326865-W-V2) has been issued with revised results for metals on all samples , following repeat processing of results utilizing trace validation data.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised by:

[redacted]

[redacted]

[redacted]

General Manager

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

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Accreditation Number 2377
Site Number 2370 & 2554

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: [redacted]

Report **1333640-S-V2**
Project name DOT
Project ID 3045012863
Received Date Mar 11, 2026

Client Sample ID			**REF4**	**REF3**	**REF2**	**REF1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**L26-Ma0034055**	**L26-Ma0034056**	**L26-Ma0034057**	**L26-Ma0034058**
Date Sampled			**Jan 20, 2026**	**Jan 20, 2026**	**Jan 20, 2026**	**Jan 20, 2026**
Test/Reference	LOR	Unit				
TRH C6-C9	20	mg/kg	< 20	74	< 20	< 20
BTEX						
Benzene	0.1	mg/kg	< 0.1	9.2	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	7.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	6.3	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	17	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	7.9	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	25	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	50	66	82	82
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	12	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)*[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	140	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	93	< 20	< 20
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			REF4	REF3	REF2	REF1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L26-Ma0034055	L26-Ma0034056	L26-Ma0034057	L26-Ma0034058
Date Sampled			Jan 20, 2026	Jan 20, 2026	Jan 20, 2026	Jan 20, 2026
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	66	97	94	76
p-Terphenyl-d14 (surr.)	1	%	113	124	117	122
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Semivolatile Organics						
2-Methylnaphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Heavy Metals						
Aluminium	20	mg/kg	810	7600	10000	5100
Metals M8						
Arsenic	2	mg/kg	16	14	18	14
Cadmium	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Chromium	1	mg/kg	11	47	58	33
Copper	1	mg/kg	< 1	18	25	11
Lead	1	mg/kg	1.1	6.0	7.8	4.1
Mercury	0.02	mg/kg	< 0.02	0.04	0.04	0.02
Nickel	1	mg/kg	2.7	21	27	13
Zinc	5	mg/kg	< 5	36	47	26
% Moisture	1	%	16	50	57	45

Client Sample ID			SMB1	SMB1-DUP	SMB2
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L26-Ma0034059	L26-Ma0034060	L26-Ma0034061
Date Sampled			Jan 20, 2026	Jan 20, 2026	Jan 20, 2026
Test/Reference	LOR	Unit			
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	87	50	50

Client Sample ID			SMB1	SMB1-DUP	SMB2
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L26-Ma0034059	L26-Ma0034060	L26-Ma0034061
Date Sampled			Jan 20, 2026	Jan 20, 2026	Jan 20, 2026
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)*[N01]	50	mg/kg	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	82	80	70
p-Terphenyl-d14 (surr.)	1	%	133	131	112
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100
Semivolatile Organics					
2-Methylnaphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Heavy Metals					
Aluminium	20	mg/kg	12000	14000	6900
Metals M8					
Arsenic	2	mg/kg	19	24	14
Cadmium	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chromium	1	mg/kg	66	79	46
Copper	1	mg/kg	20	22	17
Lead	1	mg/kg	9.8	11	6.3
Mercury	0.02	mg/kg	0.03	0.03	< 0.02

Client Sample ID			SMB1	SMB1-DUP	SMB2
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L26-Ma0034059	L26-Ma0034060	L26-Ma0034061
Date Sampled			Jan 20, 2026	Jan 20, 2026	Jan 20, 2026
Test/Reference	LOR	Unit			
Metals M8					
Nickel	1	mg/kg	31	36	21
Zinc	5	mg/kg	33	37	33
% Moisture	1	%	47	47	48

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
BTEX	Welshpool	Mar 16, 2026	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Mar 12, 2026	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Welshpool	Mar 12, 2026	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Welshpool	Mar 12, 2026	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Mar 12, 2026	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Welshpool	Mar 12, 2026	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Semivolatile Organics	Welshpool	Mar 20, 2026	14 Days
- Method: LTM-ORG-2190 SVOC in Water & Soil by GC-MS			
Heavy Metals	Welshpool	Mar 12, 2026	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Welshpool	Mar 11, 2026	14 Days
- Method: LTM-GEN-7080 Moisture			

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Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: DOT
Project ID: 3045012863

Order No.: 3045012863
Report #: 1333640
Phone: 0458 839 200
Fax:

Received: Mar 11, 2026 2:21 PM
Due: Mar 17, 2026
Priority: 4 Day
Contact Name: [redacted]

Eurofins Analytical Services Manager : [redacted]

Sample Detail						Aluminium	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Total Recoverable Hydrocarbons
Perth Laboratory - NATA # 2377 Site # 2370 & 2554						X	X	X	X	X
External Laboratory										
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	REF4	Jan 20, 2026		Soil	L26-Ma0034055	X	X	X	X	X
2	REF3	Jan 20, 2026		Soil	L26-Ma0034056	X	X	X	X	X
3	REF2	Jan 20, 2026		Soil	L26-Ma0034057	X	X	X	X	X
4	REF1	Jan 20, 2026		Soil	L26-Ma0034058	X	X	X	X	X
5	SMB1	Jan 20, 2026		Soil	L26-Ma0034059	X	X	X	X	X
6	SMB1-DUP	Jan 20, 2026		Soil	L26-Ma0034060	X	X	X	X	X
7	SMB2	Jan 20, 2026		Soil	L26-Ma0034061	X	X	X	X	X
Test Counts						7	7	7	7	7

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Heavy Metals							
Aluminium	mg/kg	< 20			20	Pass	
Method Blank							
Metals M8							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.1			0.1	Pass	
Chromium	mg/kg	< 1			1	Pass	
Copper	mg/kg	< 1			1	Pass	
Lead	mg/kg	< 1			1	Pass	
Mercury	mg/kg	< 0.02			0.02	Pass	
Nickel	mg/kg	< 1			1	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
TRH C6-C9	mg/kg	< 20			20	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
TRH C6-C9	mg/kg	< 20			20	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C10-C14	%	99			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	106			70-130	Pass	
Acenaphthylene	%	104			70-130	Pass	
Anthracene	%	107			70-130	Pass	
Benz(a)anthracene	%	109			70-130	Pass	
Benzo(a)pyrene	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	%	101			70-130	Pass	
Benzo(g.h.i)perylene	%	97			70-130	Pass	
Benzo(k)fluoranthene	%	104			70-130	Pass	
Chrysene	%	104			70-130	Pass	
Dibenz(a.h)anthracene	%	102			70-130	Pass	
Fluoranthene	%	113			70-130	Pass	
Fluorene	%	107			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	104			70-130	Pass	
Naphthalene	%	103			70-130	Pass	
Phenanthrene	%	108			70-130	Pass	
Pyrene	%	118			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	91			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	110			80-120	Pass	
LCS - % Recovery							
Metals M8							
Arsenic	%	113			80-120	Pass	
Cadmium	%	109			80-120	Pass	
Chromium	%	110			80-120	Pass	
Copper	%	106			80-120	Pass	
Lead	%	106			80-120	Pass	
Mercury	%	110			80-120	Pass	
Nickel	%	108			80-120	Pass	
Zinc	%	115			80-120	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C9	%	84			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	90			70-130	Pass	
Toluene	%	97			70-130	Pass	
Ethylbenzene	%	77			70-130	Pass	
m&p-Xylenes	%	86			70-130	Pass	
o-Xylene	%	98			70-130	Pass	
Xylenes - Total*	%	90			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	89			70-130	Pass	
TRH C6-C10	%	80			70-130	Pass	
LCS - % Recovery							
TRH C6-C9	%	92			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	107			70-130	Pass	
Toluene	%	104			70-130	Pass	
Ethylbenzene	%	107			70-130	Pass	
m&p-Xylenes	%	105			70-130	Pass	
o-Xylene	%	112			70-130	Pass	
Xylenes - Total*	%	107			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	112			70-130	Pass	
TRH C6-C10	%	86			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
TRH C6-C9	L26-Ma0028859	NCP	%	100			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	L26-Ma0028859	NCP	%	106			70-130	Pass	
Toluene	L26-Ma0028859	NCP	%	108			70-130	Pass	
Ethylbenzene	L26-Ma0028859	NCP	%	116			70-130	Pass	
m&p-Xylenes	L26-Ma0028859	NCP	%	112			70-130	Pass	
o-Xylene	L26-Ma0028859	NCP	%	112			70-130	Pass	
Xylenes - Total*	L26-Ma0028859	NCP	%	112			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	L26-Ma0028859	NCP	%	125			70-130	Pass	
TRH C6-C10	L26-Ma0028859	NCP	%	96			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	L26-Fe0079345	NCP	%	81			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	L26-Ma0023444	NCP	%	111			70-130	Pass	
Acenaphthylene	L26-Ma0023444	NCP	%	108			70-130	Pass	
Anthracene	L26-Ma0023444	NCP	%	110			70-130	Pass	
Benz(a)anthracene	L26-Ma0023444	NCP	%	99			70-130	Pass	
Benzo(a)pyrene	L26-Ma0023444	NCP	%	111			70-130	Pass	
Benzo(b&j)fluoranthene	L26-Ma0023444	NCP	%	108			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(g.h.i)perylene	L26-Ma0031292	NCP	%	104			70-130	Pass	
Benzo(k)fluoranthene	L26-Ma0023444	NCP	%	111			70-130	Pass	
Chrysene	L26-Ma0023444	NCP	%	109			70-130	Pass	
Dibenz(a.h)anthracene	L26-Ma0022421	NCP	%	92			70-130	Pass	
Fluoranthene	L26-Ma0023444	NCP	%	113			70-130	Pass	
Fluorene	L26-Ma0023444	NCP	%	111			70-130	Pass	
Indeno(1.2.3-cd)pyrene	L26-Ma0022421	NCP	%	94			70-130	Pass	
Naphthalene	L26-Ma0023444	NCP	%	107			70-130	Pass	
Phenanthrene	L26-Ma0023444	NCP	%	111			70-130	Pass	
Pyrene	L26-Ma0023444	NCP	%	104			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	L26-Fe0079345	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	L26-Ma0028831	NCP	%	84			75-125	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Arsenic	L26-Ma0034060	CP	%	98			75-125	Pass	
Cadmium	L26-Ma0034060	CP	%	98			75-125	Pass	
Chromium	L26-Ma0034060	CP	%	79			75-125	Pass	
Copper	L26-Ma0034060	CP	%	82			75-125	Pass	
Lead	L26-Ma0034060	CP	%	90			75-125	Pass	
Mercury	L26-Ma0034060	CP	%	96			75-125	Pass	
Nickel	L26-Ma0034060	CP	%	84			75-125	Pass	
Zinc	L26-Ma0034060	CP	%	92			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
TRH C6-C9	L26-Ma0023451	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	L26-Ma0023451	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	L26-Ma0023451	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	L26-Ma0023451	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	L26-Ma0023451	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	L26-Ma0023451	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	L26-Ma0023451	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	L26-Ma0023451	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	L26-Ma0023451	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	L26-Fe0081460	NCP	mg/kg	4700	4800	2.0	30%	Pass	
TRH C15-C28	L26-Fe0081460	NCP	mg/kg	16000	16000	2.0	30%	Pass	
TRH C29-C36	L26-Fe0081460	NCP	mg/kg	27000	27000	2.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(b&j)fluoranthene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	L26-Ma0028847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	L26-Fe0081460	NCP	mg/kg	5700	5800	2.0	30%	Pass	
TRH >C16-C34	L26-Fe0081460	NCP	mg/kg	19000	19000	2.0	30%	Pass	
TRH >C34-C40	L26-Fe0081460	NCP	mg/kg	32000	33000	2.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	L26-Ma0034059	CP	mg/kg	12000	12000	1.0	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	L26-Ma0034059	CP	mg/kg	19	19	1.0	30%	Pass	
Cadmium	L26-Ma0034059	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Chromium	L26-Ma0034059	CP	mg/kg	66	66	<1	30%	Pass	
Copper	L26-Ma0034059	CP	mg/kg	20	19	1.0	30%	Pass	
Lead	L26-Ma0034059	CP	mg/kg	9.8	9.7	<1	30%	Pass	
Mercury	L26-Ma0034059	CP	mg/kg	0.03	0.04	5.0	30%	Pass	
Nickel	L26-Ma0034059	CP	mg/kg	31	31	1.0	30%	Pass	
Zinc	L26-Ma0034059	CP	mg/kg	33	34	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	L26-Ma0034060	CP	%	47	47	1.0	30%	Pass	

Comments

Report 1333640-S-V2 (amendment to report 1333640-S) has been issued with revised results for 2-methylnaphthalene on all samples, following repeat analysis.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised by:

[redacted]

[redacted]

General Manager

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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Appendix D Spoilbank Marina MEWQMP Summary Report Q4

Port Hedland Spoilbank Marina Project: MEWQMP Summary Report – Q4

Prepared for: Department of Transport

Date: 25/06/2026

Prepared by: [redacted]

Project: 304501863

Stantec Australia Pty Ltd

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
A01	06/05/2026	Q4 Report	JJ	JL	JD	TS
00	25/06/2026	Q4 Final Report	JJ	JD	JD	TS

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1 Introduction

1.1 Background

The Spoilbank Marina, located on the western extent of the spoil bank sand formation in Port Hedland, was developed to replace the Richardson Street boat ramp and to redirect recreational boating traffic away from the commercial shipping channel within the inner harbour. Federal environmental approval for the project was granted by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) on 19 February 2021 (EPBC 2019/8520).

On 9 July 2024, DCCEEW approved the transfer of proponent responsibilities from Pilbara Ports (PP) to the Department of Transport and Major Infrastructure (DoTMI) (Previously Department of Transport (DoT)). As the new proponent, DoTMI has assumed full operational responsibility for the Spoilbank Marina, including ongoing environmental management, monitoring, and maintenance in accordance with the approved Operational Environmental Management Plan (OEMP).

Within the OEMP a Marine Environment and Water Quality Management Plan (MEWQMP) outlines how the new proponent (DoTMI) will monitor marine water quality, sediment quality and accumulation of marine debris and how impacts to protected matters via the operation of the marina will be managed (O2 Marine 2024). Monitoring frequency of physicochemical, toxicants and nutrients in marine water require quarterly sampling to satisfy the requirements of MEQMP outlined in the OEMP.

This report is submitted in partial fulfillment of Condition C6 of the Approval Decision Notice (2019/8520), which requires DoTMI to implement the OEMP. Specifically, this document summarises the outcomes of the fourth round of quarterly water quality analysis and visual observations, completed on 5 May 2026, against the relevant EQGs set out in Section 3.

2 Methods

2.1 Sample Collection and Locations

Water quality samples to determine concentrations of dissolved metals, hydrocarbons, chlorophyll-a, pathogenic bacteria, toxic phytoplankton and physiochemical profiling of the water column were taken in accordance with the MEQMP on 5 May 2026.

Sampling for water was undertaken at two impact sites: one Moderate Ecological Protection Area (MEPA) site; one High Ecological Protection Area (HEPA) site; and four reference sites (**Figure 2-1**, **Table 2-1**). Three of the reference sites are situated approximately 100 to 1500 m north of the marina, while the fourth legacy reference site is located roughly 7.7 km west of the marina. Reference sites 1, 2 and 3 were added to the program in Q4 of 2025.

At each water quality monitoring location, visual inspections were undertaken concurrently with sample collection in accordance with the criteria outlined in Table 12 and 13 of the OEMP. These inspections were conducted to assess the presence of surface oil films and petrochemical indicators, anthropogenic debris, and other objectionable matter, including foam-forming substances, as well as accumulations of floating seagrass and macroalgal wrack.

Table 2-1: Water quality sampling conducted at the Port Hedland Spoilbank Marina.

Site	Site Type	Latitude	Longitude	Metals (As, Cr, Cu, Pb, Ni, Cd, Hg, Zn, Al)	Chromium speciation (III, VI)	Chlorophyl-a	TPH aliphatic/aromatic (>C16-C35)	TRH - Silica gel clean up (NEPM Fractions) + BTEXN	Inorganics (NH3, NOx, FRP, NO2, TN, TP, TN)	Pathogenic Bacteria (enterococci) and toxic phytoplankton
SBM1	Impact (MEPA)	20° 18'25.19"S	118° 35'25.15"E	✓	✓	✓	✓	✓	✓	✓
SBM2	Impact (HEPA)	20° 18'11.32"S	118° 35'12.56"E	✓	✓	✓	✓	✓	✓	
REF1	Reference	20° 17'56.44"S	118° 35'11.69"E	✓	✓	✓	✓	✓	✓	
REF2	Reference	20° 17'50.52"S	118° 35'14.20"E	✓	✓	✓	✓	✓	✓	
REF3	Reference	20° 17'44.51"S	118° 35'16.75"E	✓	✓	✓	✓	✓	✓	
REF4	Reference	20° 17'15.08"S	118° 30'52.82"E	✓	✓	✓	✓	✓	✓	

Figure 2-1: Water quality sampling sites at the Port Hedland Spoilbank Marina.

2.2 Data Analysis

Data collected during the Q4 sampling event were cleaned and analysed as follows:

- Profile data were first cleaned to remove spurious measurements in the top 0.5m and the lower 0.5m of the water column. Data at these levels were affected by microbubbles in the turbulent surface layers, and the contact with sediments in the lower strata of the water column.
- Median values for each physicochemical profile were calculated and compared against the numerical EQGs in EPA (2019) and the legacy EQGs in Table 9 of Appendix A of the OEMP where appropriate.
- Laboratory water quality results were tabulated and compared against the numerical EQGs in EPA (2019).

2.3 QA/QC

- Manual QA/QC checks were completed on the physiochemical data refinement process, including the identification and removal of outliers.
- Field sampling included the collection of duplicate samples and met sample holding time requirements.
- All laboratory water quality analysis was completed at a NATA accredited laboratory and abides by QA/QC requirements as part of the accreditation.
- 4-bromofluorobenzene (surr.) (BFB) is employed as a surrogate standard in environmental laboratory analysis, particularly in methods involving volatile organic compounds (VOCs). It is added to samples prior to extraction and analysis to monitor the performance of the analytical process. BFB is not naturally present in environmental matrices, making it ideal for assessing method accuracy and recovery efficiency. Its consistent recovery confirms that sample preparation, instrument calibration, and analytical conditions are functioning correctly, thereby validating the reliability of the reported results.

3 Results

3.1 Visual Observations

Visual observations were conducted from the vessel at each site to satisfy the conditions from Table 12 from the OEMP are presented in **Table 3-1**. Visual observations form one of three components used to assess whether water quality remained safe for primary and secondary contact, and that 'Recreational and Aesthetic Values' are protected. At each site where visual observations were taken, no aesthetic exceedances were recorded against the EQGs as listed in Table 12 of the OEMP.

The EQGs for aesthetic values were met. There was therefore no requirement to conduct further monitoring against the EQS.

Table 3-1: General observations recorded at the monitoring sites for Spoilbank Marina

Site	Observations				
	Oil	Debris	Wrack	Fauna Deaths	Odour
SBM1	Nil	Nil	Nil	Nil	Nil
SBM2	Nil	Nil	Nil	Nil	Nil
REF1	Nil	Nil	Nil	Nil	Nil
REF2	Nil	Nil	Nil	Nil	Nil
REF3	Nil	Nil	Nil	Nil	Nil
REF4	Nil	Nil	Nil	Nil	Nil

3.2 Pathogenic Bacteria and Nuisance Organisms

Analysis of pathogenic bacteria and nuisance organisms comprised the other two components required to demonstrate that water quality remained safe for primary and secondary contact, and that 'Recreational Aesthetic Values' are protected. The results of pathogenic bacteria and nuisance algae sampling on the 5 May 2026 are presented in **Table 3-2** to satisfy the conditions from Table 12 and Table 13 from the OEMP.

- Nuisance algae concentrations and pathogenic bacteria were assessed from SBM1 only.
- Enterococci concentrations at SBM1 where below the LoR and did not exceed the concentrations against EQO3 and EQ04.
- There was no detection off DoHWA watch list species of pathogenic bacteria as per Table 13 of the OEMP.
- There was no presence of phytoplankton scum, filamentous algal mats, blue green algae or sewage fungus at SBM1.
- The median pH value at SBM1 did not exceed the range of EQ03 and EQ04.

Table 3-2: Pathogenic bacteria and nuisance organism analysis

EQO	EQG	Result (SBM1)
Safe for Primary contact (EQ03)	< 95th percentile of 200cfu/100ml. <10,000 cells/ml or DoHWA watch list species exceeded their trigger levels.	<1 cfu/100ml No detection off DoHWA watch list species exceeded their trigger levels.
Safe for Secondary contact (EQ04)	< 95th percentile of 2000cfu/100ml <25,000 cells/ml or DoHWA watch list species exceeded their trigger levels.	<1 cfu/100ml No detection off DoHWA watch list species exceeded their trigger levels.
Aesthetic values protected (EQ05)	Presence of phytoplankton scum, filamentous algal mats, blue green and sewage fungus	nil
pH value	5-9 pH units	8.23

The EQOs to maintain water quality is safe for primary and secondary contact and that 'recreational aesthetic values' are protected were met. There was therefore no requirement to conduct further monitoring against the EQS.

3.3 Physicochemical Stressors

Results of the physicochemical profiling and chlorophyll-a sampling events on 5 May 2026 are detailed in **Table 3-2** and summarised briefly below.

- Chlorophyll-a concentrations were consistently below the LOR and met the EQGs (both those listed in Table 9 of Appendix A of the OEMP (O2 Marine 2024).
- Median water temperature analysis identified marginal exceedances relative to both the winter legacy OEMP and EPA EQGs. Temperatures at SBM1 were 0.05 °C lower than those recorded at the coolest reference site (Ref 4), while SBM2 temperatures were marginally higher (0.8°C) than those at the warmest reference site (Ref 2). Despite these slight differences, temperatures were consistent with expected seasonal conditions for the Pilbara in July and were not considered atypical. Accordingly, the observed temperatures are unlikely to pose a risk to marine fauna or to adversely affect broader ecosystem processes.
- Median DO concentrations did not meet both the legacy OEMP and EPA EQGs during this quarter of monitoring. DO concentration at SBM1 and SBM2 were 0.3% and 0.8% lower than those recorded at the lowest reference site (Ref 4) respectively. Despite these marginal differences, the observed DO concentrations were consistent with seasonal winter conditions for the Pilbara are unlikely to pose a risk to marine fauna or to adversely affect broader ecosystem processes.
- pH values of 8.23 at SBM1 did not meet the MEPA EPA EQG by 0.04, however remained compliant against the legacy OEMP EGQs. Whilst this was a marginal exceedance, this pH value were within the normal range for Pilbara waters. SBM2 was compliant against both the legacy and EPA EGGs.
- The measured values for salinity and electrical conductivity on 5 May 2026 met the respective OEMP and EPA EQGs.

The EQGs for physicochemical stressors were not met. See Section 4 for comments on the need for contingency monitoring against the EQS.

Table 3-3: Median physicochemical measurements obtained on 5 May 2026 against the respective OEMP (O2 Marine 2024) and EPA (2019) environmental quality guidelines.

	OEMP EQG (MEPA)[1]	OEMP EQG (HEPA)[1]	EPA EQG (MEPA)[2]	EPA EQG (HEPA)[2]	LOR	Unit	SBM1 (MEPA)	SBM2 (HEPA)	REF1	REF2	REF2 (dup)	REF3	REF4
Chlorophyll-a	0.002	0.001	-	-	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Temperature	20.9 - 25.5	21.4 - 24.0	25.72 - 25.89	25.78 - 25.83	-	°C	25.67	26.17	25.89	25.83	25.78	25.83	25.72
DO	> 97.3	> 99.60	> 99.42	> 99.60	-	%	96.20	98.90	99.90	100.0	99.70	100.60	97
EC	N/A	N/A	57058.83 - 57653.97	57492.06 - 57650.90	-	uS/cm	57418.80	57559.90	57629.90	57645.70	57640.70	57650.3	57062.1
Salinity	32.8 – 38.9	32.90 – 38.90	37.96 – 38.41	38.29 - 38.41	-	PPT	38.24	38.33	38.39	38.40	38.40	38.41	37.97
pH	7.9 – 8.35	8.17 – 8.35	8.27 - 8.28	8.27 - 8.28	-	pH	8.23	8.26	8.28	8.28	8.28	8.27	8.28
Turbidity[3]	9.1	6.7	n/a	n/a	-	NTU	-	-	-	-	-	-	-

Notes: 1. Interim EQGs calculated from three-year data base from PHMEQSAP (O2 Marine 2023); 2. EQGs as per the EPA's guidance (EPA 2019) with exceedances bolded. The EPA's EQGs for temperature, EC, salinity, pH and turbidity are the 80th and 95th percentile values of the combined reference sites (n=5). Only the 20th and 5th percentile values were used for DO. Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQGs respectively. The EPA's EQG values are considered more appropriate than the legacy OEMP EQGs and are less likely to yield false positive results.; 3. EPA EQGs for turbidity (NTU) could not be calculated due to a technical issue with the logging instrument during deployment.

3.4 Toxicants in Water

3.4.1 Dissolved Metals

Results of the water quality sampling for heavy metals are detailed in **Table 3-4** and summarised briefly below. The laboratory certificate for the analysis is provided in **Appendix A**.

- Measurements of heavy metals at both SBM1 and SBM2 met their respective EQGs except for Zinc which marginally exceeded the EQGs at SBM2.
- Zinc concentrations at all reference sites were marginally higher than SBM2 and therefore the results at the HEPA were not considered of ecological significance.

The EQGs for dissolved metals were met. There was therefore no requirement to conduct further monitoring against the EQS.

3.4.2 Hydrocarbons

Results of the water quality sampling for hydrocarbons are detailed in **Table 3-5** and summarised briefly below. Laboratory certificate for analysis is provided in **Appendix A.**

- None of the measured hydrocarbon concentrations measured on 5 May 2026 exceeded the EQGs listed in Table 9 of Appendix A of the OEMP.
- All other measurements were below the laboratory limit of reporting (LOR).

The EQGs for hydrocarbons were met. There was therefore no requirement to conduct further monitoring against the EQS.

Table 3-4 Heavy metal concentrations recorded on 5 May 2026 compared against the respective OEMP (O2 Marine 2024) environmental quality guidelines.

Metal	EQG (MEPA)	EQG (HEPA)	LOR	Unit	SBM1	SBM2	REF1	REF2	REF2 (dup)	REF3	REF4
Aluminium	-	-	0.05	mg/L	< 0.05	0.07	0.06	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic	0.003	0.003	0.001	mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cadmium	0.014	0.0007	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	0.049	0.0077	0.001	mg/L	< 0.001	0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (III)	0.02	0.00014	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	0.003	0.0003	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01
Lead	0.0066	0.0022	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01
Mercury	0.0007	0.0001	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.001
Nickel	0.2	0.007	0.001	mg/L	< 0.001	< 0.001	0.001	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	0.023	0.007	0.005	mg/L	0.018	0.018	0.024	0.024	0.029	0.021	0.021

Notes: 1. EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQG triggers respectively.

Table 3-5. Hydrocarbon concentrations recorded on 5 May 2026 compared against the respective OEMP (O2 Marine 2024) environmental quality guidelines.

Hydrocarbon	OEMP EQG (MEPA)	OEMP EQG (HEPA)	LOR	Unit	SBM1	SBM2	REF1	REF2	REF2 (dup)	REF3	REF4
TRH											
TRH C6-C9	0.025	0.025	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C15-C28	0.1	0.1	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
2-methylnaphthalene			0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
BTEX											
Benzene	0.9	0.5	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.23	0.11	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.11	0.05	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.1	0.05	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Naphthalene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
4-Bromofluorobenzene (surr.)			1	%	99	102	103	104	97	101	105
Polycyclic Aromatic Hydrocarbons											
Acenaphthylene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)anthracene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
dibenzo (a, h) anthracene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
fluoranthene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene			0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

*Notes: 1. EQGs as per the OEMP (O2 Marine 2024). Orange and blue cells represent exceedances of the OEMP HEPA and MEPA EQG triggers respectively. *, ^ are inclusive analytes for low and high molecular PAHs respectively*

3.5 Nutrients in Water

Results of the water quality sampling for nutrients are **Table 3-7** and summarised briefly below.

- No exceedances were observed, and all nutrient concentrations met their respective EQGs.

The EQGs for nutrients were met. There was therefore no requirement to conduct further monitoring against the EQS.

Table 3-6. Nutrient concentrations recorded on 5 May 2026 compared against the respective EPA (EPA 2019) environmental quality guidelines.

Nutrient	EPA EQG (MEPA)	EPA EQG (HEPA)	LOR	Unit	SBM1	SBM2	REF1	REF2	REF2 Duplicate	REF3	REF4
Ammonia (as N)	0.50	0.51	0.02	mg/L	0.50	0.48	0.51	0.45	0.50	0.18	0.19
Nitrate (as N)	-	-	0.01	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrite (as N)	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
NOx (as N)	-	-	0.01	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.6	0.9	0.2	mg/L	0.6	0.6	1.0	0.5	0.5	< 0.2	0.5
Total Nitrogen	0.6	0.9	0.2	mg/L	0.6	0.6	1.0	0.5	0.5	< 0.2	0.5
Total Phosphorus	-	-	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Notes: 1. EQGs as per the EPAs guidance (EPA 2019). The EPA EQGs nutrients are the 80th and 95th percentile values of the combined reference sites (n=5) for the MEPA and HEPA respectively. Orange and blue cells represent exceedances of the HEPA and MEPA EQG triggers respectively.

4 Discussion

4.1 Physicochemical Stressors in Water

Water temperatures at the MEPA (SBM1) and HEPA (SBM2) exceeded the range of both the OEMP and EPA EQGs. The marginal exceedance at the MEPA was against the upper bound of the OEMP EGQ range (0.17ºC) but exceeded the lower bound of the EPA EQG range marginally by 0.05ºC. SBM2 exceeded the upper range bound of both the legacy OEMP EQG and EPA EQG.

While these differences were sufficient to exceed the winter EQGs as listed in the OEMP and the EPA EQGs, they were marginal and well within the range expected of Pilbara near-shore waters in May (EPA 2019). The observed exceedances in water temperatures are likely false positives and an artefact of the timing of sampling, which at SBM1 and SBM2 were sampled at the end of the sampling program and these sites are subject to discrete changes due to the marina being protected from ocean currents.

DO values at the MEPA (SBM1) and HEPA (SBM2) sites (96.2% and 98.9% respectively) were between 0.8 - 2% lower than the reference sites (97 - 100.6%). Based on these results, the DO values at SBM1 and SBM2 exceeded the EQGs for a moderate and high level of ecological protection respectively. However, similar to results for water temperature, DO values of between 96.2% and 98.9% are within the tolerance limits of flora and fauna of the Pilbara and are therefore not of ecological significance (EPA 2019).

While reduced hydrodynamic mixing in semi-enclosed marinas may result in lower DO relative to external, more exposed waters, the results in this case are likely due to natural variability or instrument drift. Further sampling is expected to improve the understanding of the spatiotemporal variability and reduce the probability of making Type I inference errors (falsely concluding there has been an exceedance).

Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

4.2 Toxicants in Water

Measurements of heavy metals at SBM1, located inside the Marina, and SBM2 located at the boundaries of the high and moderate ecological protection areas, met their respective EQGs. Only zinc recorded metal concentrations above the LOR. Metal concentrations in water were otherwise below the laboratory limit of reporting.

None of the measured hydrocarbon concentrations measured on 5 May 2026 exceeded the EQGs listed in Table 9 of Appendix A of the OEMP. The sum of all quantified analytes classified as low molecular weight, and high molecular weights met their respective EQGs. Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

4.3 Nutrients in Water

Nutrient monitoring is a new addition to the Spoilbank Marina OEMP, which commenced in Q3 2025. The EQGs for nutrients were developed based on EPA (2019) which advocates the use of the 80th and 95th

percentiles of the reference sites as triggers for a moderate and high level of ecosystem protection respectively.

All nutrient levels at both SBM1 and SBM2 met their respective EQGs. Ammonia values at SBM1 and SBM2 were marginally elevated relative to Ref 3 and Ref 4 sites, however, were within the range of the other reference sites.

While the EQGs for nutrients have been set based on the 80th and 95th percentile of reference sites, we note that the EPAs triggers for nutrient enrichment are based on chlorophyll-a, which in Q4 were consistently below detection limit. Based on these results, water quality within the marina met the EPAs criteria for both moderate and high-level ecosystem protection.

Based on these observations, there was no requirement to conduct further monitoring, nor was there a requirement to conduct further assessment against the EQSs.

5 Conclusion

Water quality within the marina is of an acceptable quality and within the range expected for Pilbara waters during the Australia winter. Based on these results, there was no requirement to conduct further monitoring against the EQS. EQO1, EQ03, EQ04 and EQ05 was achieved.

Appendices

Appendix A Laboratory Results Certificate

Stantec Australia Pty Limited
6F 226,Adelaide Terrace
Perth
WA 6000

Attention: [redacted]

Report **1355432-W**
Project name DOT
Project ID 304501863
Received Date May 06, 2026

Client Sample ID			SMB1	SMB2	REF1	REF2
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L26-My0015928	L26-My0015929	L26-My0015930	L26-My0015931
Date Sampled			May 05, 2026	May 05, 2026	May 05, 2026	May 05, 2026
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	99	102	103	104
BTEX and Naphthalene						
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total Recoverable Hydrocarbons						
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
2-Methylnaphthalene	0.1	ug/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	0.50	0.48	0.51	0.45
Chlorophyll-a	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Reactive Phosphorus (as P)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate (as N)	0.01	mg/L	0.01	< 0.01	< 0.01	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
NOx (as N)	0.01	mg/L	0.01	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	0.6	0.6	1.0	0.5
Total Nitrogen	0.2	mg/L	0.6	0.6	1.0	0.5
Total Phosphorus (as P)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Chromium (III) (filtered)*	0.002	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			SMB1	SMB2	REF1	REF2
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L26-My0015928	L26-My0015929	L26-My0015930	L26-My0015931
Date Sampled			May 05, 2026	May 05, 2026	May 05, 2026	May 05, 2026
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	99	104	118	115
p-Terphenyl-d14 (surr.)	1	%	149	144	90	85
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	0.19	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	0.19	< 0.05	< 0.05	< 0.05
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water						
Aliphatic >C16-C35	0.04	mg/L				
Aromatic >C16-C35	0.04	mg/L				
Heavy Metals						
Aluminium	0.05	mg/L	[G01]< 0.5	[G01]< 0.5	[G01]< 0.5	[G01]< 0.5
Metals M8						
Arsenic	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Cadmium	0.0001	mg/L	[G01]< 0.001	[G01]< 0.001	[G01]< 0.001	[G01]< 0.001
Chromium	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Copper	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Lead	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Mercury	0.0001	mg/L	[G01]< 0.001	[G01]< 0.001	[G01]< 0.001	[G01]< 0.001
Nickel	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Zinc	0.005	mg/L	[G01]< 0.05	[G01]< 0.05	[G01]< 0.05	[G01]< 0.05
Heavy Metals (filtered)						
Chromium (filtered)	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Microbiology						
Enterococci	1	CFU/100mL	< 1	-	-	-

Client Sample ID			REF2 DUP	REF3	REF4
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L26-My0015932	L26-My0015933	L26-My0015934
Date Sampled			May 05, 2026	May 05, 2026	May 05, 2026
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02
BTEX					
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	97	101	105
BTEX and Naphthalene					
Naphthalene[N02]	0.001	mg/L	< 0.001	< 0.001	< 0.001
Total Recoverable Hydrocarbons					
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02
2-Methylnaphthalene	0.1	ug/L	< 0.1	< 0.1	< 0.1
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C6-C36 (Total) (after silica-gel clean up)	0.1	mg/L	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.02	mg/L	0.50	0.18	0.19
Chlorophyll-a	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chromium (VI)	0.002	mg/L	< 0.002	< 0.002	< 0.002
Dissolved Reactive Phosphorus (as P)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Nitrate (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Nitrite (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
NOx (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	0.2	mg/L	0.5	< 0.2	0.5
Total Nitrogen	0.2	mg/L	0.5	< 0.2	0.5
Total Phosphorus (as P)	0.01	mg/L	< 0.01	< 0.01	< 0.01
Chromium (III) (filtered)*	0.002	mg/L	< 0.01	< 0.01	< 0.01
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.001	mg/L	< 0.001	< 0.001	< 0.001
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	90	93	90
p-Terphenyl-d14 (surr.)	1	%	55	92	55

Client Sample ID			REF2 DUP	REF3	REF4
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L26-My0015932	L26-My0015933	L26-My0015934
Date Sampled			May 05, 2026	May 05, 2026	May 05, 2026
Test/Reference	LOR	Unit			
TRH - 2013 NEPM Fractions (after silica gel clean-up)					
TRH >C10-C16 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH >C16-C34 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C34-C40 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C10-C40 (total) (after silica-gel clean up)*	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH - 1999 NEPM Fractions (after silica gel clean-up)					
TRH C10-C14 (after silica gel clean-up)	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C15-C28 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C29-C36 (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
TRH C10-C36 (Total) (after silica gel clean-up)	0.04	mg/L	< 0.04	< 0.04	< 0.04
Aro/Ali Split of TPH Water					
Aliphatic >C16-C35	0.04	mg/L			
Aromatic >C16-C35	0.04	mg/L			
Heavy Metals					
Aluminium	0.05	mg/L	[G01]< 0.5	[G01]< 0.5	[G01]< 0.5
Metals M8					
Arsenic	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Cadmium	0.0001	mg/L	[G01]< 0.001	[G01]< 0.001	[G01]< 0.001
Chromium	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Copper	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Lead	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Mercury	0.0001	mg/L	[G01]< 0.001	[G01]< 0.001	[G01]< 0.001
Nickel	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01
Zinc	0.005	mg/L	[G01]< 0.05	[G01]< 0.05	[G01]< 0.05
Heavy Metals (filtered)					
Chromium (filtered)	0.001	mg/L	[G01]< 0.01	[G01]< 0.01	[G01]< 0.01

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
BTEX	Welshpool	May 07, 2026	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX and Naphthalene	Welshpool	May 07, 2026	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Welshpool	May 07, 2026	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Welshpool	May 07, 2026	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
2-Methylnaphthalene	Welshpool	May 07, 2026	7 Days
- Method: ARL005 - Polycyclic Aromatic Hydrocarbons in Water			
Chlorophyll-a	Welshpool	May 07, 2026	28 Days
- Method: ARL141 - Chlorophyll-a and Pheophytin-a in Water			
Chromium (VI)	Welshpool	May 07, 2026	1 Day
- Method: ARL316 - Hexavalent Chromium in Water by Discrete Analyser			
Chromium (III) (filtered)*	Welshpool	May 06, 2026	180 Days
- Method: ARL402/403 - Metals in Water by ICPOES/ICPMS			
Polycyclic Aromatic Hydrocarbons	Welshpool	May 07, 2026	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Aro/Ali Split of TPH Water	Welshpool	May 07, 2026	7 Days
- Method: ARL111 - Aliphatic/Aromatic Split of TPH			
Heavy Metals	Welshpool	May 07, 2026	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Welshpool	May 07, 2026	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Welshpool	May 07, 2026	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Enterococci	MicWA	May 06, 2026	24 Hours
- Method: PM 4.4 - Faecal Streptococci (Enterococci) by Membrane Filtration			
Ammonia (as N)	Welshpool	May 07, 2026	28 Days
- Method: LTM-INO-4200 Ammonia by Discrete Analyser			
Dissolved Reactive Phosphorus (as P)	Welshpool	May 07, 2026	28 Days
- Method: ARL309 - Filterable Reactive Phosphorus in Water by Discrete Analyser			
Nitrate (as N)	Welshpool	May 07, 2026	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Nitrite (as N)	Welshpool	May 07, 2026	2 Days
- Method: LTM-INO-4350 Determination of NO2, NO3, NOx in Water by Discrete Analyser			
NOx (as N)	Welshpool	May 07, 2026	28 Days
- Method: LTM-INO-4350 Determination of NO2, NO3, NOx in Water by Discrete Analyser			
Total Kjeldahl Nitrogen	Welshpool	May 06, 2026	28 Day
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Nitrogen	Welshpool	May 07, 2026	28 Days
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Phosphorus (as P)	Welshpool	May 07, 2026	28 Days
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			

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Project Name: DOT
Project ID: 304501863

Order No.: 304501863
Report #: 1355432
Phone: 0458 839 200
Fax:

Received: May 6, 2026 1:40 PM
Due: May 13, 2026
Priority: 5 Day
Contact Name: [redacted]

Eurofins Analytical Services Manager : [redacted]

Sample Detail						2-Methylnaphthalene	Aluminium	Chlorophyll-a	Chromium (filtered)	Chromium (III) (filtered)*	Chromium (VI)	Enterococci	Polycyclic Aromatic Hydrocarbons	Metals M8	Aro/Ali Split of TPH Water	Eurofins Suite B19E	Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN
Perth Laboratory - NATA # 2377 Site # 2370 & 2554						X	X	X	X	X	X		X	X	X	X	X
External Laboratory																	
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**												
1	SMB1	May 05, 2026		Water	L26-My0015928	X	X	X	X	X	X	X	X	X	X	X	X
2	SMB2	May 05, 2026		Water	L26-My0015929	X	X	X	X	X	X		X	X	X	X	X
3	REF1	May 05, 2026		Water	L26-My0015930	X	X	X	X	X	X		X	X	X	X	X
4	REF2	May 05, 2026		Water	L26-My0015931	X	X	X	X	X	X		X	X	X	X	X
5	REF2 DUP	May 05, 2026		Water	L26-My0015932	X	X	X	X	X	X		X	X	X	X	X
6	REF3	May 05, 2026		Water	L26-My0015933	X	X	X	X	X	X		X	X	X	X	X
7	REF4	May 05, 2026		Water	L26-My0015934	X	X	X	X	X	X		X	X	X	X	X
Test Counts						7	7	7	7	7	7	1	7	7	7	7	7

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised by:

[redacted]

[redacted]
General Manager

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

dalcon environmental

NATA WORLD RECOGNISED ACCREDITATION

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Laboratory	Dalcon Environmental
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Email	[redacted]

Project	Miscellaneous	**Dalcon Environmental Reference**	DE03863
Samples	1	**Report Number**	DE03863.R0
Date Received	7/05/2026	**Date Reported**	20/05/2026

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing.
NATA accredited laboratory 20077.

These results apply only to the sample(s) as received and tested.
This report may only be reproduced in full.

SIGNATORY

[redacted]

[redacted]
Principal/Senior Scientist

Analytical Report
Report DE03863.R0

CLIENT DETAILS		LABORATORY DETAILS	
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Client	EUROFINS	**Laboratory**	Dalcon Environmental
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Project	Miscellaneous	**Dalcon Environmental Reference**	DE03863
Samples	1	**Report Number**	DE03863.R0
Date Received	7/05/2026	**Date Reported**	20/05/2026

LABORATORY COMMENTS

Sample received unpreserved and chilled. Sample integrity intact.
Sample settled in a Utermohl chamber (25ml) and preserved with Lugol's Iodine.
Sample analysed using method DE-AM-03. Limit of Reporting = 80 cells L^{-1}

Suffix (PT) = potential toxin producer
Suffix (t) = trichome/filament
Suffix (unknown) = unidentifiable to genus level

Where (PT) is indicated next to a genus, it should be noted that not all (and, in most cases, only a few) species within that genus are responsible for producing these compounds.

OTHER COMMENTS

PO Number: AU0145209847

Sample Description:
DE03863.1: Sample clear and colourless.

Sample Notes:

Analytical Report
Report DE03863.R0

SAMPLE DETAILS

DE Sample Number	DE03863.1
Sample Type	Marine
Client Sample Desc.	SBM1
Sample Date	6/05/2026

Test Method: DE-AM-01

Analysis Date	20/05/2026
Chamber Type	SRC
Chamber Volume	1ml
Concentration Factor	100x
Units	cells L^{-1}
LOR	100 cell L^{-1}

Analytical Results

Taxon	Abund.	%
Bacillariophyceae	**29040**	**82.69**
Amphora spp	4400	12.53
Bacteriastrum spp	400	1.14
Chaetoceros spp	3760	10.71
Cocconeis spp	800	2.28
Coscinodiscus spp	2560	7.29
Cylindrotheca closterium	8960	25.51
Entomoneis spp	80	0.23
Guinardia spp	320	0.91
Gymnodinium spp	80	0.23
Leptocylindrus spp	640	1.82
Navicula spp	240	0.68
Pseudo-nitzschia "delicatissima" group (PT)	3360	9.57
Rhizosolenia setigera	320	0.91
Thalassiosira spp	2880	8.20
Thalassiothrix spp	240	0.68
Chlorodendrophyceae	**400**	**1.14**
Tetraselmis spp	400	1.14
Dinophyceae	**5680**	**16.17**
Gonyaulax spp	160	0.46
Gyrodinium spp	80	0.23
Heterocapsa spp	1120	3.19
Peridiniella spp	1280	3.64
Prorocentrum micans	80	0.23
Protoperidinium spp	1040	2.96
Scrippsiella spp	1920	5.47
TOTAL (All Taxa)	**35120**	**100**

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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Appendix E Spoilbank Marina Hatchling Orientation and Light Monitoring 2025/2026

nocterra

REPORT REF	N00604	8 JUNE 2026

Spoilbank Marina: Hatchling Orientation and Light Monitoring 2025/26

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	Internal Review	17/04/2026	[redacted]
Rev A	Client Review	24/04/2026	[redacted]
Rev B	Report Draft	22/05/2026	[redacted]
Rev 0	Final	08/06/2026	[redacted]

DISCLAIMER AND LIMITATION

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1. INTRODUCTION

1.1 Background

The Spoilbank Marina Project (Project) is located in Port Hedland, in the Pilbara region of Western Australia (WA). It is situated on the western side of the spoilbank sand formation created in the 1970s during the Port Hedland inner harbor development. The Project became operational in 2025, and features a boat ramp, 22 boat pens, public recreational facilities, parking, and an art/cultural gathering space.

Given the proximity of listed threatened species to the Project, including marine turtles and sawfish, the Project was referred by the Department of Transport (now the Department of Transport and Major Infrastructure (DTMI)) in 2019 under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth; EPBC Act). Approval for the Project was received on 19th February 2021 under EPBC 2019/8520. Following issue of implementation conditions, two variations to the Approval were granted, and the Approval was transferred to the Pilbara Ports Authority (PPA). However, in July 2024, ownership of the Project was transferred back to DTMI. It is noted that during the transitional handover period from PPA, the turtle nesting, hatchling orientation, and light monitoring surveys for the 2024/25 season were not undertaken. The Department of Climate Change, Energy, the Environment and Water (DCCEEW) was informed of the missed monitoring season by DTMI in February 2025.

Condition 5a of EPBC 2019/8520 required an Artificial Light Management Plan (ALMP) be developed to ensure artificial light associated with the operation of the Project did not impact on flatback turtle nesting on Cemetery Beach (Pendoley Environmental 2024a). The ALMP includes requirements to undertake a hatchling orientation and light monitoring program during operations (including limited operations) and assess results against outcome-based criteria to determine if there were any significant impacts on hatchling sea-finding behaviour. Furthermore, a lighting audit was required in the first year of operations to determine compliance with lighting control measures and identify any remedial actions required, which was undertaken by Nocterra (2025).

1.2 Scope of Works

To fulfil the requirements of the ALMP, Stantec (on behalf of DTMI) engaged Nocterra to undertake the required turtle hatchling orientation and artificial light monitoring survey for the 2025/26 season at Cemetery Beach in Port Hedland (**Figure 1**). This report presents the findings from this survey and provides an assessment of the combined results against trigger and threshold values specified in the ALMP.

Figure 1: *Hatchling and light monitoring survey areas in 2025/26.*

2. METHODOLOGY

The data capture and analysis undertaken in 2025/26 align with the approach taken for the baseline survey in the 2023/24 season (Pendoley Environmental 2024b).

2.1 Survey Location and Schedule

One field survey was completed over a 15-day period between the 12th to 26th January 2026. This survey was scheduled to coincide with both the new moon on the 19th January and the peak hatching period for flatback turtles on Cemetery Beach. Hatchling orientation monitoring was undertaken daily at Cemetery Beach, consisting of the length of the beach between Cemetery Beach Park and Mosely Street (**Figure 1**).

Artificial light monitoring was conducted at two locations on Cemetery Beach (CB East and CB West), aligning with historical data collection locations (**Figure 1**). Light monitoring was undertaken daily between the 13th and 17th January 2026.

2.2 Hatchling Orientation

2.2.1. Data Collection

The most common method to monitor the influence of existing artificial light on the sea-finding behaviour of hatchling turtles is to record the angles of their tracks left on the beach (a 'nest fan') after they emerge from the nest and crawl to the ocean (Pendoley 2005).

A nest fan was recorded if five or more hatchling tracks were sighted from a hatched clutch. Hatchling tracks fan out from a localised depression (i.e. nest cone) in the sand which marks their point of emergence. A sighting compass was used to measure the bearing of the outermost tracks of the nest fan (vectors A and B) and the bearing of the most direct route to the ocean (vector X; **Figure 2**) relative to the nest cone and the point at which the hatchling tracks crossed the high tide line. Single hatchling tracks that were separated by more than 30˚ from the outermost track of the main fan were recorded as outliers, as per the methodology of Pendoley (2005).

A GPS location was recorded at the emergence point of the nest. In addition, a circle was drawn in the sand around the depression, and a line drawn through all hatchling tracks, to ensure the same nest fan was not recorded on subsequent monitoring days.

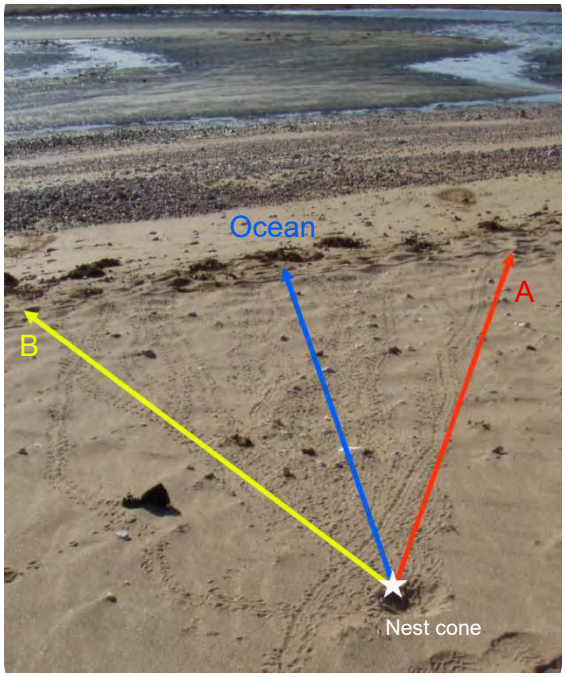

Figure 2: *Example of nest fan angles measured to assess hatchling orientation. Red arrow: 'A' angle. Yellow arrow: 'B' angle. Blue arrow: bearing to ocean. White star: emergence point (i.e. nest cone). End points of arrows indicate where hatchling tracks cross the high tide line.*

2.2.2. Data Analysis

Hatchling orientation data was analysed to provide two metrics:

- **Spread Angle:** The range of dispersion of tracks from the emergence point towards the ocean (i.e. Angle B minus Angle A; **Figure 2**). A larger value indicates greater variation in ocean-finding bearings and may indicate disruption to natural hatchling sea-finding ability.
- **Offset Angle:** The degree of deflection of tracks from the most direct route to the ocean (i.e. deviation in central bearing of Angles A and B relative to the ocean; **Figure 2**). A smaller value indicates hatchlings travelling a more direct route to the ocean, while a larger value demonstrates greater deviation from the most direct route, which may indicate disruption to natural hatchling sea-finding ability.

These metrics were compared against baseline trigger and threshold limits outlined in the ALMP to determine whether exceedances occurred in 2025/26.

2.3 Artificial Light

2.3.1. Data Collection

Artificial light data was captured at each monitoring site (**Figure 1**) using an All-Sky Camera (ASC).

Each ASC incorporates a DSLR camera and fisheye lens with a 360° wide and 90° high field of view, which captures images of the complete hemisphere of sky visible above deployment

locations. The ASC camera, lens, and associated electronic systems are encased within a weatherproof housing, allowing them to be left in harsh conditions for up to a week at a time. After deployment, a small onboard computer automates the ASC to capture images with 64 second exposures at set intervals (typically 15 minutes) throughout the night (i.e. between sunset and sunrise). Captured data was downloaded wirelessly at the start of each day prior to the ASC being redeployed for the next night of monitoring.

Imagery is typically collected during a new-moon period to reduce the influence of natural light on the results. The viability of images can be impacted by weather and atmospheric conditions such as cloud, rain, dust, and humidity. Any images determined to be impacted by natural light (e.g. sun or moon is visible) and/or weather conditions were removed from the dataset prior to analysis.

2.3.2. Data Analysis

All viable ASC images were processed using specialised software to measure several sky brightness metrics including “whole-of-sky” (WOS) and “horizon” brightness. These represent the mean brightness in the entire image (**Figure 3a**), and the mean brightness in the 60° – 90° region closest to the horizon (**Figure 3b**), respectively. Additionally, sky brightness was measured for the Spoilbank Marina sector, which is the mean value of sky glow within the 60° – 90° outer band constrained to the bearings of the Spoilbank Marina as viewed from the Cemetery Beach monitoring locations (**Figure 3c**).

Sky brightness was quantified in visual magnitudes per square arcsec (Vmag); a standard unit used for astronomical light intensity measurement. These units indicate luminance (i.e. how much light is received by an observer) as opposed to illuminance (i.e. how much light falls on a surface) and are considered more biologically relevant than other, more commonly used units of measurement such as lux, which are relevant only to human vision. It is important to note that visual magnitudes are measured on an inverse logarithmic scale and that lower values indicate a higher brightness. For example, naturally dark skies typically provide a reading of 22 – 24 Vmag.

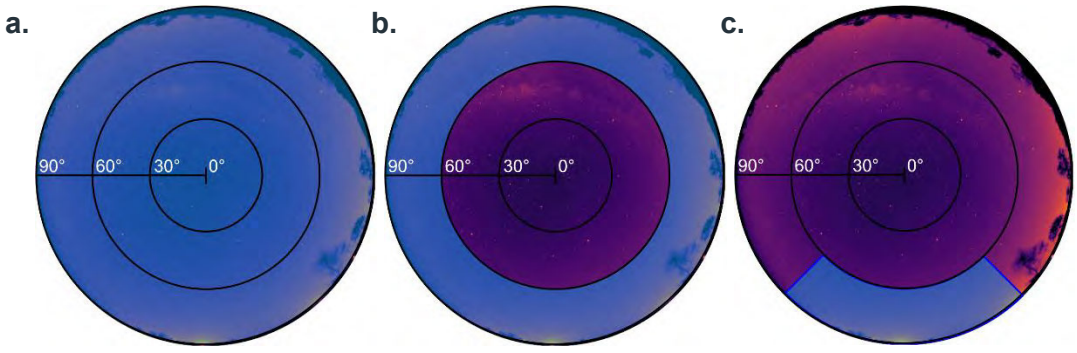

Figure 3: *Light monitoring metrics. a. Whole-of-sky brightness (mean value of whole image); b. Horizon brightness (mean value of pixel in the 60° – 90° outer band); c. Sector brightness (mean value of pixels within a defined region). Blue shading indicates area of the sky being measured.*

2.4 Trigger and Threshold Criteria for Key Metrics

The mean of the spread angle and offset angle at each monitoring location was determined, as well as an upper bound and lower bound for each mean (for full methodology, refer to Pendoley Environmental 2024a). The upper and lower bounds indicate a 95 % probability that the true mean lies within these limits, based on the data (also referred to as the 95 % highest posterior density interval; Cremers 2018).

The upper and lower bounds of the baseline mean for both spread angle and offset angle were used to assess if the post-baseline data were statistically different to the baseline dataset. If the post-baseline mean was beyond the upper bound of the baseline data, but the lower bound was within the baseline limits, this implied that there *may* be a difference between the baseline and post-baseline data (i.e. a trigger; **Figure 4a**). However, if the post-baseline lower bound exceeded the upper bound of the baseline data, then this implied that there was a significant difference between the baseline and post-baseline data (i.e. a threshold; **Figure 4b**) (Cremers 2018). Specifically, trigger and threshold criteria are defined as follows:

Trigger criteria:

- The mean of the post-baseline offset angle exceeds the upper bound of the baseline offset angle but the post-baseline lower bound is still within the baseline limits; **or**
- The mean of the post-baseline spread angle exceeds the upper bound of the baseline spread angle but the post-baseline lower bound is still within the baseline limits.

Threshold criteria:

- The lower bound of the post-baseline offset angle exceeds the upper bound of the baseline offset angle; **or**
- The lower bound of the post-baseline spread angle exceeds the upper bound of the baseline spread angle.

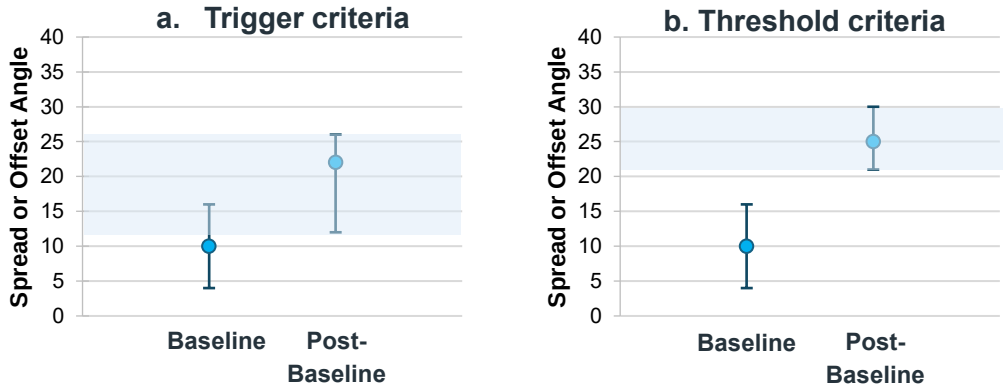

Figure 4: *Examples of statistical comparisons between baseline and post-baseline datasets. a. Possible change (trigger criteria): the lower bound of the post-baseline dataset is above the baseline mean, within the baseline limits; b. Significant change (threshold): the lower bound of the post-baseline dataset exceeds the upper bound of the baseline dataset. Shaded blue boxes represent limits of the post-baseline dataset.*

Defined trigger and threshold criteria values for the 2025/26 hatchling orientation monitoring season, based on the 2023/24 season baseline data are outlined in **Table 1**.

Table 1: *Spread and Offset angle trigger and threshold criteria defined in the Project ALMP.*

Metric	Trigger Criteria	Threshold Criteria
Spread Angle	The mean exceeds 96° but the lower bound is less than 96°.	The lower bound exceeds 96°.
Offset Angle	The mean exceeds 32° but the lower bound is less than 32°.	The lower bound exceeds 32°.

3. RESULTS

3.1 Hatchling Orientation

A total of 17 marine turtle hatchling nest emergences were recorded during the field survey. Of these, 12 nest fans were able to be measured and included in the data analysis, due to the remaining five emergences overlapping and appearing uninterpretable. No outliers were recorded for any emergence.

The estimated mean spread and offset angles, along with the lower and upper bounds for each survey location, are shown in **Table 2**. The lower bounds were less than the mean of the baseline data for both spread and offset angle (**Figure 5**), and consequently, there were no exceedances in either metric at any location (**Table 2**).

The nest fan locations and fan angles at Cemetery Beach are shown in **Figure 6**.

Table 2: *Spread and Offset angle mean, lower bound and upper bound for hatchling fans at Cemetery Beach in the 2025/26 season.*

Metric	*n*	Mean Angle (°)	Lower Bound (°)	Upper Bound (°)	Exceedance
Spread Angle	12	66.6	54.9	79.4	None
Offset Angle	12	12.5	6.4	19.3	None

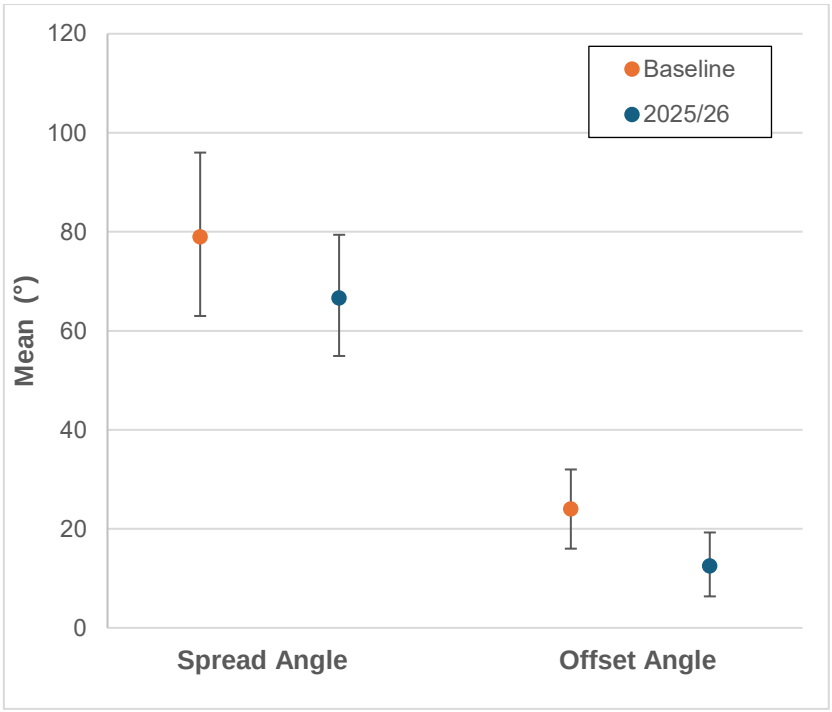

Figure 5: *Comparison between baseline (orange) and post-baseline (i.e. 2025/26; blue) spread and offset angles at Cemetery Beach.*

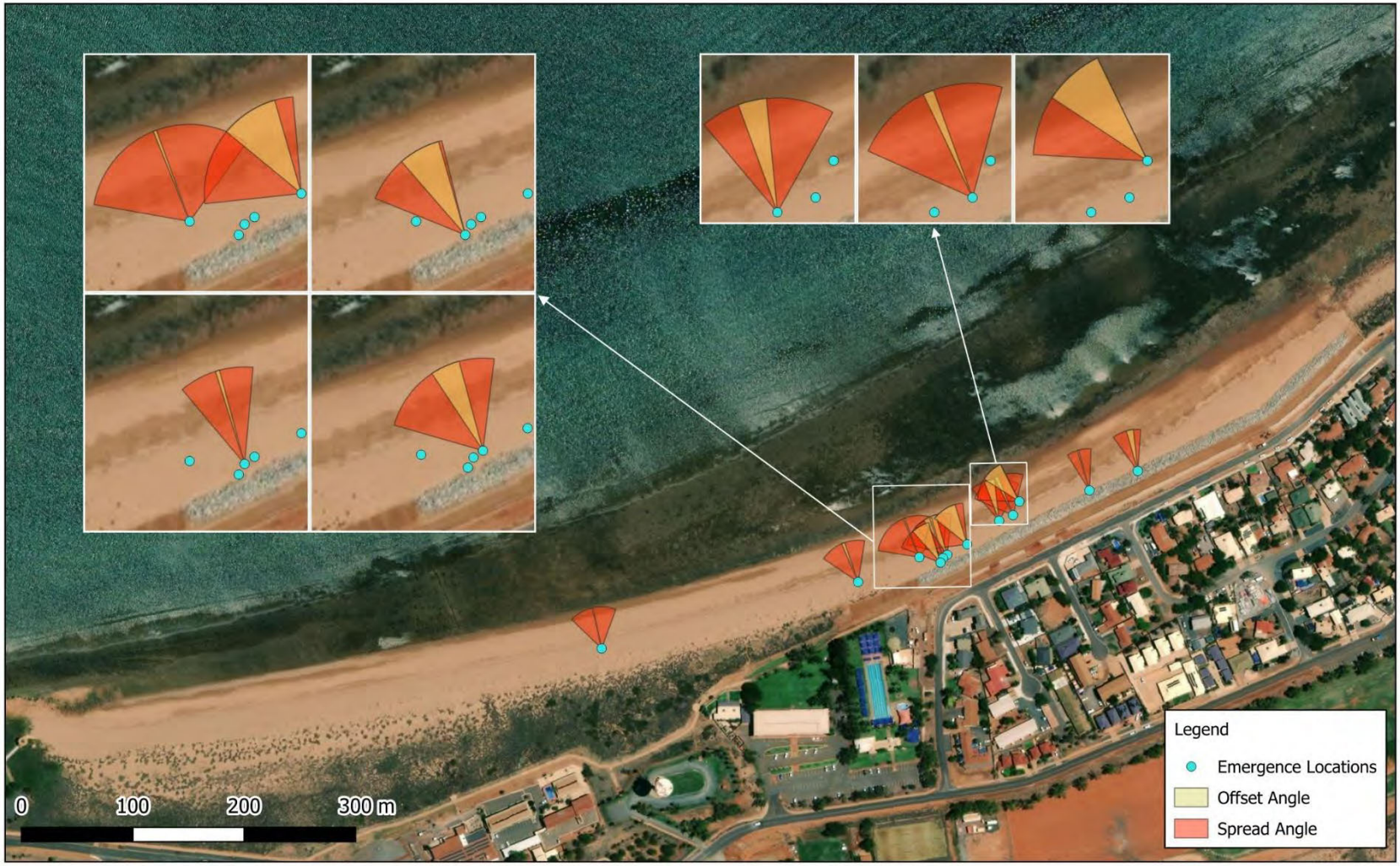

Figure 6: *Spread (red) and offset (yellow) angles of hatchling fans at Cemetery Beach in 2025/26.*

3.2 Light Monitoring

While night-time weather conditions during the survey period were consistently cloudy, clear night-sky imagery was captured from both monitoring locations. The clearest image from clearest night at each location was analysed and is presented within this report (**Figure 7** and **Figure 8**).

Notable light sources present in the imagery were similar to those observed in previous seasons of monitoring and included the port facilities, Port Hedland residential and commercial lighting, streetlights, and vessels. The port facilities were the most dominant source of sky glow visible from both monitoring locations, which overlap with the bearing of the Project. Streetlights along Sutherland Street are visible as high intensity point sources of light towards the northeast, which have decreased in brightness from the previous season of monitoring. Lower-intensity point sources of light corresponding to offshore vessels are visible on the horizon, with an increase in sources as compared to the previous seasons of monitoring to the northwest and northeast from both locations (**Figure 7** and **Figure 8**). It is noted that when compared to the previous seasons of monitoring, there is a decrease in the visible light produced from the Gratwick Aquatic Centre at CB East (**Figure 7**).

Median WOS and horizon brightness at each monitoring location correlated strongly with the visibility of the identified light sources. CB West, which is located closer to the port facilities and has lower dunes, recorded the brightest values for both WOS and horizon brightness (18.59 and 18.18 Vmag respectively). This was followed by CB East, which is located further from the port facilities with higher dunes, but still had direct visibility of these light sources (18.88 and 18.55 Vmag respectively). Sky brightness was slightly higher at CB East than at CB West (17.47 and 17.50 Vmag respectively) and produced a higher sky brightness than WOS or horizon, likely due to the sector focusing on a direct light source that also overlaps the port facilities (**Table 3**). Compared to previous monitoring seasons, the WOS, horizon and sector brightness recorded at the monitoring locations in the 2025/26 season indicated a lower level of sky brightness (**Table 3**; Pendoley Environmental 2024b).

Table 3: *WOS, horizon and Spoilbank Marina Sector brightness at each monitoring location and the change (percentage) in brightness between the previous (2023/24) and current monitoring seasons.*

Monitoring Location	Sky Brightness (Vmag)		
	WOS	Horizon	Spoilbank Marina Sector
CB East	18.88 ↓18.34%	18.55 ↓21.30%	17.47 ↓7.96%
CB West	18.59 ↓17.59%	18.18 ↓18.34%	17.50 ↓17.59%

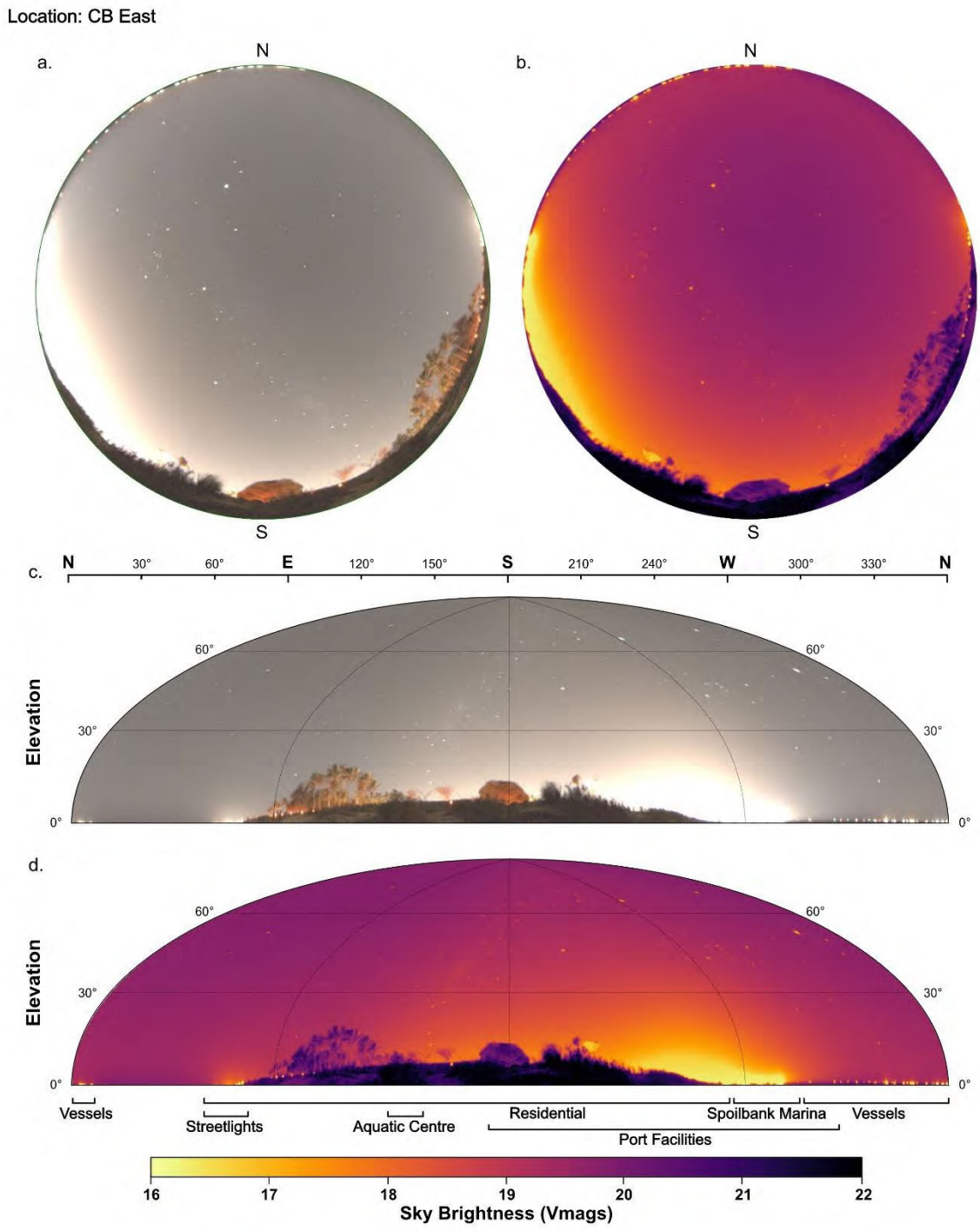

Figure 7: *ASC light monitoring results at CB East on 13th January 2026. a: Raw image; b: Processed image; c: Raw panoramic projection; d: Processed panoramic projection.*

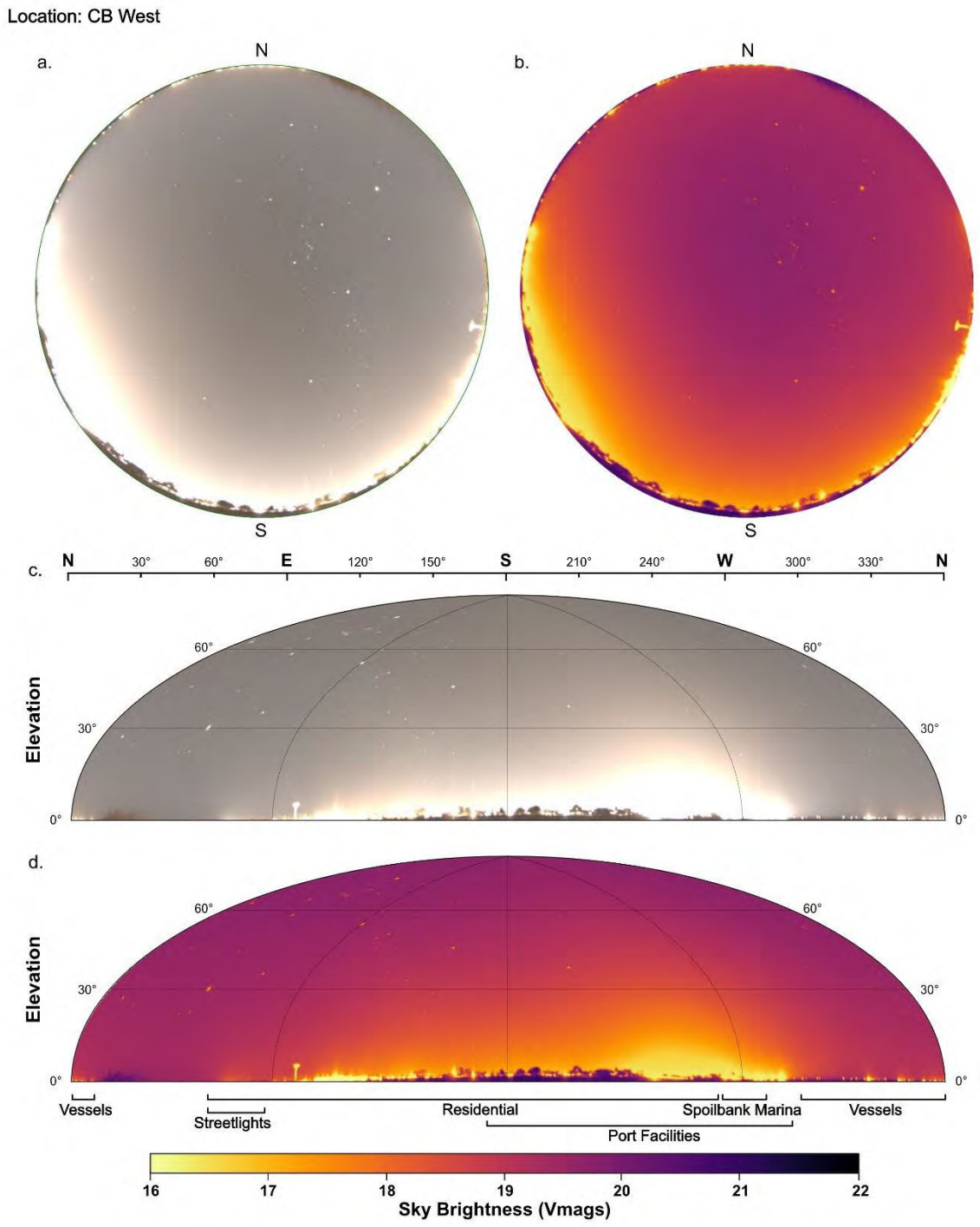

Figure 8: *ASC light monitoring results at CB West on 15th January 2026. a: Raw image; b: Processed image; c: Raw panoramic projection; d: Processed panoramic projection.*

4. DISCUSSION

Hatchling orientation was monitored over a period of 15 consecutive days at Cemetery Beach during the 2025/26 marine turtle nesting season. The monitoring collected hatchling orientation data as required by the ALMP for the first year of Project operations. Key metrics (i.e. spread and offset angles) were analysed and compared against baseline data to identify any exceedances in trigger and threshold limits. Furthermore, light monitoring data was captured from two monitoring locations to provide insight into the causal factors of any adverse changes observed in hatchling behaviour.

Hatchling emergence activity was low in 2025/26, with a total of 17 nest emergences recorded across Cemetery Beach, 12 of which were included for analysis. The remaining five samples were excluded from the analysis due to tracks overlapping with other emergences. In contrast, 135 nest fans were recorded in 2023/24 (Pendoley Environmental 2024b). While the cause of the lower emergences in 2025/26 is not definitive, similar trends were observed at other nesting habitat in the Pilbara (pers. comm. A. Mitchell). The reduced emergence success is likely due to the impacts of a heatwave that occurred during the peak nest incubation period throughout December 2025 and January 2026 (Bureau of Meteorology 2026).

No exceedances in trigger or threshold limits were recorded for either spread or offset angle in 2025/26, and there were no indications of severe mis- or dis-orientation events. This was in contrast to 2023/24 where several nest emergences were severely disoriented in close proximity to the Gratwick Aquatic Centre. Most emergences in 2025/26 were distributed in front of the seawall on the eastern part of Cemetery Beach, whereas in 2023/24 emergences were more evenly distributed across the western section of the beach (Pendoley Environmental 2024b).

In general, identified light sources remained similar to those reported in previous seasons. However, notable changes were the reduction in visible light from the Gratwick Aquatic Centre and streetlighting, previously visible from CB East, and the increase in visible light from vessels at both locations. New, low-intensity amber bollard lighting recently installed by the Town of Port Hedland was also visible at CB East. Sky brightness recorded in the direction of Spoilbank Marina was lower than recorded in the baseline survey, though changes appear minor and could be attributed to overlapping light sources such as the port facility (Pendoley Environmental 2024b).

In conclusion, there were no exceedances in hatchling orientation metrics in the first year of Project operations (i.e. 2025/26) when compared to baseline. However, it is noted that the sample size was low, likely due to adverse natural factors impacting emergence success, and that this result should be interpreted with caution as a result. Ongoing monitoring in future seasons will allow for continued detection and assessment of any mis- or dis-orientation of hatchlings associated with Project lighting.

5. REFERENCES

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Pendoley Environmental (2024a) Port Hedland Spoilbank Marina Artificial Light Management Plan. Report prepared for Pilbara Ports Authority. Revision 4, Report Number J11301. 30 July 2024.

Pendoley Environmental (2024b) Spoilbank Marina: Baseline Hatchling Orientation and Light Monitoring. Report prepared for Pilbara Ports Authority. Revision 0, Report Number J11302. 25 March 2024.

Appendix F Spoilbank Marina Cemetery Beach SMP 2025 Report

Port Hedland Spoilbank Marina Project: Cemetery Beach Summary Report

Prepared for: Department of Transport and Major Infrastructure

Date: 04/02/2026

Project: 304501863

Prepared by: Stantec

Stantec Australia Pty Ltd

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
A01	04/02/2026	Draft report for client review	[redacted]	[redacted]		[redacted]

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1 Introduction

1.1 Background

The Spoilbank Marina, located on the western extent of the Spoilbank sand formation in Port Hedland, was developed to replace the Richardson Street Boat Ramp and to redirect recreational boating traffic away from the commercial shipping channel within the inner harbour. Federal environmental approval for the project was granted by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) on 19 February 2021 (EPBC 2019/8520).

On 9 July 2024, DCCEEW approved the transfer of proponent responsibilities from Pilbara Ports (PP) to the Department of Transport and Major Infrastructure (DTMI) (previously Department of Transport (DoT)). As the new proponent, DTMI has assumed full operational responsibility for the Spoilbank Marina, including ongoing environmental management, monitoring and maintenance of the facility.

1.2 EPBC 2019/8520 Port Hedland Spoilbank Marina Cemetery Beach Sediment Management Plan

To satisfy the relevant conditions of EPBC 2019/8520, the Cemetery Beach Sediment Management Plan (SMP) (M P Rogers & Associates, 2024) was prepared to ensure that construction and operation of the Spoilbank Marina does not result in, or contribute to, sediment loss from Cemetery Beach. Specifically, the SMP sets out the required coastal monitoring program and associated management actions following construction of the facility, with a focus on identifying changes to coastal processes and sediment transport pathways associated with the development.

The SMP stipulates the following monitoring approaches:

- Aerial topographic surveys of the coastline in the vicinity of the Seawall, Cemetery Beach and Spoilbank.
- Beach profiles ‘cut’ from the aerial topographic survey.
- Photographic monitoring.
- Shoreline mapping using ortho-rectified aerial photographs.
- Post cyclone monitoring.
- Assessment of shoreline changes against triggers

The SMP stipulates the following monitoring frequency:

- Baseline: May/ June 2023 and September/ November 2023.
- Biannually (during May and September each year) until at least September 2025.
- Annually (during September each year) until at least September 2027.

1.3 Trigger Assessment

Baseline surveys undertaken by M P Rogers & Associates (2023) informed the development of management triggers for the survey area. These triggers are defined within the Operational Environmental Management Plan (OEMP) (O2 Marine, 2024) and are presented below.

- **Trigger 1**: Where the observed rate of recession of the shoreline or beach profile on Cemetery Beach is greater than 5 m plus the assessed rate of long term shoreline recession (approximately 0.7 m/yr) as measured from the baseline survey location, or assessed by an experienced coastal engineer, further investigation will be required to ascertain the potential cause of the erosion.

- **Trigger 2:** Where the observed shoreline movement outside of Cemetery Beach is significantly different to the expected shoreline changes (approximately greater than 10 m plus the assessed rate of long term approximately 0.7 m/yr rate of shoreline recession as measured from the baseline, or as assessed by an experienced coastal engineer), further investigation will be required to ascertain the potential cause of the difference.

If a trigger is exceeded, further investigation is required by an experienced coastal engineer to determine if the exceedance was the direct result of the Spoilbank Marina and if the shoreline changes have had, or are likely to have, an impact on Cemetery Beach.

1.4 Purpose of this Report

Stantec has been commissioned by DTMI to implement the SMP since September 2025. This report summarises the data collected during the September 2025 monitoring campaign.

Implementation of the SMP prior to September 2025 has been reported previously by M P Rogers & Associates (2024b, 2025). It is understood that monitoring was not undertaken during the September 2024 campaign. In addition, monitoring data collected during earlier campaigns has not been made available for inclusion in this report. As a result, interpretation of the September 2025 monitoring data is necessarily limited.

Monitoring Data

2 Manual Imagery

2.1 Methods

Manual imagery is captured using a high-resolution camera at eight monitoring locations across the study area. Images are processed using the software package Solocator to establish spatial metadata including camera heading, GPS location and timestamp information. Where applicable, photographs are captured looking both up- and down- the beach. The locations of the manual imagery sites are shown in **Figure 2-1** and coordinates are provided in **Table 2-1**.

Table 2-1: Location and Coordinate Details for Manual Imagery.

Photo Monitoring Location	Coordinates (MGA GDA 2020)		Approximate Heading (°TN)
	Easting (m)	Northing (m)	
1	665,975	7,753,947	40
2	666,282	7,754,417	215, 40
3	666,533	7,754,644	225, 190
4	666,847	7,753,612	310, 80
5	667,729	7,753,679	85, 260
6	668,464	7,753,770	65, 250
7	668,945	7,753,986	235
8	668,963	7,754,029	50

2.2 Results

Manual imagery collected during the monitoring campaign was captured on 24 September 2025. All manual imagery is provided in **Appendix A** below.

Figure 2-1: Manual Imagery Locations.

3 Aerial Topographic Surveys

3.1 Methods

Aerial topographic surveys are undertaken using full-coverage photogrammetry to capture elevation data across the subaerial beach. Surveys are undertaken during low spring tide conditions, preferably during the morning and evening, to take advantage of optimal lighting and sun angle. Temporary ground control points (GCPs) and independent check points are surveyed using a differential GNSS rover operating in real-time kinematic (RTK) mode.

Pre- and post-survey quality checks are undertaken at state survey control marks within the study area to confirm the accuracy and stability of the RTK corrections and to ensure traceability of the final datasets. Following the aerial survey, imagery and GCP data are processed using the software package Pix4D, enabling generation of a spatially accurate orthomosaic and digital elevation model (DEM).

It should be noted that photogrammetry cannot penetrate surfaces such as vegetation and water. As such, the elevation model can be confounded in areas of high vegetation and where the ocean encroaches on the shoreline.

In accordance with the SMP, beach profiles are extracted from the aerial topographic survey to enable comparison across monitoring campaigns, where survey data is available. The survey extent and the locations of the extracted beach profiles are shown in **Figure 3-1** below.

3.2 Results

3.2.1 Aerial Topographic Surveys

Aerial topographic surveys collected during the monitoring campaign were undertaken over a four-day period between 22 and 25 September 2025. Contours extracted from the aerial topographic surveys are presented in **Figure 3-1**, below. The processed survey data and survey reports can be accessed interactively via the link provided below.

Typical RTK positional precision (RMSE) achieved during the surveys was approximately 0.01–0.06 m horizontally and 0.04–0.12 m vertically. A minimum of seven ground control or independent check points were established for each of the four unmanned aerial vehicle (UAV) surveys completed across the study area. Across all surveys, photogrammetry processing typically achieved GCP precision (RMSE) of 0.01–0.06 m horizontally and 0.03–0.07 m vertically.

Spoilbank Marina - Photogrammetry - September 2025

Figure 3-1: Aerial Topographic Survey and Beach Profiles.

3.3 Beach Profiles

Beach profiles extracted from the aerial topographic surveys are presented in **Appendix B**.

3.4 0m AHD & +4m AHD Contours

Implementation of the SMP has previously involved mapping changes in the position of the 0m AHD and +4m AHD contours. For completeness, Stantec has reproduced the changes previously reported in M P Rogers & Associates (2025). In addition, changes in the 0m AHD and 4m AHD contours have been extracted from the aerial topographic survey undertaken during September 2025 to enable visual comparison against SMP triggers. The contour changes are presented in **Figure *3-2*** and **Figure 3-3**, below.

It should be noted that manually re-producing the contour changes previously applied to the SMP introduces some inherent positional uncertainty. Notwithstanding this, the magnitude of this uncertainty is not expected to influence the outcomes of the trigger exceedance assessment.

3.5 Results

Assessment of the September 2025 contour data against the trigger values derived from baseline did not identify any exceedances at any beach profile locations for either the 0 m or 4 m AHD contours.

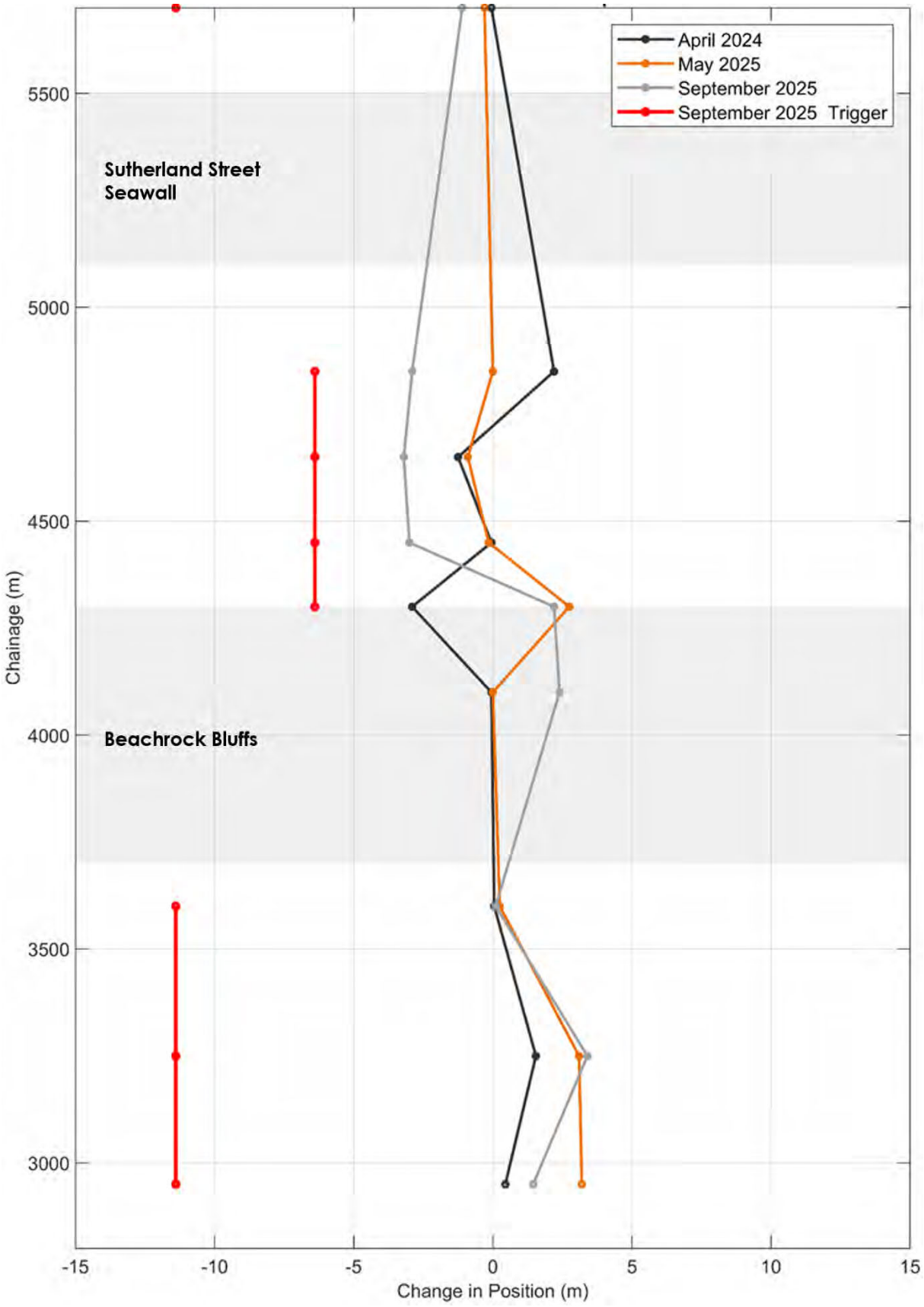


Figure 3-2: Position of 0m AHD Contour Relative to Baseline.

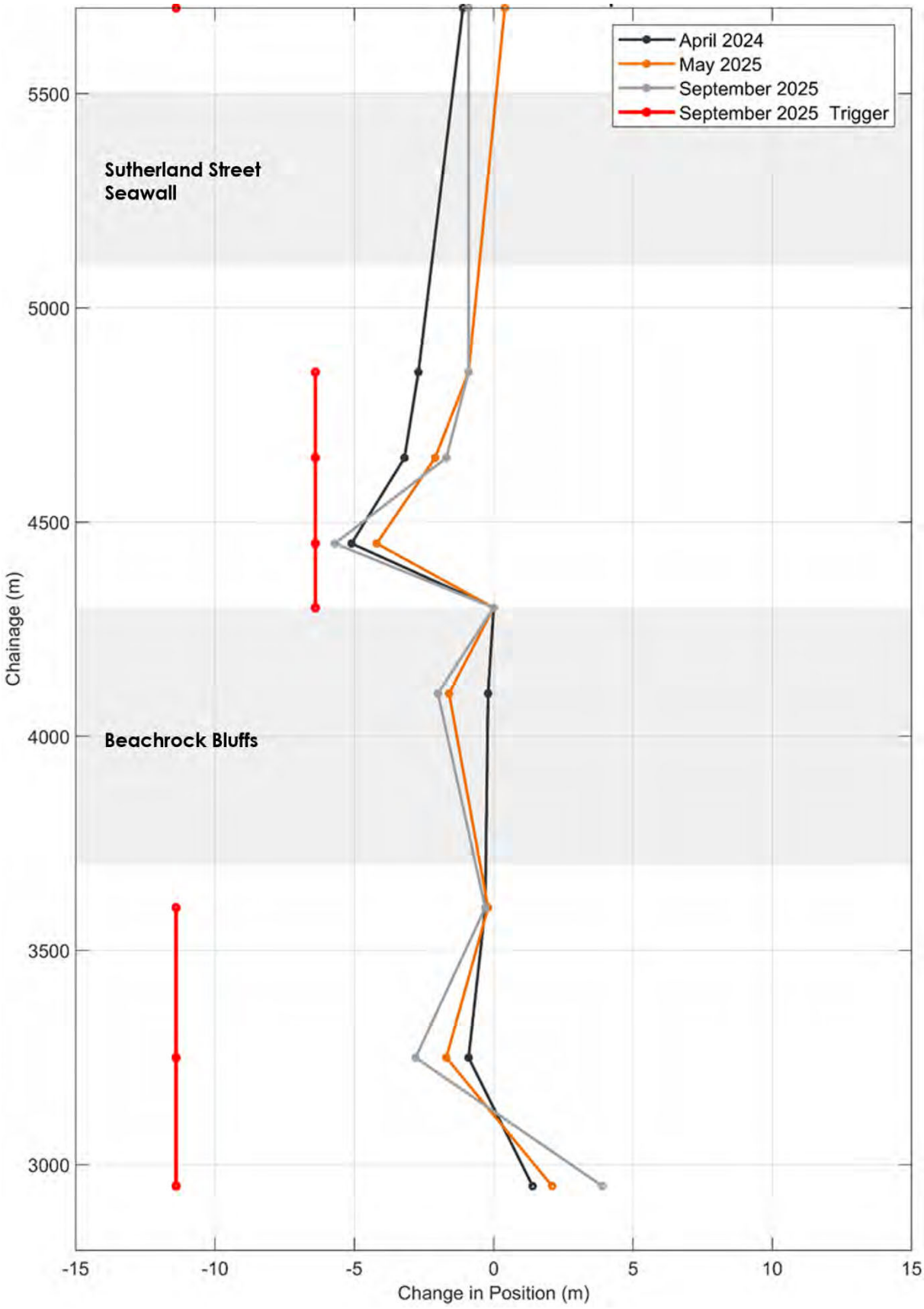


Figure 3-3: Position of +4m AHD Contour Relative to Baseline.

4 Shoreline Mapping

4.1 Methods

Implementation of the SMP involves mapping changes in the vegetation line across the study area. For completeness, Stantec has orthorectified and re-mapped the vegetation lines previously reported in M P Rogers & Associates (2025). The vegetation line extracted from the aerial topographic survey undertaken during September 2025 has also been included to enable assessment of SMP trigger exceedances. All vegetation lines are presented in **Figure 4-2** and **Figure 4-3**, below.

4.2 Results

In accordance with the SMP, comparisons between the baseline (2023) and current (September 2025) vegetation lines have been used as the basis for assessing trigger exceedances across the study area. The outcomes of this assessment are presented in **Section 5**, below.

It should be noted that manual orthorectification of vegetation lines previously applied to the SMP introduces some inherent positional uncertainty. Notwithstanding this, the magnitude of this uncertainty is not expected to influence the outcomes of the trigger exceedance assessment.

Figure 4-1: Shoreline Mapping Chainage.

Figure 4-2: Vegetation Lines 1995 to 2025, 1 of 2.

Figure 4-3: Vegetation Lines 1995 to 2025, 2 of 2.

5 Evaluation

The evaluation of the vegetation line changes and profile contours against the coastal monitoring triggers is presented in **Table *5-1***.

Table 5-1: Evaluation of Shoreline Change Against Triggers.

Location	Trigger	Outcome
Cemetery Beach	**Trigger 1**: Where the observed rate of recession of the shoreline or beach profile on Cemetery Beach is greater than 5 m plus the assessed rate of long term shoreline recession (approximately 0.7 m/yr) as measured from the baseline survey location, or assessed by an experienced coastal engineer, further investigation will be required to ascertain the potential cause of the erosion.	**No exceedance(s).**
Other areas within the Monitoring Area	**Trigger 2**: Where the observed shoreline movement outside of Cemetery Beach is significantly different to the expected shoreline changes (approximately greater than 10 m plus the assessed rate of long term approximately 0.7 m/yr rate of shoreline recession as measured from the baseline, or as assessed by an experienced coastal engineer), further investigation will be required to ascertain the potential cause of the difference.	**No exceedance(s).**

.

6 Conclusion

This report presents the coastal monitoring data collected during the September 2025 monitoring campaign, undertaken in accordance with the requirements of EPBC 2019/8520 and the Port Hedland Spoilbank Marina – Cemetery Beach Sediment Management Plan (SMP) prepared by M P Rogers & Associates (2024a). The September 2025 monitoring program comprised:

- Aerial topographic surveys of the coastline in the vicinity of the Seawall, Cemetery Beach and Spoilbank.
- Beach profiles ‘cut’ from the aerial topographic survey.
- Photographic monitoring.
- Shoreline mapping.
- Assessment of shoreline changes against triggers

In accordance with the SMP, changes in the vegetation line and contours relative to baseline (2023) conditions were used as the basis for assessing coastal monitoring triggers. Based on the assessment undertaken, no coastal monitoring triggers were exceeded during the September 2025 campaign.

7 References

Department of Climate Change, Energy, the Environment and Water (DCCEEW). 2021. EPBC Act Approval EPBC 2019/8520 – Port Hedland Spoilbank Marina Project. Approval dated 19 February 2021, including subsequent variations and management plan approvals. Government of Australia.

O2 Marine. (2024). Port Hedland Spoilbank Marina Project Operational Environmental Management Plan. Fremantle, Western Australia.

MRA 2024a. EPBC 2019/8520 Port Hedland Spoilbank Marina Cemetery Beach Sediment Management Plan, R1665 Rev 7. Prepared for the Pilbara Ports Authority.

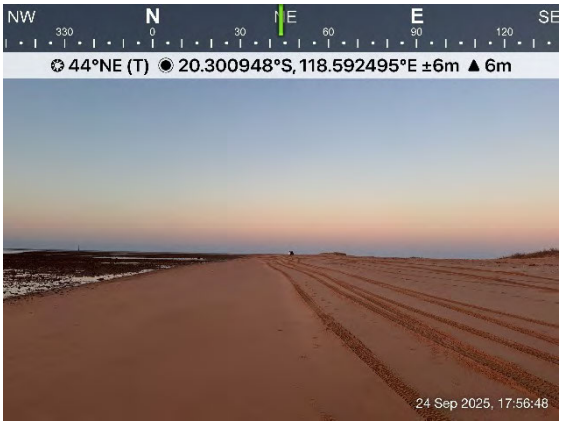
MRA 2024b. EPBC 2019/8520 Spoilbank Marina Cemetery Beach SMP 2024 Report, R1970 Rev 0. Prepared for the Pilbara Ports Authority.

MRA 2025. EPBC 2019/8520 Spoilbank Marina Cemetery Beach SMP 2025 Report, R2078 Rev 0. Prepared for the Department of Transport.

Appendices

Appendix A 2025 Photographic Monitoring

1 NE



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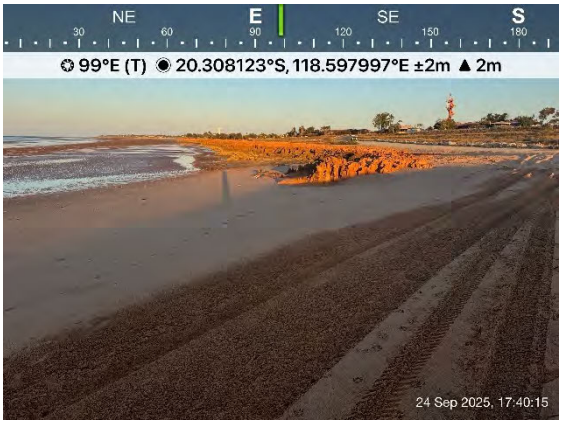
2 SW

3 S

3 SW



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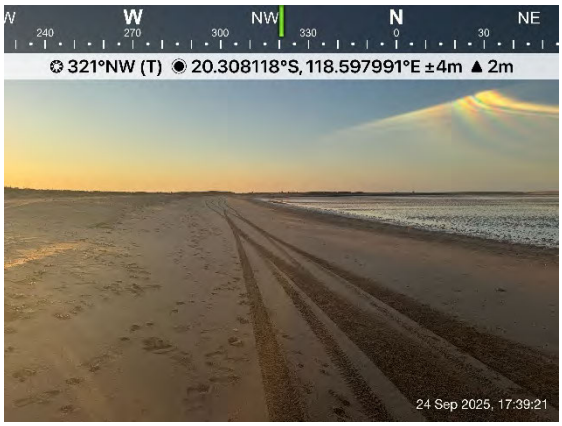

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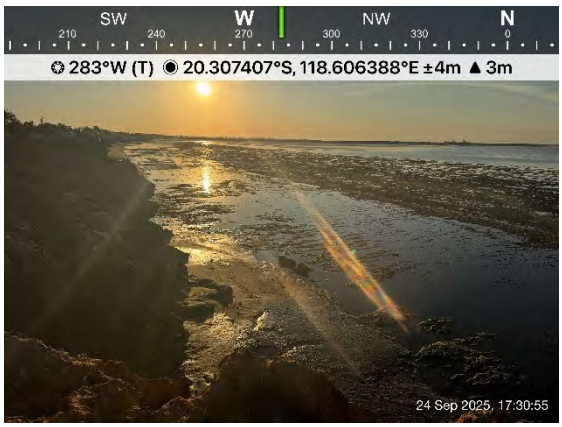

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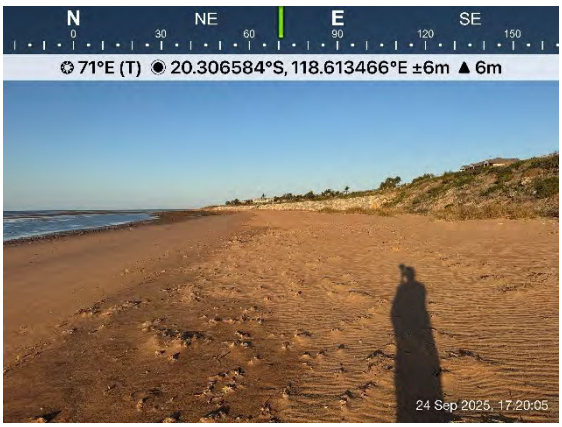

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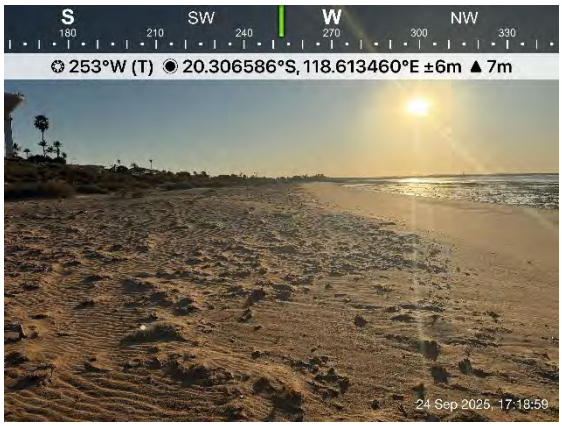

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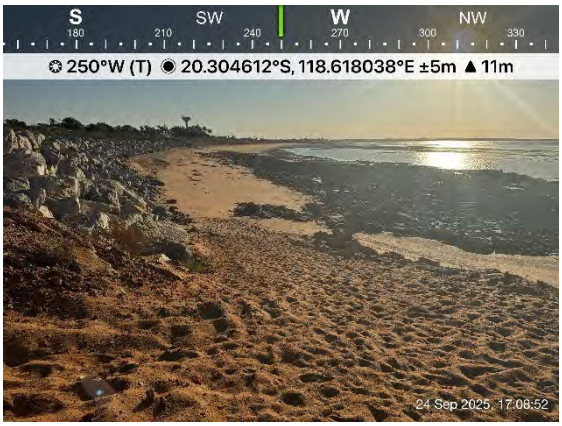
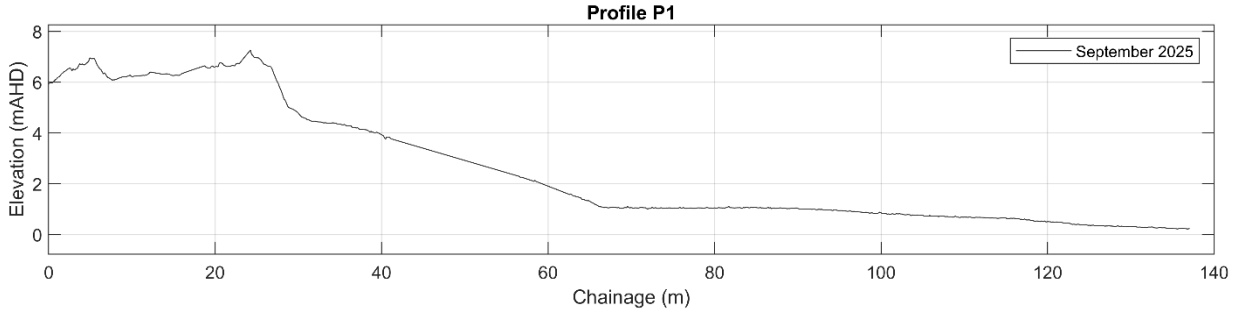


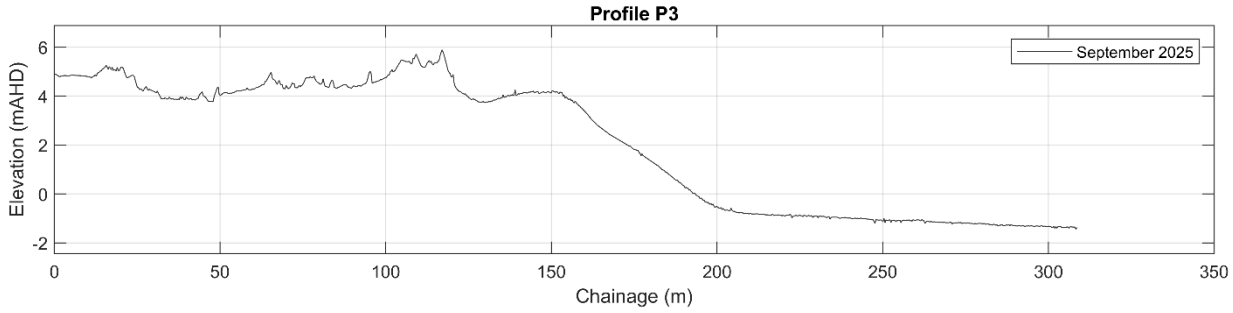
7 W

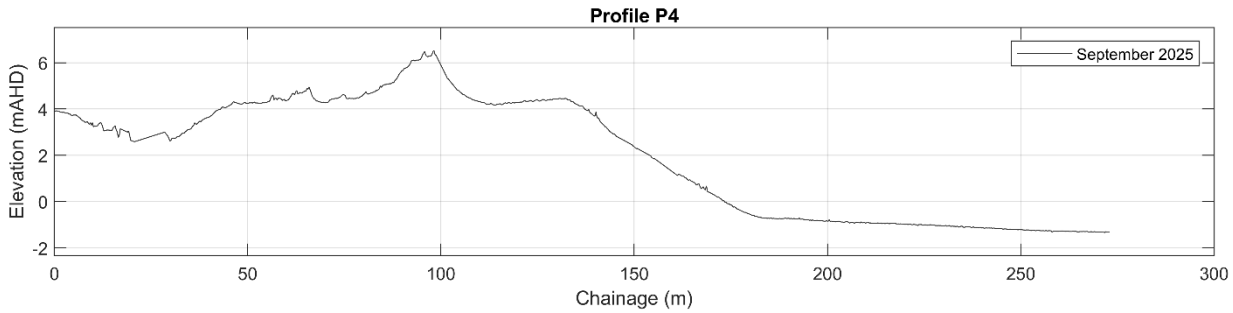

N
NE
E
SE
330
0
30
60
90
120
55°NE (T) 20.304154°S, 118.618235°E ±4m 4m
24 Sep 2025, 17:11:16

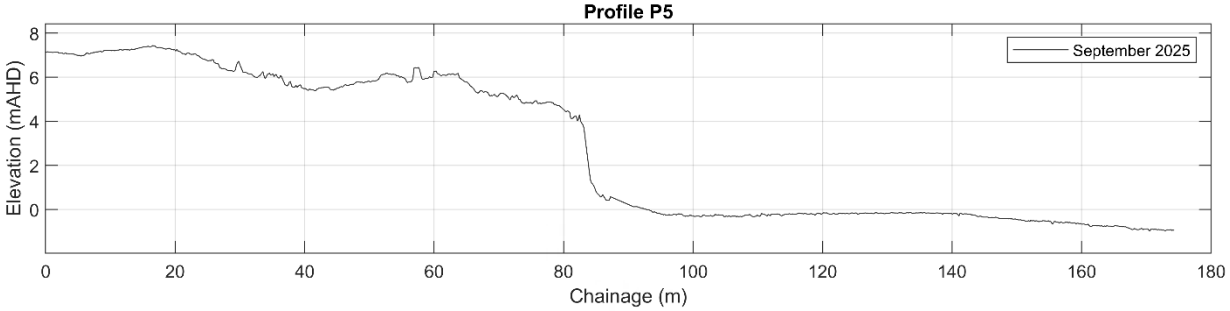
8 NE

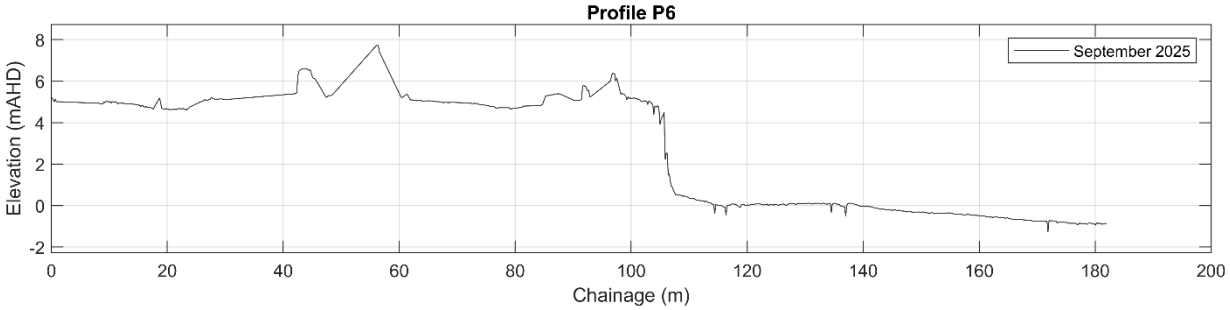
Appendix B 2025 Aerial Topographic Survey and Beach Profiles

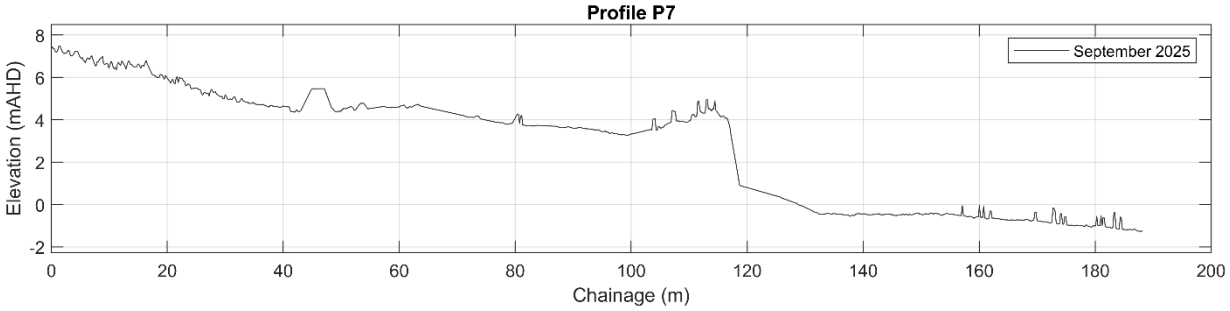


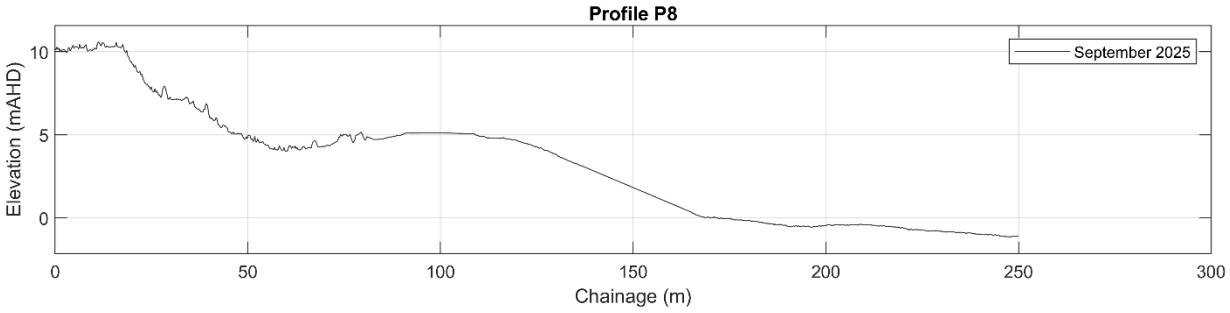


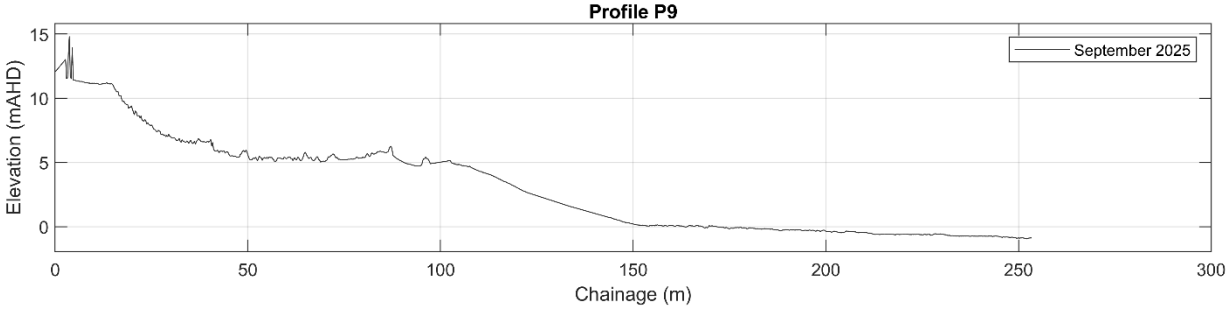


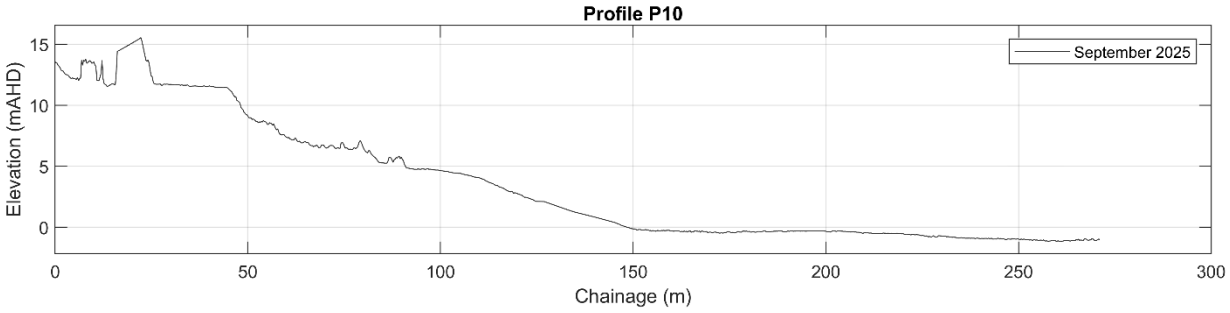

Profile P5
September 2025
Elevation (mAHD)
Chainage (m)
0
20
40
60
80
100
120
140
160
180
2
4
6
8

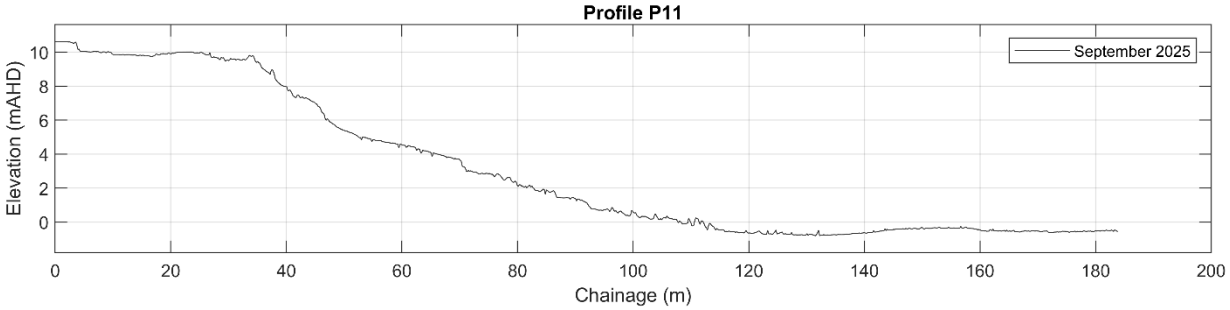

Profile P6
September 2025
Elevation (mAHD)
Chainage (m)
0
20
40
60
80
100
120
140
160
180
200
-2
2
4
6
8


Profile P7
September 2025
Elevation (mAHD)
Chainage (m)
0
20
40
60
80
100
120
140
160
180
200
-2
2
4
6
8


Profile P8
September 2025
Elevation (mAHD)
Chainage (m)
0
50
100
150
200
250
300
5
10


Profile P9
September 2025
Elevation (mAHD)
Chainage (m)
0
5
10
15
0
50
100
150
200
250
300


Profile P10
September 2025
Elevation (mAHD)
Chainage (m)
0
5
10
15
0
50
100
150
200
250
300


Profile P11
September 2025
Elevation (mAHD)
Chainage (m)
0
2
4
6
8
10
0
20
40
60
80
100
120
140
160
180
200

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Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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