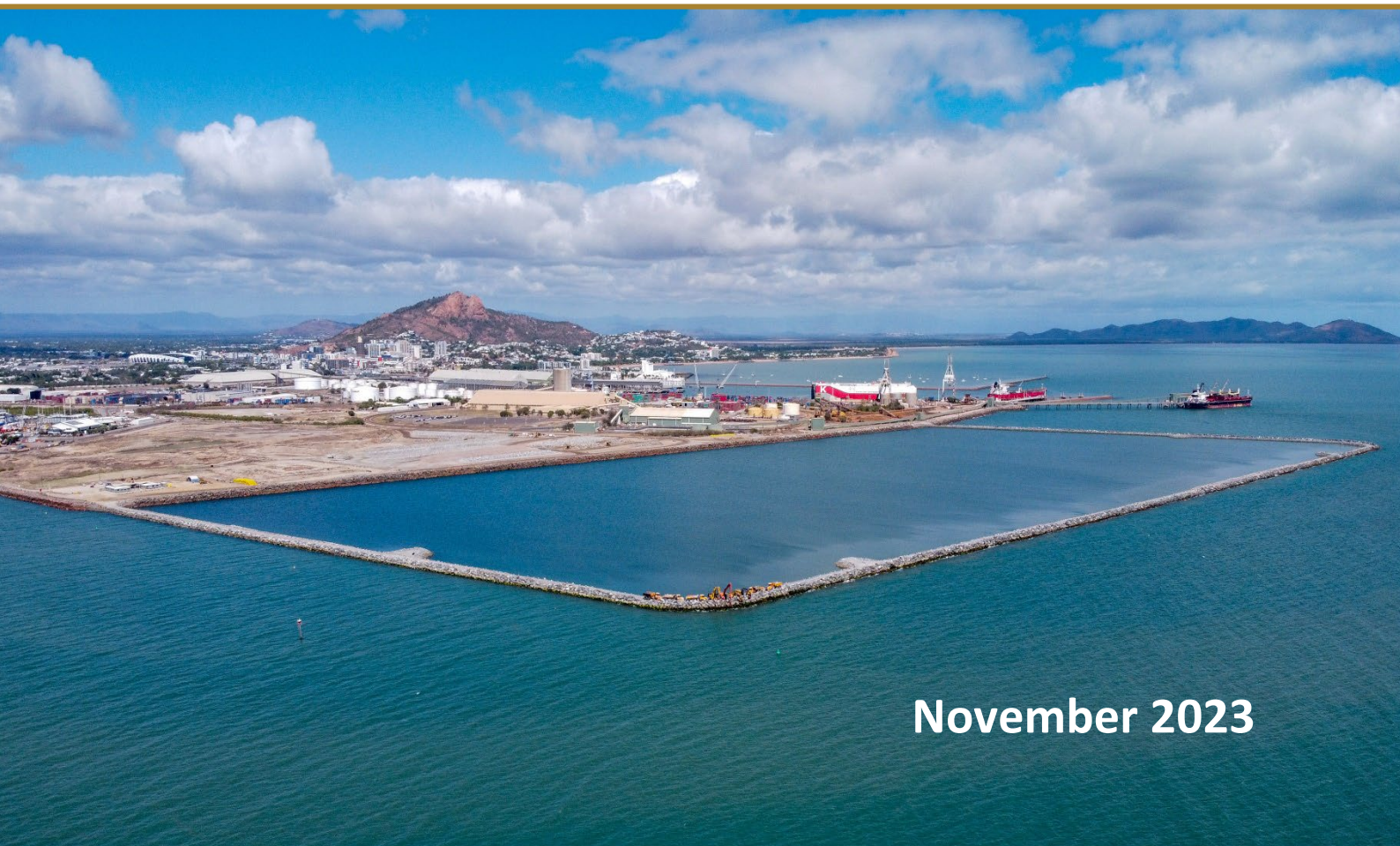


TOWNSVILLE PORT EXPANSION CHANNEL UPGRADE PROJECT

TAILWATER MANAGEMENT PLAN



November 2023

DOCUMENT CONTROL SHEET

Revision history

Revision No.	Date	Changed by	Nature of amendment
0	14/02/2020	T Smith	Submitted version
1	16/09/2021	T Smith	Revised with DMP details
2	21/02/2023	T Smith	Revised for new discharge arrangement
3	17/11/2023	T Smith	Revised in incorporate updated State (EA) discharge limit for tailwater and updates to early warning triggers

DOCUMENT APPROVAL

Approval of the Tailwater Management Plan (R2), via condition 38 notification to DCCEW, occurred on 22 February 2023.

The Tailwater Management Plan (R2) was published on the CU Project's website on 22 February 2023.

This document has been prepared to meet the Commonwealth Government's EPBC Approval No. 2011/5979 Conditions and the Queensland's Coordinator General's Conditions and subsequent state approvals for the Port of Townsville Limited's Port Expansion Project.

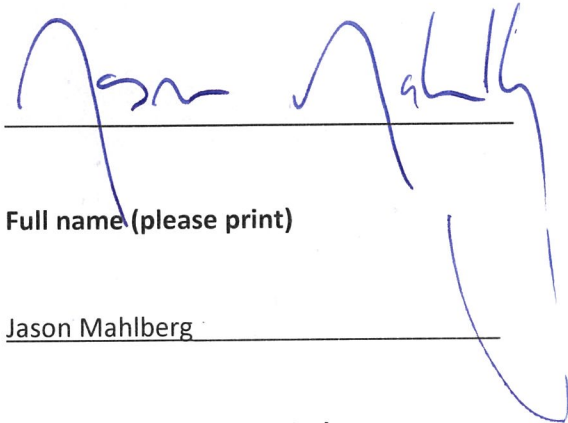
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DECLARATION OF ACCURACY

EPBC Number 2011/5979
Project Name Port of Townsville Port Expansion Project
Approval Holder Port of Townsville Limited
ACN / ABN 130 077 673 / 44 411 774 236
Approved Action To expand the Port of Townsville, in Townsville Queensland. The action is for dredging, land reclamation and construction of infrastructure.
Location of the Action Townsville, Queensland

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed



Full name (please print)

Jason Mahlberg

Organisation (please print)

Port of Townsville Limited

Date 17 / 11 /2023

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GLOSSARY

AEIS	Townsville Port Expansion Project: Additional Information to the Environmental Impact Statement - Final (June 2017).
ANZECC	Australian and New Zealand Environment Conservation Council
AS/NZS	Australian Standard / New Zealand Standard
ASS	Acid Sulfate Soil
ASSCMP	Acid Sulfate Soil & Contamination Management Plan
Cd	Cadmium
CEMP	Construction Environmental Management Plan
Cr	Chromium
Cu	Copper
CU Project	Townsville Port Expansion Channel Upgrade Project
Department / DCCEEW	The Australian Government Department of Climate Change, Energy, the Environment and Water, or any other agency administering the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) from time to time
DES	The Queensland Government Department of Environment and Science, or any other state agency regulating coastal developments and dredging from time to time
DO	Dissolved Oxygen
D&R	Dredging and Reclamation
EA	Environmental Authority
EIS	Port Expansion Project Environmental Impact Statement (March 2013)
EPP (Water and Wetland Biodiversity)	Environmental Protection (Water and Wetland Biodiversity) Policy 2019
GPS	Global Positioning System
ITAC	Independent Technical Advisory Committee
NAGD	National Assessment Guidelines for Dredging 2009
NATA	National Association of Testing Authorities
NEPM	National Environment Protection (Assessment of Site Contamination) Measure 2013

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1 INTRODUCTION

Port of Townsville Limited (the Port) is a Government Owned Corporation established under the *Government Owned Corporations Act 1993* (Qld), which manages the Port of Townsville. The Port is located on Cleveland Bay, approximately three kilometres east of the Townsville city centre in North Queensland (Figure 1). It is a multi-purpose port that handles predominantly bulk and general cargo with a land and sea jurisdiction in excess of 450 km². The Port is situated in the Great Barrier Reef World Heritage Area but is outside of the Great Barrier Reef Marine Park. Townsville is a long-established township with a history of urbanisation and industrial activities in the Ross River and Ross Creek drainage system.

The Townsville Port Expansion Channel Upgrade Project (CU Project) is Stage 1 of the Port’s long-term Port Expansion Project (PEP). The PEP aims to create a series of strategic assets that will address current capacity constraints and accommodate future growth in trade over a planning horizon to 2040. It includes development of port infrastructure, namely work to “top of wharf” facilities, capital dredging; reclamation; breakwaters and revetments; berths; access roads; rail loop; and trunk services and utilities. It does not include the development of “above wharf” infrastructure such as terminal pavements; ship-loaders and unloaders; product conveyors; storage buildings for products; rail loaders and unloaders; stacking and reclaiming equipment; storage tanks; and pipelines, which will be subject to separate statutory assessment and approval requirements prior to the start of their operations.

1.1 SCOPE

The CU Project involves:

- Supply and haulage of marine-grade armour rock required for rockwalls and revetments at the Port;
- Creation of a 62-hectare reclamation area via the construction of rockwalls forming a receival pond for beneficial re-use of all capital dredge material from the channel widening works;
- Capital dredging works of approximately 3.9 million cubic metres from the channels using a mechanical dredge, involving:
 - On its western side to widen the Platypus Channel from 92 metres width to 180 metres for the main section of the channel and 248 metres at the harbour entrance tapering to 135 metres (at the seaward end);
 - On its eastern side to widen the Sea Channel from 92 metres to 120 metres along its length;
- Installation and operation of a temporary offloading facility to allow transfer of dredged material from the dredge barges to the reclamation area;
- Reclamation activities, including the placement of dredged material within the reclamation area and discharge of tailwater into Cleveland Bay;
- Realignment of the Inner Harbour Entrance (including realignment of an existing breakwater) to allow for a widening of Platypus Channel at the harbour entrance; and
- Installation of navigation aids in alignment with the new channel configuration.

The capital dredging, construction activities and infrastructure development for the CU Project will occur inside the existing port limits, the designated water areas in which navigation falls under the control of the Regional Harbour Master (RHM). The reclamation area forms part of Lot 794 on SP308904 adjacent to the northern extern of the East Port area (Lot 791 on EP2348, which is Strategic Port Land), while the temporary offloading facility and activities are adjacent to Lot 794.

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The layout of the reclamation area, including the boundaries of Lot 794, is shown in Figure 2, along with the layout of the temporary offloading facility (including dredge area).

The capital dredge campaign will last approximately 2 – 2.5 years and dredge approximately 3.9 million cubic metres from the channels using a mechanical dredge. Capital dredge material will be placed within the new reclamation area as part of land reclamation activities. Dewatering and ground improvement of emplaced sediments within this area will be undertaken.

A Construction Environmental Management Plan (CEMP), detailing appropriate environmental management controls, is in place to manage risk and reduce the potential for negative impacts on the environment associated with the CU Project's construction and reclamation activities. This Tailwater Management Plan (TMP) forms part of the CEMP and outlines the environmental monitoring and management controls for tailwater discharges from the new reclamation area during the CU Project capital dredging campaign.

Management of maintenance dredging at the Port of Townsville is managed separately and is not relevant to this plan and is not part of the CU Project's activities or monitoring.

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Figure 1: Locality Plan of the Port of Townsville & CU Project



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Figure 2: Lot Plan for CU Project Rock Wall Construction & Reclamation Activities



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1.2 LEGISLATIVE OVERVIEW

The PEP was the subject of an Environmental Impact Statement (EIS) and a further Additional Information to the Environmental Impact Statement (AEIS), submitted in support of Commonwealth and State project approval applications.

Commonwealth approval (EBPC 2011/5979) under the *Environment Protection and Biodiversity Conservation Act 1999* for the PEP was granted on 5 February 2018. The Queensland Coordinator-General issued an evaluation report on the PEP's EIS/AEIS in September 2017. That report contains conditions to be included in the State Development Permits and Environmental Authorities, for the various stages of the PEP, including the CU Project.

State operational approvals issued for the CU Project are as follows:

- Development Permit DA0190 POTL/CU / 1905-11091 SRA for Operational Work for Tidal Works (Townsville Port Expansion Project Rock Wall and Reclamation Works), issued June 2019.
- Development Permit DA0197 POTL/CU / 03-21840 SRA for Operational Work for Tidal Works for Temporary Unloading Facility, issued May 2021
- Development Permit 2103-21834 SDA for Operational Work for Tidal Works for Diagonal Breakwater, issued June 2021
- Development Permit 2103-21775 SDA for MCU for ERA 16 and Operational Works – Tidal Works within a Coastal Management District (for the purpose of capital dredging) and Marine plant disturbance, issued June 2021
- Environmental Authority (EA) SDA EA0002890 for capital dredging and placement activities, issued June 2021 and amended on 7 November 2023.
- Development Permit 2306-35238SRA/DA0208 for Tidal Works for Partial Demolition of Eastern Breakwater, issued August 2023.
- Development Approval 2308-36219 SDA – Operational Works – Tidal Works dredging of Eastern Harbour Entrance widening area issued October 2023).

Environmental Authority *EA0002890* provides the operational conditional requirements for dredging and dredging related activities for the CU Project, including tailwater management. This EA was amended on 7 November 2023 and included an update of the Tailwater discharge criteria limit for Dissolved Oxygen. This change, and associated further adjustments, are subject of this revision (this document).

Both Commonwealth and State approvals prescribe conditions relevant to the management and monitoring of tailwater (included in Appendix A). This document provides the TMP to address the prescribed conditions. Results of tailwater monitoring will be used to validate the EIS/AEIS tailwater modelling outputs and manage risk to the environmental values of the receiving marine waters during tailwater release.

1.3 PROJECT DESCRIPTION – TAILWATER MANAGEMENT

Capital dredge material from the CU Project will be loaded into barges by the mechanical dredge and transferred by the barges to a temporary unloading facility at the new reclamation area (see Figure 2). Material will be unloaded from the barges and placed by dump truck into the reclamation area. Once dredge materials have been brought to the reclamation area, civil equipment will unload the capital dredge material and place it in the reclamation area based on a contractor determined filling sequence.

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Once dredged material has been placed within the reclamation area, all waters that are captured and released from within the reclamation area through tailwater pipes is considered tailwater. The D&R contractor will discharge tailwater to manage freeboard within the reclamation area for optimal reclamation performance, particularly as the reclamation area fills with dredged material. Discharge may also be required in response to extreme rainfall events where the ambient water level within the reclamation is raised by large volumes of rainwater.

Discharges from the reclamation area will occur through tailwater discharge pipes at the identified discharge location at the reclamation perimeter rock wall. The tailwater discharge will be pumped into the tailwater pipes, ensuring full control on the flow of tailwater release when required. Tailwater will be discharged to maintain inside water levels as low as possible to maximise operational performance of the reclamation without exposing sea bed levels and increasing the PASS risk for those areas.

The perimeter rock walls of the reclamation area have been designed to withstand extreme metocean conditions (i.e. 50 year design life with a return period of 1 in 500 year storm event), with adequate capacity for the combined volume of capital dredge material and tailwater. Internal bund walls may be installed as required, to control the movement of sediment and water. This is to ensure areas can be dewatered and suspended sediments can settle to control the quality of tailwater released; and to also withstand wind-wave action that may be generated within the reclamation area. The perimeter rock walls have also been constructed with a geotextile fabric layer, intended to minimise the inadvertent release of suspended sediments from the reclamation area through the wall.

With the current dredging and placement methodology, after an initial reduction in tailwater level to as low as possible, it is expected that discharge will be occasional and mostly as a result of a significant rainfall event.

1.4 PURPOSE OF THIS TMP

The overall objective of this TMP is to avoid or otherwise reduce impacts to sensitive marine environment receptors that could be affected by tailwater released from the reclamation area.

In accordance with this objective, this TMP is designed to:

- Identify the management framework and procedure for tailwater releases from the reclamation area, including setting out the tailwater monitoring approaches;
- Establish a system of controlled releases of tailwater from the reclamation area that complies with approvals and environmental responsibilities;
- Characterise the placed dredge material and tailwater quality within the reclamation area to confirm that the existing conditions of release as set in relevant statutory approvals are sufficient to protect the receiving water environmental values;
- Conduct representative monitoring in the receiving environment prior to and at commencement of tailwater release in accordance with stated regulatory conditions to assess any adverse impacts to receiving water environmental values; and Outline management actions to prevent or mitigate adverse impacts to the receiving environment from release of tailwater.

This Tailwater Management Plan forms Appendix G of the CU Construction Environmental Management Plan (CEMP; POT 2099). An overview of the management intention and performance criteria relevant to tailwater release is provided in the CEMP; this TMP specifically details the monitoring program and mitigation approach to minimise impacts from tailwater release, including outlining all responsibilities associated with tailwater management.

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2 DREDGE MATERIAL AND TAILWATER CHARACTERISATION

The CEMP establishes the risk level assessed regarding dredge placement and tailwater management. As detailed in the CEMP, the risk assessment is based on the risk management guidelines within the Port's Quality Management System.

A comprehensive Sediment and Analysis Plan (SAP), prepared in accordance with the National Assessment Guidelines for Dredging 2009 (NAGD), the Queensland Acid Sulfate Soil Technical Manual 2014 (QASSTM) and the National Environment Protection (Assessment of Site Contamination) Measure 2013 (NEPM), has been developed and implemented to characterise the quality of the material to be dredged prior to the commencement of the capital dredge campaign. This SAP was reviewed by the Queensland Department of Environment and Science from late 2020 and SAP implementation report provided in July 2021.

The sampling and testing program under the SAP was implemented in early 2021. In particular, the sediment sampling and analysis has characterised both the trace metal concentrations in the sediment and the potential acid sulfate soil (PASS) capacity of the sediment, incorporating the self-buffering / neutralising capacity. While background studies have indicated a low risk of adverse impacts being generated from Potential Acid Sulfate Soil (PASS), sediment contamination from the dredging footprint, the SAP has identified areas of PASS and metal contamination risk that are the subject of specific management through the CU Project Acid Sulfate Soil and Contamination Management Plan (ASSCMP – POT2100). Management of this dredge material contamination and treatment for tailwater quality is addressed through this is TMP, supported by tailwater quality testing and verification it meets standards prior to release.

The SAP identified a limited number of hot spots for metals as well as PASS throughout the dredge area. Other than PASS (which is managed via POT 2100), no specific contaminants of concern or other substances requiring special management for land placement in the reclamation were identified as part of the 2021 sampling and testing regime.

A large proportion of the capital dredge material is consolidated ('stiffer/denser') undisturbed residual soils, as detailed in Table 1, with limited potential for contamination than the overlying unconsolidated (soft) alluvial marine sediment.

Table 1: Dredge Material Approx. Split of Sediment Types

MATERIAL TYPES	PERCENTAGE*
Very Soft Silts and Clays	~21%
Soft to Firm Clays and Loose Sands	~30%
Stiff Clays and Medium Dense Sands	~18%
Very Stiff Clays and Medium Dense Sands	~19%
Hard Clays and Dense to Very Dense Sands	~12%

*Note: Total capital dredge campaign volume is approx. 3,900,000 m³.

Additional samples of dredged material are collected during the reclamation activities to monitor the PASS status of the dredged material. Any PASS will be treated in accordance with the management and mitigation actions detailed in the Acid Sulfate Soil & Contamination Management Plan (ASSCMP – POT 2100) and contractor-specific operational plans.

An additional SAP was undertaken for the Eastern Breakwater area, this SAP was reviewed by the Queensland Department of Environment and Science mid 2023, and SAP implementation report provided in August 2023. As per the channel SAP a large proportion of the capital dredge material is consolidated ('stiffer/denser')

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undisturbed residual soils, as detailed in Table 1, with limited potential for contamination than the overlying unconsolidated (soft) alluvial marine sediment. The material in the Eastern Breakwater area had no identified PASS and met all guideline requirements.

During the CU Project, tailwater may be generated in the reclamation area from:

- Water existing in interstitial voids between the dredge material (i.e. pore water);
- Ambient seawater transferred into the barge hopper during dredging and subsequently collected and deposited in the reclamation area (noting this is limited given the mechanical dredge methodology);
- Ambient seawater within the reclamation area (including sea water seeping through the bund structure prior to the reclamation being fully clay lined) that mixes with the placed material; and
- Rain that falls directly into the reclamation area and mixes with the water described above.

Tailwater is to be monitored during tailwater releases. Further as per conditional requirements, the quality of the tailwater was the subject of a dedicated assessment and review within the first 40 business days of tailwater discharge (including the within the receiving environment) which characterised the tailwater and any potential impacts on the receiving water quality. The tailwater release limits for selected parameters stated in the conditions were reviewed through this assessment and the dissolved oxygen upper limit has been modified by the administering authority via EA amendment based on this review.

The potential for cumulative impacts from the CU Project have been considered in the EIS, however this monitoring program may be influenced by other natural and anthropogenic activities given the range of activities that occur within the Ross River Catchment.

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3 TAILWATER MANAGEMENT APPROACH

Tailwater management for the CU Project will consist of two main elements:

- Detailed operational plans governing the on-ground management of tailwater within the reclamation area, monitoring and corrective actions associated with the releases at the tailwater discharge point; and
- Characterisation of tailwater quality and mixing within the receiving environment

The relevant statutory conditions related to tailwater are set out in EA0002890 (Environmental Authority) as follows –

- WT 1 – sets out the tailwater release limits for discharge water quality at the ‘end of pipe’ for pH, Dissolved Oxygen (DO) and Turbidity, with daily monitoring required during releases;
- WT 2- sets out the maximum water release volume per day (285 ML/day);
- WT 3- sets out the requirement for a tailwater release report to be prepared within 40 business days of commencing tailwater discharge, that identifies and describes any adverse impacts to receiving water environmental values due to authorised tailwater release.

The relevant statutory conditions related to tailwater under the EPBC 2011/5979 approval is:

- Condition 10(f) which requires, ‘a program to monitor, manage and treat tailwater before release into the marine environment’;

3.1 TAILWATER OPERATIONAL PLANS

A detailed operational Tailwater management plan has been established by the D&R contractor. This plan is based on planned design, production rates, water balance requirements and other reclamation arrangements, which will change over time to reflect the changing status of the reclamation activity. It includes:

- High-level reclamation and release sequence;
- Measures to proactively manage water levels and minimise the need to release tailwater at a rate or daily volume that is greater than that is permitted;
- Measures to minimise the generation of poor quality tailwater within the reclamation area and/or tailwater that poses a risk of not meeting the required discharge quality standards;
- Operational procedure for tailwater management and release, including measurement and real time monitoring of water quality before discharge to ensure compliance with release limits;
- Setting and monitoring trigger levels for the instigation of additional management measures and corrective actions prior to exceedance of quality standards at the point of discharge;
- Procedures and corrective actions to mitigate adverse environmental impacts that could occur due to uncontrolled release of tailwater from the reclamation area; and
- Water quality management, reporting, communication and notification procedures, including reporting between contractor reclamation and dredging teams and between contractor and the Port.

Implementation of the operational plan will be the responsibility of the D&R contractor, with oversight from the Port CU Team.

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3.2 CHARACTERISATION OF TAILWATER QUALITY

Monitoring within the receiving environment (e.g. at the boundary of the mixing zone according to the EHP Wastewater Release to Queensland Waters Technical Guideline) to characterise the receiving water environmental values has been completed.

As per the EA conditions, within 40 business days of commencing tailwater releases, a report was completed and submitted to the administering authority that characterised the tailwater being discharged and assessed if there were any adverse impacts to receiving water environmental values from the tailwater discharge. The requirements that the report had to address are outlined in full in condition WT3 of the EA and summarised below:

- Characterisation of the concentrations of contaminants within the tailwater releases to the receiving environment;
- determination of the spatial mixing zone in relation to tailwater discharge and quality, based on modelling approved by ITAC;
- Compare the above tailwater information to numerical modelling undertaken in the PEP AEIS; and
- Assessment of the suitability of the current tailwater release limits.

The receiving environment and tailwater characterisation included key water quality parameters of: NTU, pH, DO and metals of potential concern. The characterisation met the minimum data requirements outlined in the Queensland Water Quality Guidelines (QWQG) (2009) and defined the mixing zone according to the EHP Wastewater Release to Queensland Waters Technical Guideline (2016).

Overall, the tailwater assessment identified:

- The results indicate that there have been no adverse impacts to receiving water environmental values as a result of the authorized tailwater release;
- that the tailwater that was discharged was of a higher quality than that in the receiving environment; the tailwater found to contain substantially less suspended sediments than the receiving environment and is compliant with all nominated Water Quality Objectives.
- That while turbid plumes were visible during tailwater release, these were well within the natural variability recorded in Cleveland Bay and dissipated with distance from the outlet, achieving background conditions within the mixing zone (300m). It was considered that the observed plumes were a result of the action of discharge leading to agitation/resuspension of natural surface sediments in the receiving environment (similar to the influence of wind-driven waves in the Bay), rather than from the tailwater itself.
- That the tailwater release limits outlined in Table WT1 of the EA are suitable for the protection of receiving water environmental values, with the exception of Dissolved Oxygen (upper limit of 105% saturation). The report found that this upper limit of 105% saturation is considered overly restrictive and does not reflect natural conditions.

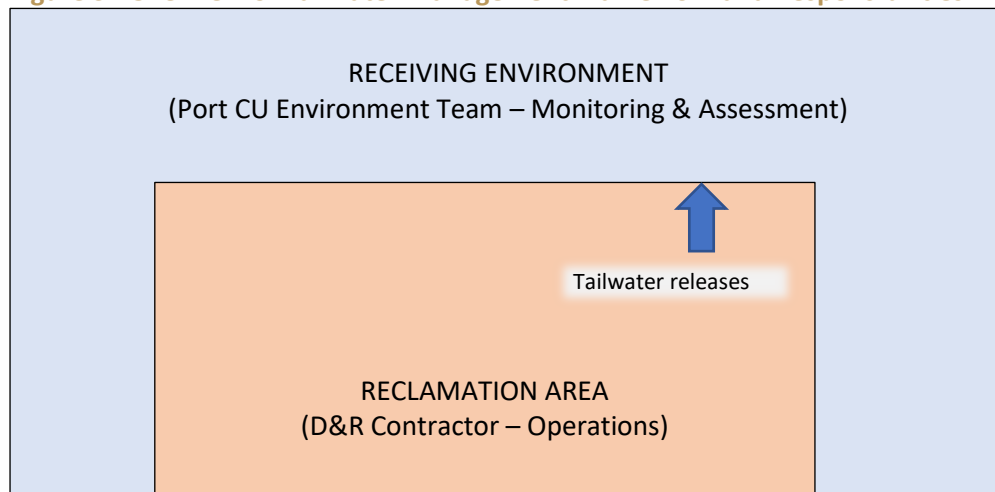
Figure 3 provides an overview of the interaction between the two levels of tailwater management actions. In general, the D&R contractor is responsible for the management of tailwater up to and including the release of tailwater, in addition to implementing remedial actions for non-compliant releases or trigger value exceedances.

The Port holds responsibility for the monitoring of the receiving environment, characterisation of receiving environment impacts from tailwater and conduct of post-release assessments. The Port also established the

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tailwater monitoring adjacent to the tailwater discharge within the reclamation area (prior to release); with the D&R contractor responsible for managing tailwater release based on that monitoring.

Figure 3: Overview of Tailwater Management Framework and Responsibilities



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4 TAILWATER MONITORING PROGRAMS

Tailwater monitoring has been conducted since tailwater is being released from the tailwater pipes. This Tailwater monitoring program monitors the tailwater quality to ensure compliance with the conditions in the Environmental Authority (EA) for the CU Project prior to and during any controlled releases. Monitoring requirements associated with PASS are detailed in the ASSCMP.

4.1 RELEVANT DOCUMENTS

The TMP described herein has been developed with reference to the following documents:

- Environmental Authority EA0002890 (issued on 11/06/2021; amended on 07/11/2023);
- EPBC approval decision 2011/5979 – Port of Townsville Port Expansion Project;
- Environment Management Plan Guidelines, Australian Government Department of the Environment (2014);
- Monitoring and Sampling Manual 2018,
- Environmental Protection (Water and Wetland Biodiversity) Policy 2019;
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality volumes 1 – 3 (ANZECC, 2000);
- *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (EPP (Water));
- Wastewater release to Queensland waters – Technical guideline (DES, 2021);
- Ross River Basin and Magnetic Island Environmental Values and Water Quality Objectives – Basin No. 118 including all waters of the Ross River Basin, and adjacent coastal waters (including Magnetic Island) (DEHP, 2013);
- AS/NZS 5667.1:1998 *Water quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*. Standards Australia, 2016;
- AS/NZS 5667.9:1998 *Water quality - Sampling - Guidance on sampling from marine waters*. Standards Australia, 2016.

4.2 PARAMETERS AND FREQUENCY

Table 2 provides an overview of the parameters that will be monitored under the TMP. Parameters have been selected based on current knowledge of contaminants likely to be present in the dredged material and include those specified in the EA conditions.

It should be noted that not all of these parameters will be monitored on all occasions and the operational frequency may be reduced once initial characterisation of the tailwater is achieved and assured.

Metal suite testing was undertaken in associated with tailwater characterisation that occurred in the first 40 business days of active release to inform the tailwater release report under Condition WT3 but based on the findings this is not continued after that time.

Monitoring will be conducted as per the frequency detailed in Table 2.

Visual observations of tailwater will also be conducted as part of the daily routine inspections for the duration of the CU Project.

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Table 2: Tailwater Monitoring Parameters and Frequency

PARAMETER	METHOD	FREQUENCY FOR COMPLIANCE PURPOSES (REFER CONDITION WT 1)	FREQUENCY FOR OPERATIONAL PURPOSES
pH	Field measurement	Daily during discharge	Prior to and during discharge
DO	Field measurement	Daily during discharge	Prior to and during discharge
Turbidity (NTU)	Field measurement	Daily during discharge	Prior to and during discharge
TSS	Laboratory analysis	Monthly during releases	Initial sampling to establish reliable correlation with NTU data for real time comparison
Dissolved metals suite* (Aluminium (Al), Antimony (Sb), Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Nickel (Ni), Silver (Ag), Zinc (Zn))	Laboratory analysis		Initial sampling to inform discharge report at beginning of tailwater release program
Visible Gross Pollutants/ hydrocarbons	Field observation		Minimum daily during discharge
Daily Discharge	Field measurement / Estimation	Daily (not to exceed 285 ML/Day) over a 24 hour period	Continuous during discharge

* Full metal suite to be analysed as part of initial tailwater sampling to characterise the tailwater discharge.

Tailwater quality inside the reclamation area (at CUT01) will be monitored adjacent to the discharge inlet pipework via sub-surface, real time, telemetered monitoring equipment. While this will record tailwater quality data every 10 minutes, the following averages will be used for operational and compliance assessment:

- Compliance limit assessment – daily (calendar) averages (adjusted if there are periods of no discharge within the day); and
- Operational trigger limit assessment – hourly averages.

If for any reason the telemetered monitoring equipment is off-line or malfunctioning, monitoring may be undertaken via insitu handheld monitoring equipment within the reclamation area adjacent to the discharge inlet (at CUT01). This monitoring will be completed on an hourly basis, conducted in accordance with the requirements in the current edition of the Department of Environment and Heritage Protection Monitoring and Sampling Manual and will be used for Operational and compliance water quality assessment.

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If an uncontrolled release occurs, additional targeted monitoring may be conducted (if deemed necessary and safe to do so) as soon as practically possible after the release.

4.3 MONITORING LOCATIONS

Monitoring associated with tailwater will be conducted at different locations based on the following purposes:

- Tailwater monitoring – at location CUT01 within the reclamation area prior to release (in association with tailwater release);
- Receiving environment monitoring – at locations CUT02 and CUT03 as defined by the modelled the mixing zone around the tailwater discharge location.

Prior to discharge water quality information will be assessed and the pipe only opened if the water quality is suitable for discharge.

During tailwater release, receiving environment water quality will be monitored at specified monitoring locations. Global positioning system (GPS) co-ordinates of monitoring locations are included in Table 3 and Figure 4, with the receiving environment monitoring locations refined as part of the tailwater mixing zone monitoring assessment work. This receiving environment monitoring will be undertaken during the tailwater characterisation assessment (first 40 days of release). The Port may choose to continue this receiving environment monitoring beyond that period, outside of the requirements of this plan.

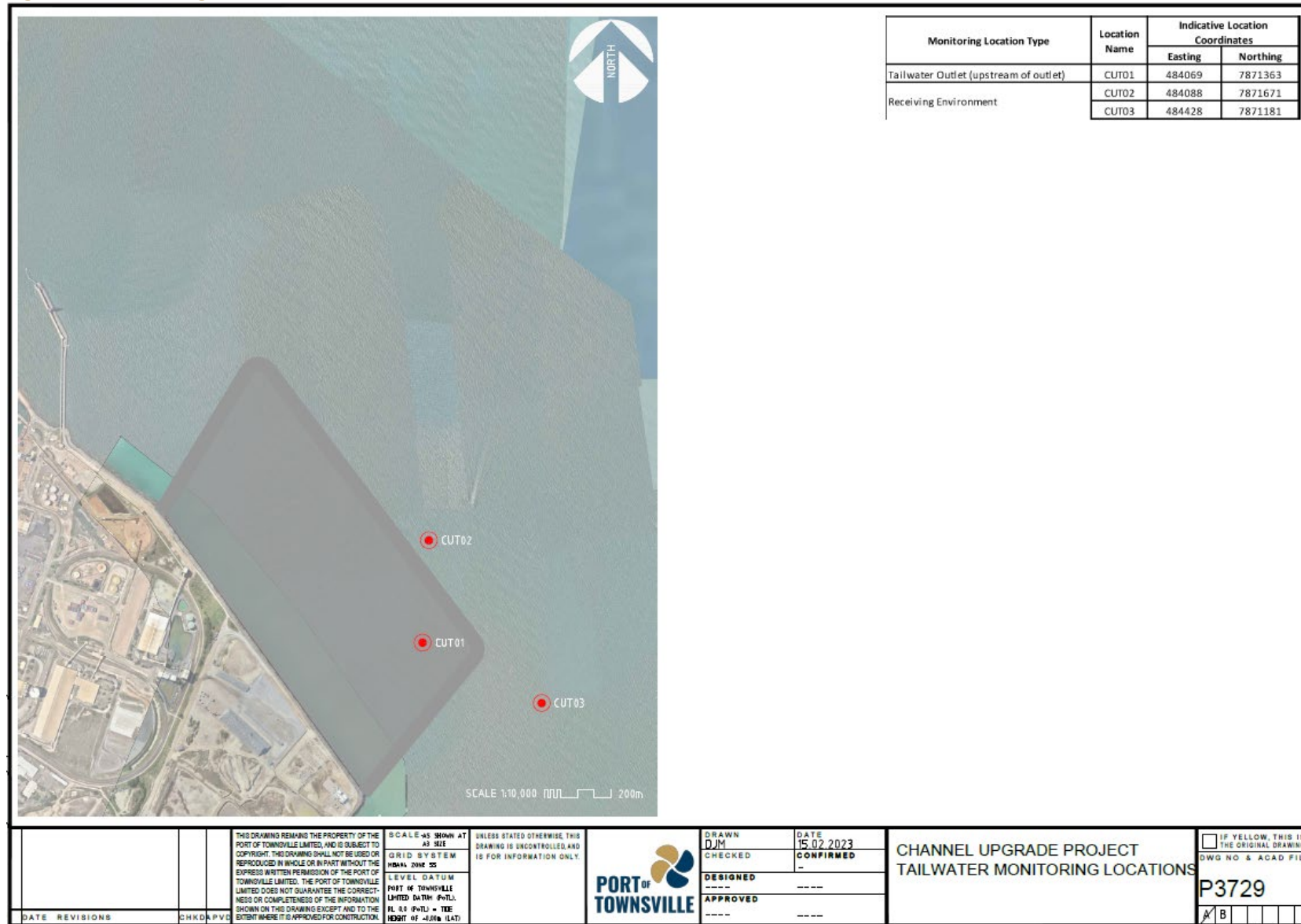
Additional monitoring may be conducted at other locations, as required, for background and overall trend analysis information, complaint investigation, incident monitoring etc.

Table 3: Coordinates of Tailwater Monitoring Locations

MONITORING LOCATION TYPE	LOCATION NAME	LOCATION COORDINATES	
		Easting	Northing
Tailwater Outlet (upstream of outlet)	CUT01	484069	7871363
Receiving Environment	CUT02	484088	7871671
	CUT03	484428	7871181

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Figure 4: Monitoring Locations associated with Tailwater



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4.4 METHODOLOGY & EQUIPMENT

Sampling will be conducted in accordance with the requirements of the Queensland Monitoring and Sampling Manual (DES 2018). All laboratory sample analysis will be undertaken by a National Association of Testing Authorities (NATA) accredited laboratory; scheduling of analyses will include employing analytical practical quantitation limits of sufficient sensitivity to enable comparisons of results to relevant water quality guidelines. All water monitoring devices will be maintained and calibrated in accordance with manufacturer guidelines.

At all tailwater locations, real time data loggers will be installed and maintained with suitable water quality instrumentation to collect continuous (logged every 10 minute) data for the key parameters of concerns (NTU, DO, pH). This monitoring will be continuous, not just during periods of discharge, and will provide detailed quality information prior to any release of tailwater from the reclamation commencing.

Tailwater discharge is expected to be periodic rather than ongoing and will therefore be mechanically pumped, with flow volumes monitored for the pumping system. Pumps for tailwater discharge will be managed to ensure any release is below the daily discharge volumetric limit.

Collection of samples for laboratory analysis (for TSS and metals) will be conducted using a sampling pole, Niskin sampler (if available) and suitable clean, sterile sample container. Samples will be collected from different depths below the water surface at the nominated locations. Care will be taken to ensure that collected samples are representative of the tailwater to be released/receiving waters to be sampled. Samples will be handled and dispatched in accordance with instructions from the analytical laboratory.

If further tailwater monitoring is required within the reclamation area, it will be conducted using a hand-held water meter to analyse the physical parameters:

- Turbidity (NTU);
- Dissolved oxygen (DO) (percent saturation); and
- pH (pH units)

The hand-held water meter will be calibrated and maintained according to the manufacturer's specifications.

Visual observations of oil/grease/sheens on the water surface and colouration and odours will also be made.

During sample collection in the receiving environment, field monitoring will also be conducted from a vessel using a sampling pole and a hand-held water meter as described above.

4.5 QUALITY ASSURANCE / QUALITY CONTROL

4.5.1 Field Quality Assurance / Control Measures

Collection of samples for laboratory analysis will be undertaken in accordance with the quality assurance and quality control measures outlined in the Queensland Government Monitoring and Sampling Manual (DES 2018). This will include:

- Conduct monitoring in similar weather conditions (where possible).
- Works to be undertaken by appropriately trained and experienced field staff;
- Use of properly maintained, calibrated monitoring equipment, including decontamination of equipment between locations;

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- Implementation of appropriate monitoring techniques in accordance with relevant guidelines, including clear and accurate labelling of sample containers and completion of field record sheets;
- Collection of field duplicate samples for laboratory analysis as required by sampling QA procedures;
- Adherence to water sample preservation and handling procedures, including provision of samples to the laboratory within required holding times with accurate chain of custody forms.

4.5.2 Laboratory Quality Assurance / Control Measures

Only NATA accredited laboratories will be used to analyse samples and therefore strict quality assurance and quality control procedures will be in place. Routine laboratory controls include:

- Certified Reference Materials
- Laboratory Duplicates
- Laboratory Control Spikes
- Matrix Spikes
- Surrogates
- Secondary and project Standards
- Intra Laboratory (Proficiency) Testing
- Client and Industry managed independent audits and accreditations.

Inter laboratory testing will also be investigated to demonstrate quality assurance.

All laboratory analysis procedures will be completed within the laboratory specified practical quantification limits. These limits are expected to provide adequate sensitivity for the selected parameters to enable assessment of the particular characteristic against the limits.

4.5.3 Real time data Quality Assurance / Control Measures

As real-time data is automatically uploaded by the web-based platform, programming has been incorporated to screen incoming data using a set of QA/QC rules. These rules have been agreed with ITAC as part of the broader CU Project Marine Water Monitoring Program, and include:

- Upper and lower bounds of typical readings for all parameters. These bounds have been determined based on baseline collected for the CU Project, and knowledge gained from works in similar environments.
- For some parameters (i.e. Turbidity), changes of >100% of previous results are screened (e.g. a brief spike in turbidity).

Samples for laboratory analysis of TSS are also taken during servicing trips to provide additional evidence that sensors are reading correctly. A handheld NTU meter is also deployed during each servicing trip to confirm readings. Should data not be reading correctly, an appropriate calibration can be placed on the data on the monitoring website to ensure data displayed is correct.

The real time data QA/QC will be reviewed following commencement of tailwater discharge to ensure the agreed QA/QC measures are representative for these marine water locations as part of the tailwater management and review.

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5 THRESHOLD LIMITS

Tailwater parameters will be assessed against the site-specific surface water release limits listed in the EA (Condition WT1), as reproduced in Table 4. As tailwater monitoring at location CUT01 is within the reclamation area, tailwater quality will be known prior to any release – with no release permitted to occur (no pumping) unless the tailwater quality is compliant with the limits in Table 4. Identification of results outside the threshold limits within the pond (prior to release) will trigger additional assessments and possible mitigation actions to ensure it is suitable for release. Release will not occur until monitoring results indicate that the release limits have been achieved.

Table 4: Tailwater Surface water and Early Warning trigger Limits

PARAMETER	SURFACE WATER RELEASE LIMITS (COMPLIANCE)	EARLY WARNING TRIGGER LIMITS (OPERATIONAL)	MONITORING FREQUENCY
pH	6.5 – 8.5	6.75 – 8.40	Every 10 min (real time)
DO	60 – 115% saturation	65 – 110%	Every 10 min (real time)
Turbidity	50 NTU (max)	40 NTU (max)	Every 10 min (real time)
TSS	monitor only	n/a	Monthly during discharge
Persistent sheens	not be visible on the water surface*	n/a	Daily during discharge
Odours/ Colouration	no unusual odour or colouration*	n/a	Daily during discharge
Flow Rate	Max 285 ML/day	-	Daily during discharge

Note: *Limit is not specified in EA.

As noted in section 4.2, tailwater quality inside the reclamation area (at CUT01) will be monitored via real time, telemetered monitoring equipment. While this will record tailwater quality data every 10 minutes, the following averages will be used for operational and compliance assessment:

NTU:

- Compliance limit assessment – daily (calendar) averages during pumping (adjusted if there are periods of no discharge within the day); and
- Operational trigger limit assessment – hourly averages.

DO:

- Compliance limit assessment – daily (calendar) averages during pumping (adjusted if there are periods of no discharge within the day); and
- Operational trigger limit assessment – hourly averages.

pH:

- Compliance limit assessment – daily (calendar) averages during pumping (adjusted if there are periods of no discharge within the day); and
- Operational trigger limit assessment – hourly averages.

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The dredging contractor has established early warning trigger levels (see Table 4) for key quality parameters to enable proactive management of the tailwater during release. Where tailwater quality is found to trigger an early warning trigger limit (based on operational averaging periods), the contractor will investigate the cause and identify appropriate action to prevent the discharge of tailwater exceeding the applicable surface water release limits. This may include stopping the discharge of tailwater while investigation and mitigation actions are undertaken.

The real time monitoring system to be utilised for tailwater monitoring has alerts programmed relative to the early warning (operational) and surface water release (compliance) limits. This will ensure Port and the reclamation contractor is notified should tailwater quality approach or exceed these levels to allow operational controls to be implemented.

Further to the threshold analysis, within 40 Business days of commencing tailwater release, a full analysis of the tailwater discharge characteristics was undertaken that characterised the tailwater discharge and assessed that there was no adverse impacts to receiving water environmental values (including suitability of tailwater release limits) due to authorised tailwater releases. This also included definition of the spatial extent of the mixing zone, using an appropriate near field model in relation to selected metals of concern. The tailwater receiving environment assessment and hydrodynamic model to be used has been approved by the CU Project ITAC (ITAC meeting 10, 17 March 2022).

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6 MITIGATION ACTIONS IF RELEASE LIMITS APPROACHED OR EXCEEDED

This plan addresses the performance objectives detailed for Tailwater by the CEMP.

6.1 MITIGATION ACTIONS

Mitigation actions will be considered on a case-by-case basis based on the tailwater monitoring results and trends, and how the levels compare with the release limits detailed in Section 5.

Given real time monitoring will be implemented and quality of tailwater will be known prior to release, it is not expected that tailwater will be released above the surface water release (compliance) limits. This scenario will likely only occur as a result of a major event e.g. a severe weather event, monitoring failure or mechanical failure associated with the tailwater discharge that prevents stopping the release.

In the event that tailwater release is occurring and the water quality approaches the surface water release limits, initial response will be to cease tailwater release. The D&R Contractor has established operational tailwater early warning trigger levels to alert if tailwater quality is deteriorating, before reaching the compliance limits, to enable a timely response.

Where tailwater being discharged triggers an early warning trigger limit, investigation of the cause and identification of appropriate actions will occur to prevent the discharge water exceeding the surface water quality limits. This will include:

- Ceasing pumping/discharge of tailwater, if considered necessary to ensure tailwater quality compliance;
- Review of the real-time telemetry data trends and transmissions to confirm if any equipment faults are identified and to confirm the equipment is operating correctly; or
- Conduct further in-situ testing via calibrated, hand held equipment to characterise the tailwater quality across the reclamation area.

Where the water quality remains within the surface water release limits and investigations show consistency in the water quality (under the release limits) across tested areas of the reclamation area, return to tailwater release can occur until tailwater discharge is no longer required.

Incident specific mitigation or management actions will be determined, implemented and monitored for effectiveness in order to amend standard work procedures where necessary. This process will also determine the level of notification required. Table 5 identifies indicative mitigation actions.

Table 5: Indicative Mitigation Actions for Exceedances of Tailwater Thresholds Limits

THRESHOLD LIMIT TRIGGERED	IMMEDIATE RESPONSE / ACTION	POTENTIAL MITIGATION ACTION
Exceedance of turbidity threshold limits in the reclamation area – prior to a controlled release.	Discharge of tailwater is not to commence where tailwater quality is or remains above release limits.	Review tailwater retention time and allow sediments to settle in the pond before release. Review the on-site control measures and look to change placement strategy within reclamation so that disturbance and turbidity producing activities are further away from
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THRESHOLD LIMIT TRIGGERED	IMMEDIATE RESPONSE / ACTION	POTENTIAL MITIGATION ACTION
		<p>the discharge location allowing sediment to settle.</p> <p>Consider establishment of internal bund walls within the reclamation area (if possible) in a manner that maximises settlement of sediments.</p>
Exceedance of pH range in the reclamation area – prior to a controlled release.	Discharge of tailwater is not to commence where tailwater quality is or remains above release limits.	<p>Review implementation of ASS / PASS treatment measures in the ASSCMP to ensure effectiveness.</p> <p>Introduce sea water into the reclamation to regulate the pH.</p> <p>Add alkaline or acidic materials (such as agricultural lime or other materials i.e. acidic compound) to increase/decrease pH and monitor pH during dosing to limit risk of over dosing.</p>
Exceedance of dissolved oxygen range in the reclamation area – prior to a controlled release.	Discharge of tailwater is not to commence where tailwater quality is or remains outside release limits.	<p>Review dredge production rates and tailwater retention time.</p> <p>Monitor weather conditions (wind, temperature, rainfall) for likely influence on dissolved oxygen levels.</p> <p>Review the on-site control measures and look to change placement strategy within reclamation if it could improve DO levels.</p> <p>Introduce sea water into the reclamation to regulate the DO levels.</p> <p>Consider establishment of a localised aeration system where DO remains low.</p>
Exceedance of turbidity, TSS, DO or pH threshold limits at the tailwater outlet during a controlled or uncontrolled release.	<p>Stop all tailwater discharge</p> <p>Report the incident to the Principal's Site Representative, and Manager Environment CU/Environmental Advisor CU as soon as practicable, but within 24 hours.</p>	<p>As per potential mitigations listed above for the specific parameter that is in non-compliance.</p> <p>Review release details and consider implementation of tailwater incident response monitoring in the receiving environment.</p>
Any observances of turbidity incidents from tailwater releases, which are likely to cause environmental harm to the	Report the incident to the contractor Project Manager, the Principal's Site Representative and Manager Environment	The Principal's Site Representative and Manager Environment CU, in conjunction with the Environment Advisor CU, must undertake / facilitate the necessary incident response procedure.

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THRESHOLD LIMIT TRIGGERED	IMMEDIATE RESPONSE / ACTION	POTENTIAL MITIGATION ACTION
immediate location and/or surrounding areas.	CU/Environmental Advisor CU as soon as practicable, but within 24 hours.	
Turbidity or metals as measured in the mixing zone / receiving environment during a controlled or uncontrolled release (Tailwater release within approved parameters) are larger than those modelled (condition WT3).	<p>Review data for trends and compare results to historical marine water quality trends and meteorological parameters to establish natural levels of turbidity and metals at monitoring locations.</p> <p>If necessary, interrogate data collected under the broader CU and / or Port marine water monitoring programs to determine if sensitive receptors are at risk of impact from tailwater.</p> <p>Continue to monitor discharge at the tailwater outlet for quality trend patterns until exceedance subsides.</p>	<p>If larger mixing zone is likely caused by tailwater release operations.</p> <p>Review dredge production rates, tailwater retention time and tailwater release flow rate to minimise levels of water quality parameters being discharged.</p> <p>Continue to monitor receiving environment water quality parameters to demonstrate mitigation action(s) have been effective.</p> <p>If required, implement additional mitigation actions (internal bund walls, serpentines, silt curtain etc.) to improve internal tailwater quality.</p> <p>Review relevance of the EA specified water quality limits for tailwater release in relation to the background water quality levels for Cleveland Bay/within the area of the tailwater discharge (as per WT3).</p>
Exceedance of flow limits during an uncontrolled or controlled release.	Cease release.	Monitor flow rates more regularly during releases.

6.2 TAILWATER RELEASE INCIDENT RESPONSE

In the event of a controlled or uncontrolled release of tailwater outside of the surface water release limits, the primary response will be to cease discharge of tailwater as soon as practicable.

Once ceased, notification of the release outside of limits will be made to the Port for incident investigation and internal reporting, in line with the relevant provisions of the CEMP. This investigation may be undertaken in conjunction with the respective contractors, consultants, relevant agency representatives or other project team members.

Incident specific mitigation or management actions will be determined, implemented and monitored for effectiveness in order to amend standard work procedures where necessary. This process will also identify the regulatory reporting of the incident required.

In any event, no recommencement of tailwater discharge will occur until the incident is investigated, appropriate controls are implemented and tailwater quality within the reclamation area is in compliance with surface water release limits.

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7 REPORTING AND RESPONSIBILITY

The Port will take responsibility for coordinating the implementation of this management and monitoring plan, with the assistance of suitably qualified contractors/consultants where required.

The Port will produce summaries of the monitoring results from the TMP as required. Copies of all finalised report(s) will be kept on-site and will be available for regulatory inspection. If requested by the regulators, all monitoring data and information related to this TMP will be submitted within 30 business days of the request, or within a timeframe agreed in writing between the Port and the relevant regulator.

In the event of a tailwater incident and release outside of the surface water release limits, relevant regulators will be notified in a timely manner of the incident and control measures being implemented to address the incident.

As per Condition WT3, within 40 business days of tailwater release commencing the Port provided a report to the regulators that characterised and assessed if there were any adverse impacts to receiving water environmental values due to the tailwater release. This report:

- Described the concentrations of contaminants in the tailwater released to the receiving environment
- Defined the spatial extent of the mixing zone, using an appropriate nearfield model approved by the Independent Technical Advisory Committee (ITAC), in relation to contaminants of concern
- Compared results to modelled outputs detailed in the PEP AEIS
- Assessed the suitability of the tailwater release limits detailed in Section 5 to protect receiving water environmental values
- Met the minimum data requirements outlined in Section 4.4.3 of the Queensland Water Quality Guidelines (2009) and defined the mixing zone according to the EHP Wastewater Release to Queensland Waters Technical Guideline (2016).
- Compared the results of the monitoring to the water quality objectives prescribed for the site under the *Environmental Protection (Water) Policy 2009*.

Where adaptive management controls are to be amended during the CU Project in response to recommendations, the relevant Management Plans (CEMP, MEMP, DMP) will be updated to incorporate updated management arrangements into the on ground practices. The updating of the plans may occur immediately, or as part of the regular review of the plan depending on the significance of the management action modification. A record of changes made will be kept.

In the event that the monitoring plan needs to be revised during implementation, then the Port will consult with the regulators on the need for amendments and submit a revised plan for approval. Changes that do not pose a new or increased risk to MNES will be updated and submitted, in accordance with the Department's policy on management plans changes.

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8 CONTINUOUS IMPROVEMENT

The Tailwater Monitoring Plan (TMP) will be subject to regular review.

This TMP is a “living document” which will be reviewed at least annually following commencement of tailwater release for the CU project (in association with the CEMP review for Annual Compliance Reporting function). This review will be conducted by the CU Environment Manager and/or Environment Advisor. During delivery, review and amendment will occur as necessary via adaptive management actions to ensure it remains fit for purpose and achieves the required program objectives; including identification and implementation of any new or changing environmental risks and mitigation action outcomes. Recommendations on improvements or amendments are to be reported as part of the annual reporting process.

Feedback mechanisms will be in place for the duration of the CU Project to enable this TMP to be updated and responsive to learning from any incidents, complaints and ongoing monitoring results. Other triggers for TMP review may include:

- As a result of the tailwater release assessment conducted within 40 days of commencement of tailwater release;
- Changes in operations or management;
- Changes in environmental legislation and/or policies; and
- New technologies / innovation relevant to applied monitoring methods and mitigation actions that provide innovative means of executing activities in order to meet performance objectives.

Changes to the TMP may be developed and implemented in consultation with relevant regulators and other stakeholders over time. All changes are to ensure approval conditions are met and be approved by the CU Project Management, prior to implementation.

Continuous improvement will also be achieved via the *Construction Environmental Management Plan*, to which this plan is a part of (Appendix G of CEMP). Consideration and review of improvements to the CEMP will be reflected within this Plan. Information from this TMP will be used to assist with improving the control measures in the CEMP.

As noted, where the monitoring identifies the need for revised management actions, the CEMP will be revised to incorporate the adaptive management arrangements. This will include the assessment of any monitoring program modifications.

As per Condition 38 of the EPBC Act Approval (EPBC 2011/5979), any changes to this Monitoring Plan, or any of the Management Plans as a result of the outcomes of the TMP will be notified to the Department.

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9 REFERENCES

ANZECC 2000	<i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality.</i> Australian and New Zealand Environment Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000.
AS/NZS 5667.1:1998	<i>Water quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.</i> Standards Australia, 2016
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DES 2021	<i>Wastewater release to Queensland waters – Technical Guideline.</i> Department of Environment and Science, Brisbane. ESR/2015/1654 Version 2.03, 2021.
DES 2018	<i>Queensland Monitoring and Sampling Manual.</i> Department of Environment and Science, Brisbane, 2018.
DSITIA 2014	<i>Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines.</i> Department of Science, Information Technology, Innovation and the Arts, Brisbane, 2014.
EPP (Water) 2009	<i>Environmental Protection (Water) Policy 2009: Ross River Basin and Magnetic Island Environmental Values and Water Quality Objectives Basin No. 118 including all waters of the Ross River Basin, and adjacent coastal waters (including Magnetic Island).</i> Department of Environment and Heritage Protection, Brisbane, 2016.
NAGD 2009	<i>National Assessment Guidelines for Dredging.</i> Department of Environment and Energy, Canberra, 2009.
NEPC 2013	<i>National Environment Protection (Assessment of Site Contamination) Measure Schedule B(2) Guideline on Data Collection, Sample Design and Reporting.</i> National Environment Protection Council 1999 (Amended 2013).
QASSIT 1998	<i>Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.</i> Queensland Acid Sulfate Soils Investigation Team, Brisbane, 1998.
QWQG 2009	<i>Queensland Water Quality Guidelines.</i> Department of Environment and Heritage Protection, Brisbane, 2013.

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APPENDIX A

COMMONWEALTH (EPBC APPROVAL) AND STATE (EA) CONDITIONS RELEVANT TO TAILWATER

Environmental Authority EA0002890 Conditions relevant to this TMP (as amended 7 November 2023)

REF	COND. NO.	CONDITION REQUIREMENT	PLAN REFERENCE	DEMONSTRATION OF HOW THE PLAN ADDRESSES THE CONDITION REQUIREMENT																												
1	WT1	<p>The only contaminants to be released to surface waters from the placement and management of dredge spoil are tailwater releases from the reclamation area to the mouth of the Ross River in accordance with Table WT1 – Surface water release limits and the associated monitoring requirements.</p> <p>Table WT1 – Surface water release limits</p> <table><tr><th rowspan="2">Monitoring location name</th><th colspan="2">Release Points(s) Description (GDA94 decimal degrees)*</th><th rowspan="2">Quality characteristic (units)</th><th rowspan="2">Limit</th><th rowspan="2">Limit Type</th><th rowspan="2">Minimum Monitoring Frequency</th></tr><tr><th>Latitude</th><th>Longitude</th></tr><tr><td rowspan="4">End of pipe</td><td rowspan="4">- 19.25113</td><td rowspan="4">146.84939</td><td>pH</td><td>6.5 – 8.5</td><td>Range (minimum to maximum)</td><td>Daily during releases</td></tr><tr><td>Dissolved oxygen</td><td>60-115% saturation</td><td>Range (minimum to maximum)</td><td>Daily during releases</td></tr><tr><td>Turbidity</td><td>50 NTU</td><td>Maximum</td><td>Daily during releases</td></tr><tr><td>Total Suspended Solids</td><td>Monitor only</td><td>N/A</td><td>Monthly during releases</td></tr></table> <p>Associated monitoring requirements:</p> <ul style="list-style-type: none">a) Monitoring must be in accordance with the methods prescribed in the current edition of the Department of Environment and Heritage Protection <i>Monitoring and Sampling Manual</i>;b) All determinations must employ analytical practical quantitation limits of sufficient sensitivity to enable comparisons to be made against the limits relevant to the particular water or sediment quality characteristic;c) All monitoring devices must be calibrated and maintained according to the manufacturer’s instruction manual.	Monitoring location name	Release Points(s) Description (GDA94 decimal degrees)*		Quality characteristic (units)	Limit	Limit Type	Minimum Monitoring Frequency	Latitude	Longitude	End of pipe	- 19.25113	146.84939	pH	6.5 – 8.5	Range (minimum to maximum)	Daily during releases	Dissolved oxygen	60-115% saturation	Range (minimum to maximum)	Daily during releases	Turbidity	50 NTU	Maximum	Daily during releases	Total Suspended Solids	Monitor only	N/A	Monthly during releases	4	Section 4 details the tailwater monitoring to be undertaken as part of the CU project, including location, frequency, equipment and parameters to be applied. This will indicate compliance with this condition.
Monitoring location name	Release Points(s) Description (GDA94 decimal degrees)*			Quality characteristic (units)	Limit					Limit Type	Minimum Monitoring Frequency																					
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End of pipe	- 19.25113	146.84939	pH	6.5 – 8.5	Range (minimum to maximum)	Daily during releases																										
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			Total Suspended Solids	Monitor only	N/A	Monthly during releases																										
2	WT2	The maximum tailwater release volume from the end of pipe referred to in Table WT1 – Surface water release limits must not exceed 285 ML/day.	4.2	Section 4.2 details the flow monitoring for tailwater discharge, including location, frequency and total daily volume limit. This will indicate compliance with this condition.																												
3	WT3	<p>Within 40 business days of commencing tailwater releases a report must be submitted to the administering authority that identifies and describes any adverse impacts to receiving water environmental values due to the authorized tailwater release.</p> <p>The report must:</p> <ul style="list-style-type: none">a) Describe concentrations of toxicants in the tailwater releases and the receiving environment;b) Define the spatial extent of the mixing zone, using an appropriate nearfield model approved by the Technical Advisory Group, in relation to contaminants of concern, including but not limited to: aluminium, antimony, arsenic, cadmium, chromium copper, iron, lead, nickel, silver, zinc.c) Compare results to modelled outputs detailed in the Townsville Port Expansion Project AEIS Hydrodynamic and Advection – Dispersion Modelling Technical Report, prepared by AECOM and BMT WBM, dated 30/03/2016, reference R.B21057.003.03.AEIS-Modelling.docx revision 3;d) Assess the suitability of current tailwater release limits outlined in Table WT1 – Surface water release limits to protect receiving water environmental values:	3.27	<p>Section 3.2 details the characterization of tailwater discharge within 40 days of the commencement of tailwater discharge. This will include detailing and comparison to conditional requirements listed.</p> <p>Section 7 details the reporting requirement for the tailwater characterization.</p>																												

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REF	COND. NO.	CONDITION REQUIREMENT	PLAN REFERENCE	DEMONSTRATION OF HOW THE PLAN ADDRESSES THE CONDITION REQUIREMENT
		<p>e) Meet the minimum data requirements outlined in Section 4.4.3 of the <i>Queensland Water Quality Guidelines (2009)</i> and define the mixing zone according to the <i>EHP Wastewater Release to Queensland Waters Technical Guideline (2016)</i>.</p> <p>Associated monitoring requirements</p> <p>a) Compare results of tailwater and receiving environment monitoring with Environmental Protection (Water) Policy 2009 (EPP (Water)) water quality objectives schedule under the EPP (Water) Ross River Basin and Magnetic Island Environmental Values and Water Quality Objectives Basin No. 118, including all waters of the Ross River Basin, and adjacent coastal waters (including Magnetic Island);</p> <p>b) All monitoring devices must be calibrated and maintained according to the manufacturer’s instruction manual;</p> <p>c) Monitoring of tailwater and the receiving environment must be undertaken during tailwater releases.</p>		

Definitions:

Administering authority: means the Department of Environment and Heritage Protection or its successor or predecessors.

Dredged material means materials that has been removed from under surface water, including spoil, other than mineral within the meaning of any Act relating to mining. Materials includes, for example, stone, gravel, sand, rock, clay, mud, silt and soil.

Environmental value is:

- a) A quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or
- b) Another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

Receiving waters: means the waters into which this environmental authority authorizes tailwater releases from the reclamation area.

Technical Advisory Committee: means an assembly of appropriately qualified persons representing experts in various scientific fields, formed to be capable of assessing sediment plume-associated monitoring data and presenting advice relevant to conducting the dredging campaign and protecting sensitive receptors as directed under this authority and the Dredge Management Plan. For CU Project this is the ITAC.

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EPBC Approval conditions relevant to this TMP

REF	COND. NO.	CONDITION REQUIREMENT	PLAN REFERENCE	DEMONSTRATION OF HOW THE PLAN ADDRESSES THE CONDITION REQUIREMENT
1	8	Reclamation area The person undertaking the action must ensure that: c) The design, materials and methods of construction for the reclamation area must prevent water quality impacts from leaching material through the bund wall, release of tailwater and storm-water run-off	4	Section 4 details the tailwater monitoring to be undertaken as part of the CU project, including location, frequency, equipment and parameters to be applied. This will indicate compliance with this condition and the prevention of water quality impacts via release of tailwater.
2	10	Construction and management of the reclamation area The person taking the action must submit a Construction Environmental Management Plan (CEMP) for the Minister’s approval, which includes measures to mitigate impacts to MNES from the construction of the reclamation area before the commencement of the action. The person taking the action must not commence the action unless the Minister has approved the CEMP. The CEMP must be prepared in accordance with the Department’s Environmental Management Plan Guidelines and include at least the following: f) A program to monitor, manage and treat tailwater before release into the marine environment	4	Section 4 details the tailwater monitoring to be undertaken as part of the CU project, including location, frequency, equipment and parameters to be applied. This will indicate compliance with this condition and the prevention of water quality impacts via release of tailwater.
3	26	Dredging Completion Report At the completion of capital dredging for each stage of the action the person taking the action must submit a Dredging Completion Report to the Minister . The Dredging Completion Report must: a) Include details (including assumptions, inputs and findings) of modelling used to determine the actual amount (tonnes) of fine sediment returned to the marine environment as a result of the action during dredging and release of tailwater from the reclamation area; and b) Delineate and quantify (in tonnes): i. Fine sediment returned to the marine environment that was not available for resuspension before commencement ; and ii. Fine sediment returned to the marine environment that was available for resuspension before commencement .	4	Section 4 details the tailwater monitoring to be undertaken as part of the CU project, including location, frequency, equipment and parameters to be measured. This will contribute to any estimation of the quantity of fine sediment released as a result of the action, including the release of tailwater.

Definitions:

Minister: The Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and includes a delegate of the Minister

MNES: Matters of National Environmental Significance: In the context of this approval: Great Barrier Reef World Heritage Area, Great Barrier Reef National Heritage Place, Listed turtle species, listed dolphin species, and all other Cetaceans, Dugong (*Dugong dugon*), Commonwealth marine area and the Great Barrier Reef Marine Park.

Commencement: Any works that are required to be undertaken for construction (includes works associated with the construction of the reclamation area, pile driving activities, dredging activities, and any infrastructure associated with the action). Excludes preliminary works.

Capital dredging: as defined in the NAGD, being ‘dredging for navigation, to enlarge or deepen existing channels and port areas or to create new ones.

Stage As identified at Section 2.4.1 of the *Townsville Port Expansion Project – Additional Information to the Environmental Impact Statement (October 2016)*.

Fine sediment: < 15.6 µm fine silt and clay

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