Proposed maintenance dredging at the Port of Weipa Information package





Letter from Nicolas Fertin, CEO

NQBP has a clear yet ambitious vision to set the global standard in sustainable trade and port development.

As custodian of four vital Queensland ports, we regularly demonstrate how environmental, commercial, community and stakeholder interests can work together to deliver outstanding results.

In particular, minimising the environmental impact of our operations is core to how we do business and central to achieving our vision.

We consistently strive to innovate and improve upon strong existing environmental management practices at all three of our ports in the Great Barrier Reef World Heritage Area and at the equally iconic Port of Weipa, on the unique western coast of Queensland.

A comprehensive environmental approach

In the past five years, we have invested significantly in developing a comprehensive approach to sustainably managing sediment from maintenance dredging within our ports. Industry-leading marine researchers, independent scientists, communities and regulators have all been engaged as part of this process.

Our research was first carried out at the Port of Hay Point. In 2018-19, we replicated the studies at the Port of Weipa. Ports around the world are now using parts of our published methodology to re-assess their own sediment management approaches.

In Weipa, as at Hay Point, we weighed up several possibilities for sediment management, looking at a range of onshore and offshore disposal options, as well as opportunities for beneficially reusing maintenance dredged material. Ultimately, placement of maintenance dredged material at sea was consistently ranked as the highest performing long-term approach. Key environmental investigations are outlined in this document and in our supporting reports. However, I am pleased to summarise that our research has confirmed the levels of risk for ongoing maintenance dredging at the Port of Weipa are predominantly low, with effective mitigation and management strategies in place.

Supporting the Far North Queensland economy

As a crucial bauxite supply chain partner, the Port of Weipa helps contribute millions in revenue each year to Queensland's economy.

Our annual maintenance dredging program is essential to maintaining the port's operating efficiency and export capacity.

An independent economic assessment, also completed as part of our sustainable sediment management package, suggests that the potential financial impacts could add up to billions over the next 10 to 15 years, were maintenance dredging not to take place.

The economic assessment analyses both the direct impact of reduced capacity on export revenue and government royalties, as well as the potential indirect impacts on production, incomes and employment across Far North Queensland.

In 2020, we are re-applying for the necessary permits to continue our annual maintenance dredging schedule at the Port of Weipa for the next ten years.

We have prepared this information package as part of our commitment to clear and transparent communication, wherever possible, about all of our port operations and environmental activities.

In addition to reading this document, I encourage you to visit our website to access all of our Weipa sustainable sediment management reports and research in full.

Nicolas Fertin

CE0

North Queensland Bulk Ports Corporation

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1. Executive summary

NQBP is proposing to continue to annually remove built-up sediment from within the Port of Weipa boundaries to maintain navigational depths and for operational efficiency of the port.

Natural sediment transport at the Port of Weipa occurs as a result of wind and wave energy resuspending marine sediments within the naturally turbid environment of Albatross Bay. This process results in sediments accumulating in some navigational areas, which affects the navigational depths and the efficiency of the port.

Sustainable Sediment Management Assessment

A range of options were assessed to determine whether maintenance dredging could be avoided, reduced or whether the sediment removed during the maintenance dredging could be recycled or reused. This work is brought together through NQBP's Sustainable Sediment Management Assessment for Navigational Maintenance.

This study found catchment run-off has minimal influence on sediment movement at the port, but windy weather, tropical cyclones and low pressure systems can significantly change levels of accumulation due to associated wave energy and natural sediment resuspension. This means attempts to reduce catchment runoff would not significantly change the accumulation of marine sediments.

A key finding of the assessment was maintenance dredging was considered to provide the most cost effective and lowest greenhouse gas (GHG) emissions solution to sediment build up, with low environmental and operational effects and high effectiveness.

Bed levelling is a modern technique used in many ports and harbours. It involves towing equipment behind a vessel to level high spots and ridges on the seabed. Based on the assessment, it was found that occasional bed levelling in key areas could reduce the frequency of the maintenance dredging required within the Inner Harbour, but would not eliminate this need.

The assessment also included an investigation of options to recycle or reuse the dredged material to avoid disposal. However, the assessment found that due to the nature, and volumes, of the material that would be removed by maintenance dredging, there would be limited beneficial reuse opportunities.

NQBP's structured decision-making approach included participation from a range of stakeholders who are brought together to understand what is of value to them and what key metrics are used including environment, cultural heritage, port economics and operations, health and safety and social.

Preferred sediment management option

Placement of marine material on land was found to be a less favourable option than placement at sea. Placement near the existing Dredged Material Placement Area (DMPA) was identified as the preferred long-term sediment management option.

Environmental risk assessment and management plans

Underpinning the preferred sediment management option are an environmental risk assessment and best practice maintenance dredging management plans. NQBP will also implement an industry leading adaptive monitoring and management program.



2. About the Port of Weipa

North Queensland Bulk Ports manages the Port of Weipa, in the Gulf of Carpentaria on the north-west coast of the Cape York Peninsula.

Bauxite exports comprise more than 95% of the port's trade. Fuel and cargo are also imported to support mining operations and other trading activities.

The port is within Albatross Bay, a large embayment, with the wharves and berths located in the Embley River. It has approximately 622 hectares of channels, swing basins and berths, where depths are maintained by maintenance dredging.

The port consists of:

- A main shipping channel in Albatross Bay called South Channel
- An Inner Harbour, within the Embley River, which consists of the Approach and Departure Channels, as well as four shipping berths:
 - Lorim Point East
 - Lorim Point West
 - Humbug Wharf
 - Evans Landing.



ALBATROSS BAY

Albatross Bay

DMPA

Embley River

3. What is maintenance dredging?

When you look out at a port, you'll see the ships, ocean, the wharves and maybe some offloading machinery.

What you won't see is the infrastructure beneath the surface. This includes a shipping channel, approaches and berthing pockets.

All of these are manmade depressions in the seabed that allow a ship to navigate and manoeuvre into port.

Over time, natural forces like tides, storms and cyclones cause some of the sediment that is constantly shifting through the ocean to settle into these channels and pockets.

This sediment starts to reduce the depth of these navigational areas, which have a design depth and a declared depth.

- Design depth is the original construction depth that port engineers consider ideal for operating safely and efficiently at both high tide and low tide.
- Declared depth is designated by the Harbour Master, acknowledging this sediment build-up and safe vessel clearance.

If maintenance dredging does not take place, the channels, approaches and pockets get shallower, as illustrated below.

As the distance between ship and seabed (known as under keel clearance) reduces, the port's day-to-day activities become more difficult.

The depth necessary for safe loading, manoeuvring and transit of ships is impacted.

This can cause shipping delays that have significant flow-on effects for businesses and the broader economy.

Capital versus maintenance dredging

Maintenance dredging is the removal and placement of accumulated material from existing ship navigational areas to an approved placement area.

Capital dredging involves the removal of previously undisturbed areas of seabed to expand or create new shipping channels, berths or swing basins.

FIGURE ACCUMULATED SEDIMENT IN NAVIGATION AREAS



4. How is maintenance dredging performed at Port of Weipa?

For the Port of Weipa, NQBP typically uses what is called a Trailing Suction Hopper Dredger (TSHD) to undertake maintenance dredging.

It is mainly used for dredging loose and soft material such as sand, gravel, silt or clay. The diagram below illustrates this more clearly.

In the first step, one or two suction tubes, equipped with a drag head, are lowered on the seabed and the drag head is trailed over the bottom. A pump system sucks up a mixture of sands, silts or clay and water, and discharges it in the 'hopper' or hold of the vessel.

Once fully loaded, the vessel sails to the designated placement site. The material is then deposited at the approved location through bottom doors or valves, as shown in the second step.



2. TRAILING SUCTION HOPPER DREDGER PLACING MATERIAL

International, national and state regulation

Activities to manage marine sediment in ports are highly regulated and, in particular, any dredging and dredged material placement is subject to detailed regulatory approval processes under international conventions, and under national and state legislation.

Australia is a signatory to the London Protocol, an international convention that aims to "protect and preserve the marine environment."

The placement of dredged material at sea may be allowed where in accordance with the London Protocol and the National Assessment Guidelines for Dredging (NAGD).

The NAGD set out the framework for the environmental impact assessment and permitting of at-sea placement of dredged material. Prior to any decision to dredge and place material, a comprehensive assessment is required. A strict NAGD criteria determines whether dredge material will be suitable for at-sea placement or whether it must be placed onshore. NQBP must have in place state and Commonwealth permits to conduct any maintenance dredging and at-sea placement within the Port of Weipa.

NQBP currently has 10-year Sea Dumping Permits for maintenance dredging at three NQBP ports – Weipa, Hay Point and Mackay. The Weipa permit expires in September 2020.

This information package outlines the process NQBP is undertaking to seek a new 10-year permit under the Environment Protection (Sea Dumping) Act for placement of the dredged material at the proposed Dredged Material Placement Area within Albatross Bay.

5. Why is maintenance dredging needed at the Port of Weipa?

To maintain navigational depths and operational efficiency at the Port of Weipa, NQBP undertakes annual maintenance dredging, removing and relocating built-up sediment.

In addition to the area's regularly occurring sedimentation, extreme weather events such as tropical cyclones can result in significant increases in sedimentation. This can lead to increased maintenance dredging requirements following these events.

To reduce the risk of increased sedimentation from a tropical cyclone resulting in operational or safety issues at the port, annual maintenance dredging has typically been scheduled immediately after the wet season (when tropical cyclones occur).

NQBP studies have shown that there is currently no feasible alternative to maintenance dredging.

Economic impacts

If maintenance dredging did not occur at the Port of Weipa, there would be several potential economic impacts.

The capacity of the terminals would be decreased and there would be delays in shipping movements, resulting in reduced bauxite export revenue and government royalties.

There would also be flow-on, indirect negative impacts on other industries, particularly bauxite supply chain industries.

The indirect impacts would also flow through to the broader region and Queensland economies, as the income losses by residents would affect their spending on goods and services.

As part of its broader package of Sustainable Sediment Management Assessment for Navigational Maintenance reports, NQBP commissioned an independent economic review by Acil Allen Consulting.

This review found that without maintenance dredging over a 16-year period up until 2034-35, the economic output of the region could fall by a cumulative total of up to \$7 billion, or around \$438 million per year on average.

This estimate incorporates both direct and indirect impacts, and assumes there would be two extreme weather events within that 16-year period, contributing to a significant build-up of sediment in port navigation channels.

> YOU CAN DOWNLOAD THE FULL ECONOMIC REVIEW AND ALL OTHER SUPPORTING STUDIES ON THE NQBP WEBSITE

6. What maintenance dredging will take place?

Planned schedule

Maintenance dredging has occurred at the Port of Weipa since 1961, and annually since 2002.

NQBP is applying for a new 10-year Sea Dumping Permit to facilitate the continued placement of dredge material at an area overlapping the currently approved Dredge Material Placement Area (DMPA). The current permit expires in September 2020.

Dredge planning has been based on a need to accommodate the anticipated volumes, outlined in the table below.

In brief, the full 10-year volume may be in the order of 10.8 million m³.

Number of years	Anticipated volume	Including 15% overdredge allowance
5 years in 10-year period	400,000 m ³ (typical year)	460,000 m ³
3 years in 10-year period	800,000 m ³ (cyclonic year)	920,000 m ³
2 years in 10-year period	2,500,000 m ³ (multiple cyclone year)	2,875,000 m ³
TOTAL: 10 years	9,400,000 m ³	10,810,000 m ³

How long will the maintenance dredging take?

NQBP would expect the dredger to be able to remove and relocate a 'typical year' volume of approximately 400,000 m³ in about 24 days and a 'cyclonic year' volume of around 800,000 m³ would take about 48 days.

Methodology

Maintenance dredging requires specially designed vessels. These vessels are crewed by highly experienced people, with equipment and technology designed to protect the environment.

NQBP prefers to use a Trailing Suction Hopper Dredger (TSHD) for its maintenance dredging programs. The TSHD that NQBP has used in the past has features such as under keel discharge, green-valve technology and turtle deflectors to reduce the risk of harm to marine life.

The maintenance dredging process involves using a vessel which acts like an underwater vacuum cleaner. This mainly removes loose sand, clay and silt. This process is described in section 4.

Placement area

The existing DMPA used since 2002 is in Albatross Bay, approximately 15km west of the mouth of the Embley River, and within defined port limits.

It is proposed to shift this DMPA 2km west into deeper water to facilitate access for dredge vessels (if required for placement) and provide additional storage capacity for the next 10 years.



FIGURE ADJUSTMENT OF EXISTING ALBATROSS BAY DMPA

7. What are the environmental receptors and risks?

Based on more than two years of studies and peer-reviewed research, NQBP reports and experts have concluded that the risk to environmental receptors from maintenance dredging at the Port of Weipa will be predominantly low with some temporary, short-term impact to benthic habitat possible.

We note that our independent environmental risk assessment assigned a 'High' risk rating to the risk of introduced marine pests; however, this was accompanied by a likelihood level of 'Possible'. Any dredge vessel undertaking works at Weipa is required to comply with Australian Quarantine and Inspection Service and Bio-Security Queensland requirements in relation to ship ballast water and marine pest management. This includes the National System for the Prevention and Management of Marine Pest Incursions.

Environmental receptors

The environmental values at the Port of Weipa are reflective of an inshore environment of the Cape York Peninsula. Water quality within the port is naturally turbid due to sediment resuspension driven by wind and wave energy.

Habitats in the area include patchy coral reefs, benthic infauna communities, intertidal ephemeral seagrass communities and coastal habitats including mangroves.

There are a number of protected fauna species that are known to occur at the port including marine turtles, sharks (sawfish), in-shore dolphins, dugong and migratory shorebirds.

The port and surrounding areas also have values for commercial fisheries, tourism and recreation, and heritage.

Of these, the commercial fishery operations that operate in the Weipa region are of most significance.

However, any operational impact will be temporary and NQBP will communicate any changes to operations. All boating laws and rules will apply.

Risk conclusions

All potential impacts were assessed against known environmental values and data to determine the risks posed by maintenance dredging at the Port of Weipa. The key findings of this risk assessment are:

- Resuspension of sediments from maintenance dredging is comparable to natural suspended sediment concentrations.
- Water quality monitoring results and numerical modelling of sediment transport demonstrates that natural suspended sediment levels are much higher than those generated by maintenance dredging.
- Risks to sensitive communities are likely to be low for seagrass and moderate for benthic communities, which may be temporarily impacted at the Dredge Material Placement Area due to smothering. However, studies have indicated the communities recover and restabilise.
- Other sensitive communities, such as coral and mangroves, lie outside of area predicted to be impacted by turbidity and sedimentation and the risks from maintenance dredging are negligible.
- Protected species are also unlikely to be significantly impacted by maintenance dredging. The Port of Weipa does not support important populations for marine species and disturbance to habitats will be low.
- Other port users may experience short-term disruptions to their activities, but these disruptions will not be significant.

Environmental risk assessment summary table

Risk activity (cause)	Potential environmental receptors	Potential impact	Consequence	Likelihood	Risk rating
Smothering from dredge material placement	Benthic macroinvertebrate communities	Temporary disturbance of benthic habitat and associated communities	Minor Temporary, short term negative impact	Likely	Medium
Dredging and placement generated sediment plume	Coral reef, seagrass and mangrove habitats	Changes to water quality leading to mortality or changes in the diversity or cover of coral, seagrass or mangroves	Negligible Impact is within the natural variation and tolerance of the system	Rare	Low
Dredging and placement generated sediment plume	Coral reef, seagrass and mangrove habitats	Sediment deposition resulting in the loss of coral, seagrass or mangroves	Negligible Impact is within the natural variation and tolerance of the system	Rare	Low
Movement of dredge vessel from the Port to the dredge material placement area	Transitory threatened and migratory marine animals	Potential for marine fauna vessel strike	Negligible No impact at the population or sub-population level	Unlikely	Low
Release of contaminants and nutrients	Marine biota	Potential for lethal and sub-lethal effects on biota	Negligible Material is suitable for disposal at sea	Rare	Low
Dredging suction	Foraging marine turtles	Potential for marine fauna to be caught	Negligible No impact at the population or sub-population level	Unlikely	Low
Noise	Inshore dolphins, dugong and marine turtles	Potential for alienation of habitat	Negligible No impact at the population or sub-population level	Rare	Low
Lighting	Foraging inshore dolphins, dugong and marine turtles	Alienation of habitat, animal mortality	Negligible No impact at the population or sub-population level	Rare	Low
Introduction of marine pests	Marine biota	Potential competition with native species and changes to the ecosystem	High Significant impact on the environment in the Port and potentially in the greater region	Possible	High
Dredge program	Marine users	Disruption of activities	Negligible Impact is confined to a small area or interest group that is not vulnerable	Possible	Low

The TSHD will operate in accordance with the Maintenance Dredging Environmental Management Plan. This plan includes how unlikely incidents such as waste and oil spills will be managed as well as management of emissions such as noise, light and air quality. In the unlikely event of a pollution incident, management will be in accordance with the TSHD on-board emergency procedures and the Port of Weipa emergency response procedures.

Environmental receptors and risks, modelling

The extensive bathymetric modelling undertaken by NQBP shows that ongoing maintenance dredging and placement volumes at the Port of Weipa are dependent on the wave energy associated with the number of tropical cyclones or tropical lows that occur each wet season.

Numerical modelling of dredging and placement was undertaken on the following three sedimentation year types:

- Typical year (400,000 m³) with average wave conditions and no tropical cyclones
- Cyclonic year (800,000 m³) with above average wave conditions associated with a single tropical cyclone that directly impacted the Weipa region

 Worst-case year (2,500,000 m³) with worst-case wave conditions due to the occurrence of multiple tropical cyclones and tropical lows, which directly impact the Weipa region.

It demonstrated that the increase in suspended sediments associated with maintenance dredging and placement of up to 2,500,000 m³ of sediment during a worst-case dredge program still remained below the natural suspended sediment range at the sensitive environmental receptors (see image below).

The natural suspended sediment concentration is generally much higher than that resulting from maintenance dredging and was predicted to remain within natural conditions for the sensitive receptors for all dredge scenarios considered.



FIGURE NATURAL COMPARED TO WORST-CASE WAVE CONDITIONS AT WQ2

8. How will environmental risks be managed?

Marine monitoring program

NQBP has overseen a comprehensive ongoing ambient marine monitoring program since 2000. The program is currently undertaken by James Cook University marine scientists.

The program helps NQBP understand the natural marine environment (seagrass, water quality and invasive marine species) and collects data to drive continual improvement.

Maintenance dredging monitoring program

The environmental maintenance dredging monitoring plan aims to:

- Detect any impacts from maintenance dredging
- Respond to real time environmental conditions during large maintenance dredging programs to manage unpredicted changes to water quality.

These aims will be met through the implementation of a three-tiered approach, as detailed in the Port of Weipa Marine Environmental Monitoring Plan (see below). Results from each tier of the monitoring program will be used to inform how NQBP manages maintenance dredging.

Monitoring review and updates

The Port of Weipa Marine Environmental Monitoring Plan will be reviewed after each dredging program and the plan updated (if required) prior to any future dredging. The review will examine the:

- Effectiveness of monitoring methods
- Response times and outcomes of adaptive monitoring actions
- Monitoring results and data
- Environmental changes and any incidents.

The review will be undertaken in consultation with the Technical Advisory and Consultative Committee (TACC), consisting of representatives from the Commonwealth, state and local government, port users, traditional owners, environmental/ conservation and community interest groups.

The TACC's feedback will be considered as part of future plan revisions.

Adaptive management measures

Adaptive management provides for continuous monitoring, evaluation and adjustment of management response measures, based on real-time monitoring and environmental conditions.

Based on an understanding of natural environmental conditions and thresholds for impact, a series of response levels (triggers) can be established and then monitored to ensure that conditions outside of natural ranges are avoided or stopped before they occur.

Responses to monitoring results will be required if trigger values are exceeded. The nature of the response will be scaled according to the environmental risk.



FIGURE THREE-TIERED APPROACH TO MARINE ENVIRONMENTAL MONITORING

9. What are the timeframes?

NQBP propose to lodge a permit application for placement of dredged material at sea under the Environment Protection (Sea Dumping) Act with the Commonwealth Department of Agriculture, Water and the Environment (DAWE) in mid-2020.

The statutory timeframe for a decision to grant, or refuse to grant, a permit is 90 calendar days from the date of application.

Subject to a successful outcome to NQBP's permit applications, NQBP would be in a position to start maintenance dredging under this new permit in 2021. This would depend on the availability of the dredging vessel.

The current dredging vessel is typically available at the Port of Weipa each year between March and September before returning to its home base.

Routine maintenance dredging at the Port of Weipa under the existing permit was recently completed in May 2020.

10. Will the works impact access by other port users?

Direct physical impact with other port users from collision with the maintenance dredge is unlikely as the vessel will be moving at a slow pace.

During maintenance dredging operations, the dredge will be displaying the lights and day shapes as required by orders and regulations for preventing collisions at sea.

There will be restricted safety zones around the maintenance dredge equipment. However, this will be minimal and will be designed to ensure the safety of the boating and fishing public.

Maintenance dredging has occurred annually at the Port of Weipa since 2002. Port users and mariners will also be provided with notifications and information regarding maintenance dredging operations.

11. Who has been engaged and consulted?

NQBP is engaging with stakeholders throughout the application process and the Commonwealth Department of Agriculture, Water and the Environment's assessment period.

NQBP's long-term maintenance dredging management plan is being developed in consultation with a Technical Advisory and Consultative Committee (TACC). The TACC consists of representatives from:

- North Queensland Bulk Ports (port authority)
- Rio Tinto (port operator)
- Department of Agriculture, Water and the Environment (Commonwealth Government)
- Department of Environment and Science (Queensland Government)
- Department of Agriculture and Fisheries (Queensland Government)
- Department of Transport and Main Roads (Queensland Government)
- Maritime Safety Queensland (Queensland Government)
- Biosecurity Queensland (Queensland Government)
- Weipa Town Authority (local government)
- James Cook University (technical)
- Port of Brisbane (dredging contractor)
- Traditional Owners
- CSIRO Marine and Atmospheric Research
- Queensland Seafood Industry Association (industry)
- Carpentaria Contracting (industry)
- Australian Marine Conservation Society (community)

12. Where do I go for more information?

Industry-leading research, as well as technical studies, have informed NQBP's approach to the proposed maintenance dredging. The approach has been designed to minimise impacts to the environment.

NQBP have spent more than two years undertaking detailed studies and engaging with a range of stakeholders to understand the source of natural sediment accumulation and appropriate removal and placement options at the Port of Weipa.

NQBP's long-term maintenance dredging management plan is being developed in consultation with a Technical Advisory Consultative Committee consisting of representatives from the Commonwealth, state and local government, port users, traditional owners, environmental/conservation and community interest groups. NQBP's Port of Weipa Sustainable Sediment Management (SSM) Assessment for Navigational Maintenance reports were peer reviewed by Dr Paul Erftemeijer and are considered best practice.

The SSM weighed up possible options for sediment management and determined that placement of maintenance dredge material near the existing placement area was consistently ranked as the highest performing long-term approach.

NQBP's assessment reports have found the risks to environmental receptors are predominantly low with some temporary, short-term impacts to benthic habitat possible and marine pest management required.

For more detailed information on any aspect of this assessment please click on the reports below.







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