Assessment Report 101

Assessment method:

Environmental Impact Statement

Ship Lift and Marine Industries (SLAMI) Project

Department of infrastructure, Planning and Logistics

July 2023

ntepa Northern Territory Environment Protection Authority

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 7(2)(g) of the *Environmental Assessment Act 1982*, and sections 296 and 299 of the *Environment Protection Act 2019* (EP Act). It describes the outcomes of the NT EPA's assessment of the Ship Lift and Marine Industries Project proposed by the Department of Infrastructure, Planning and Logistics.

This assessment report documents potential environmental impacts and risks identified during the environmental impact assessment process, focusing on those that could be significant, and the measures and recommended conditions required to address potentially significant impacts on the environment.

In accordance with section 64 of the EP Act, the assessment report is for the Northern Territory Minister for Environment, Climate Change and Water Security to consider when making a decision about whether to approve the action under the EP Act.

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NT EPA Chairperson

19 July 2023

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Important Disclaimer

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Summary

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 7(2)(g) of the *Environmental Assessment Act 1982* (EA Act) and sections 296 and 299 of the *Environment Protection Act 2019* (EP Act) for the Ship Lift and Marine Industries Project (proposal).

The Department of Infrastructure, Planning and Logistics (proponent) proposes to construct and operate a common user ship lift, repair and maintenance facility including wet and dry berth vessel maintenance facilities and a privately-owned facility including additional quay line, berths and hardstand. The proposal would be located approximately 700 m east of the existing East Arm Wharf and Marine Supply Base in Darwin Harbour.

The NT EPA assessed the proposal by the Environmental Impact Statement (EIS) method. The assessment was carried out in accordance with the requirements of the EA Act, Environmental Assessment Administrative Procedures 1984 (EAAP), EP Act and Environment Protection Regulations 2020 (EP Regulations). The NT EPA examined the potential for impacts on the environment as a whole and in accordance with the principles of ecologically sustainable development.

The proposal is a 'controlled action' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The NT and Australian Governments are assessing the proposals separately.

The NT EPA examined potential significant impacts on the following six environmental factors:

1. Coastal processes
2. Marine environmental quality
3. Marine ecosystems
4. Air quality
5. Community and economy
6. Culture and heritage

The proposal has the potential to have a significant impact on benthic habitats and marine megafauna, heritage features of East Arm and air quality in the Darwin airshed. The NT EPA concluded that the proposal can be implemented and managed in a manner that is environmentally acceptable and recommends that environmental approval be granted subject to the conditions recommended in Appendix 1, to mitigate and manage the potential significant impacts. This assessment report and the draft environmental approval (Appendix 1) are provided to the Minister for Environment, Climate Change and Water Security (Minister) for consideration in deciding whether to grant an environmental approval.

Contents

1. Introduction

This assessment report provides advice and recommendations of the Northern Territory Environment Protection Authority (NT EPA) to the Minister for Environment, Climate Change and Water Security (Minister) on completion of the NT EPA's environmental impact assessment of the Ship Lift and Marine Industries Project (proposal). The proposal is to construct and operate a common user ship lift, repair and maintenance facility approximately 700 m east of the existing East Arm Wharf and Marine Supply Base in Darwin Harbour.

The NT EPA has prepared this report in accordance with section 7(2)(g) of the *Environmental Assessment Act 1982* (EA Act), clause 14(3) of the Environmental Assessment Administrative Procedures 1984 (EAAP), and in accordance with sections 296 and 299 of the *Environment Protection Act 2019* (EP Act). In accordance with the EAAP, this Assessment Report is to:

- inform the Minister of the NT EPA's review and assessment of environmental aspects of the proposal
- make comments, suggestions or recommendations concerning safeguards or standards for the protection of the environment in relation to the proposal.

An environmental approval is required for the proposal under the EP Act (section 301(2)). This assessment report and the draft environmental approval (Appendix 1) are provided to the Minister for consideration in deciding whether to grant an environmental approval for the proposal. Matters taken into account during the assessment are tabulated in Appendix 2. An environmental impact assessment timeline is provided at Appendix 3.

1.1. Proponent

The proponent is the Northern Territory Department of Infrastructure, Planning and Logistics (DIPL) (Proponent) (Australian business number 84 085 734 992).

1.2. Location and context

The proposal is located approximately 6.5 km south-east of the Darwin central business district, on the East Arm Peninsula within Darwin Harbour. The proposal is located on land Parcels 5163, 5167, 5420, 6370, part of parcels 7146, 7147 and part of proposed Section 7398 Hundred of Bagot, Berrimah (Table 1).

Table 1 Tenure of the proposal area[1]

Parcel	Area (ha)	Tenure Type	Owner
5163	2.65	Crown Lease Term	Paspaley Pearls Properties Pty
5167	5.76	Crown Lease in Perpetuity	Paspaley Pearls Properties Pty
5420	1.72	Freehold	Paspaley Pearls Properties Pty
6370	0.56	Crown Lease Term	Paspaley Pearls Properties Pty
7146 (part)	112.3	Freehold	Land Development Corporation
7147 (part)	29.15	Freehold	Land Development Corporation
7398 (proposed) (part)	TBC	Crown Land	Crown Land

[1] Current tenure arrangement, land ownership and cadastre boundaries may change

The Darwin regional land use plan (2015) designated land at East Arm as 'Strategic Industry'. Neighbouring users include Darwin business park, East Arm wharf, marine supply base, Darwin port stockpile area and dredge spoil ponds, the Northern Cement plant, the Darwin Vopak terminal (petroleum import and distribution terminal), Project Caymus bulk fuel storage facility, common-user facility and the passenger terminal of the Adelaide - Darwin rail line. The closest residential areas are the Darwin Waterfront and CBD (6 km) to the north-west, the Northcrest development (6 km) and Haileybury Rendall School (5.5 km) to the north and Marlow Lagoon to the east (6 km).

2. Proposal

2.1. Description

The proposal is to construct and operate a common user ship lift, repair and maintenance facility including wet and dry berth vessel maintenance facilities and a privately-owned facility which includes additional quay line, berths and hardstand.

Table 2 describes the key components of the proposal and Figure 1 shows the proposed footprint. A detailed description of the proposal is provided in section 2 of the draft Environmental Impact Statement (EIS).

Table 2 Proposal key components

Aspect	Description
Construction duration	Approximately 33 months.
Dredge volume	Up to 520,000 m^3, approximately 70% to 100% of the dredge spoil is expected to be suitable for land reclamation.
Hardstand	Approximately 16 ha.
Land reclamation	Land area (including, infrastructure, hardstand and revetments) 22.2 ha. Up to 100,000 m^3 of imported fill. 40,000 - 55,000 m^3 of rock armour.
Piling	Up to 300 piles
Waterside infrastructure	• common user ship lift (26 m wide, 103 m long and capable of lifting vessels with up to 6 m draft and a maximum load of 5,500 t, plus associated platform, trestles and vessel transfer system) • six wet berths • heavy/lift platforms suitable for a 100 t crane at each berth • dredged manoeuvring basin and berth pockets • access channel with navigation aids
Landside infrastructure	• 16 ha of hardstand • vessel wash • vessel transfer area and equipment including a self-propelled modular transporter (SPMT) and garage • trestles for vessel support, lifting and transfer • ship lift control centre • wash down area and water treatment plants • heavy and light duty hardstand, dry berths and laydown areas • blast and paint facility with negative pressure and air filtration system • services and utilities

Aspect	Description
	• stormwater management system • internal roads and car parks • ancillary buildings including workshops and administrative offices

2.2. Justification for the proposal and alternatives

The proponent intends for the proposal to deliver enabling infrastructure to underpin growth in the Darwin-based marine service and supply industry, and to generate economic benefits, including long-term economic uplift, jobs and increased skills levels. The proponent predicts that the short term construction workforce would be small (approximately 100 workers), with the size and skill level of the workforce increasing through project life with industry capacity growth. The final permanent local workforce is difficult to predict, but is estimated as 78 to 146 full-time equivalents a year during start-up, and between 187 and 369 full time equivalents during project year 20 (EIS appendix C).

The Ship Lift and Marine Industries project was recognised as a priority project for the Australian Defence Force and commercial marine industries in the NT government's 10 year infrastructure plan 2017 – 2026 (DIPL, 2017), and the 10 year infrastructure plan 2019-2028 annual review (DIPL 2019). The ship lift and transfer system has been designed to accommodate the servicing of Australian Navy offshore patrol vessels. Other vessels that will be able to utilise the long-term maintenance opportunities provided by the proposal including those associated with the pearling and finishing industries and the resources and energy sector. Multiple commercial marine service providers will operate concurrently at the site, providing a variety of maintenance services located within secure facilities.

The proposal is expected to contribute between $130 and $260 million annually to the NT economy upon reaching its full capacity by project year 20.

Alternative sites on East Arm were considered for the proposal, with the current location selected to reduce clearing of native vegetation, minimise maintenance dredging, and to take advantage of existing infrastructure including heavy vehicle access. Several site-specific design alternatives were also considered including alternative proposal footprints, ship lift size, dredging volumes and alternate fill material sources and ship lift systems.

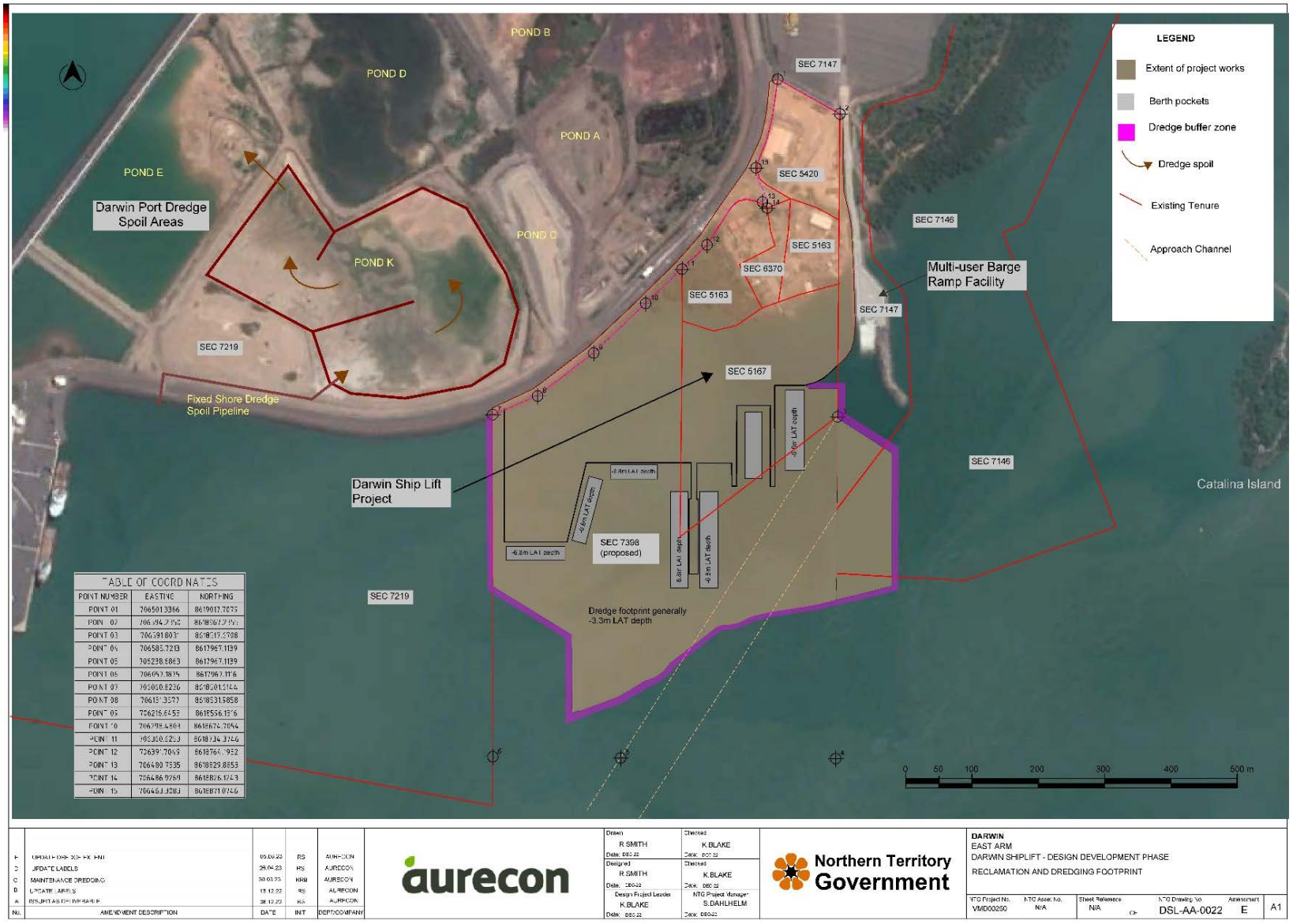

Figure 1 Approved extent (shaded polygon and 'construction buffer') (Source: DIPL)

3. Strategic context

In November 2020, Territory Economic Reconstruction Commission (TERC) released its report with recommendations to accelerate economic recovery. The report identified key strengths of the Territory that could be leveraged including the deep-water harbour, strategic location for both trade and defence, and intermodal logistics opportunities. The report highlighted the opportunity to rapidly grow a broader-based regional maritime industry, with more than 7,500 vessels operating within 850 nautical miles in the 12 months to March 2020, and Darwin's potential as a naval port. It recommended investing in infrastructure that enables growth, pointing to the importance of strategic infrastructure and development planning.

4. Statutory context

4.1. Northern Territory framework

The proposal requires assessment by the NT EPA under the EA Act and transitional matters under the EP Act. The Northern Territory Minister is the approval authority.

An environmental approval is required for the proposal under the EP Act (section 301(2)). Pursuant to section 61 of the EP Act, the purpose of the environmental approval is to manage the potentially significant environmental impacts of a proposal during all phases. The proposal may require separate regulatory approvals. It is the responsibility of the proponent to obtain all approvals which may include, but not be limited to:

- an Authority Certificate from Aboriginal Areas Protection Authority (AAPA)under the *Aboriginal Scared Sites Act 1989*
- consent for the proposed development under the *Planning Act 1999*.

4.2. Commonwealth regulatory framework

The former Australian Department of Agriculture, Water and the Environment (now Department of Climate Change, Energy, the Environment and Water (DCCEEW)) determined the proposed action is a controlled action and requires assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC Number 2021/9068). The relevant controlling provisions for the proposal under the EPBC Act are:

- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)

The Australian Government is conducting an assessment of the proposed action by preliminary documentation – separate to the NT EPA's assessment.

4.3. Mandatory matters for consideration

In preparing this assessment report, the NT EPA considered the following information in accordance with section 7(2)(g) of the EA Act:

- the objects (EA Act, clause 4)
- the principles of ecologically sustainable development (EP Act, Part 2 Division 1)
- Notice of Intent (NOI)
- Terms of Reference (TOR)

- Draft EIS
- Supplement to the Draft EIS
- comments from government authorities on the NOI, TOR, draft EIS and Supplement
- comments from non-government stakeholders on the Draft EIS.

In addition to the above, in providing advice to the Minister about a draft environmental approval, the NT EPA took into account:

- the objects (EP Act, section 3)
- the environmental decision-making hierarchy (EP Act section 26)
- the waste management hierarchy (EP Act section 27)
- ecosystem-based management
- impacts of a changing climate.

Refer to Appendix 2 for further detail about matters that the NT EPA has taken into account during its assessment.

5. Consultation

On 14 November 2018 the NT EPA decided that the proposal requires assessment under the EA Act at the level of an EIS. The NT EPA published the TOR for the EIS for comment between 16 and 30 November 2019.

The NT EPA published the Draft EIS for comment between 12 November 2021 and 12 January 2022. One public submission and eight submissions from NT government authorities were received. The Supplement to the Draft EIS was provided to NT government authorities for comment between 21 July 2022 and 3 August 2022. Four submissions were received. The NT EPA considered all submissions received in relation to the Draft EIS and Supplement in preparing this assessment report. The issues raised in submissions are discussed in more detail in section 6 below.

The NT EPA consulted with, and invited submissions from, the proponent and statutory decision makers who may have a view on the draft environmental approval. Submissions were received from the proponent, DIPL (Planning) and DCCEEW. The NT EPA considered the submission/s in finalising its recommendation to the Minister.

6. Assessment of key environmental factors

6.1. Overview

The NT EPA identified that the proposal has the potential to have a significant impact on environmental values associated with six environmental factors (Table 3).

Table 3 Key environmental factors[2]

Theme	Factor	Environmental objective
SEA	Coastal processes	Protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained.
	Marine environmental quality	Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.
	Marine ecosystems	Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
AIR	Air quality	Protect air quality and minimise emissions and their impact so that environmental values are maintained.
PEOPLE	Community and economy	Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians.
	Culture and heritage	Protect culture and heritage.

The NT EPA considered other environmental factors during its environmental impact assessment; however, the impact on those factors was not considered to be significant.

6.2. Sea (coastal processes, marine environmental quality and marine ecosystems)

6.2.1. Environmental values

The proposal is on the East Arm Peninsula in the south-east of Darwin Harbour. The Peninsula is the centre of port and marine services and development in Darwin Harbour and hosts a number of large industrial developments.

Darwin Harbour is considered a site of conservation significance supporting a range of estuarine, freshwater and terrestrial environments including extensive areas of tidal mudflats and one of the largest and most diverse areas of mangroves in the Northern Territory. Darwin Harbour supports a complex assemblage of marine ecological communities including rocky shore biota, hard corals, soft corals and sponges, macroalgae, seagrasses, soft sediment biota, and mangrove communities. These communities can comprise sensitive habitats with key ecological relationships and interdependencies. The harbour provides habitat and resources for conservation listed fauna species including dolphins, dugong, sea turtles, migratory shorebirds and a large variety of fish.

Darwin Harbour has a number of declared beneficial uses under the W*ater Act 1992* including the protection of environment, culture (aesthetic, recreational and cultural) and aquaculture.

[2] NT EPA guide to environmental factors and objectives.

The East Arm of Darwin Harbour receives flows from the Elizabeth River, which drains catchments from Noonamah to Palmerston. Wet season flows from Elizabeth River contribute significantly to terrestrial inputs of fine sediments to East Arm, which have increased since pre-urbanisation. Tidal flows are strongest in the narrowest sections of the harbour, including sections of the East Arm channel. Flood tidal (flowing into the harbour) current velocities within the Harbour are generally higher than ebb tide (water flowing out of the harbour) velocities. There are localised exceptions to this within East Arm. Elevated tidal energy, particularly during spring tides, results in the regular resuspension of fine sediments from the seabed, leading to naturally high turbidity levels within the Harbour.

The predominant seabed (benthic) habitats within the East Arm area consist of filter feeding communities. While much of the seabed within the proposal footprint appears bare, the soft sediments are likely to contain infauna assemblages including polychaete worms, crustaceans, and molluscs. Adjacent to the proposal area, South Shell Island and Catalina Island low-intertidal and sub-tidal areas provide suitable substrate for hard and soft corals, ascidians, sponges, macroalgae and hydroids. The proponent recognises the South Shell Island filter feeder communities may contain species that could be of importance to bio-prospecting for commercially valuable products. No seagrass has been reported in the zones of influence and impact.

Marine mammals and turtles, including three species of coastal dolphins, occur in East Arm and have been observed foraging in the area. The relative importance of the East Arm of the harbour for these species is not known but there is suitable habitat within East Arm as well as similar extensive foraging habitat available in other areas that have not been developed in Darwin Harbour.

Water quality in Darwin Harbour varies depending on location, tide phase and season but is generally considered high quality, albeit with naturally high turbidity. Existing and historical pressures on the marine environmental quality (including water) of East Arm include industrial activities, port and wharf operations and maintenance, wastewater outfalls, and diffuse contamination by storm water runoff from rural, urban and industrial catchments.

Despite this, sediments in Darwin Harbour generally contain low levels of contaminants. Within the East Arm area some metals and particularly arsenic, tributyltin compounds and petroleum hydrocarbons have been recorded at concentrations exceeding screening levels in the National Assessment Guidelines for Dredging (NAGD 2009) (URS 2008, 2011, 2014) but most contaminants investigated within the proposal footprint were recorded below NAGD 2009 screening levels.

6.2.2. Investigations and surveys

The following investigations and surveys were used to inform the NT EPA's assessment of the potential impacts on coastal processes, marine environmental quality and marine ecosystems:

- Metocean study report: ship lift and associated marine infrastructure. Report prepared for NTG / SMEC (MetOcean Solutions 2020) included:
    - a review and analysis of existing data for Darwin Harbour including bathymetry, water level, wind, currents, and waves
    - modelling ambient and cyclonic and non-cyclonic extreme water level, waves and currents of Darwin Harbour, the Beagle Gulf and part of the Timor Sea
- Marine Sediment Geochemical Assessment – Darwin Ship Lift Project, (Draft EIS Appendix H) (AECOM 2020)
- Modelling the sediment plume associated with dredging for the Darwin Ship Lift (Draft EIS Appendix I) (Australian Institute of Marine Science [AIMS] 2020)
- Water and Sediment Quality Assessment (URS 2011)

- Water quality sampling and testing in proposal area for metals, nutrients and hydrocarbons, and turbidity and sub-surface light measured at South Shell Island conducted by AIMS (Draft EIS Appendix E) (AECOM 2021a)
- Historical water quality assessment, historical total suspended sediment concentration assessment using satellite remote sensing in coastal waters of Darwin Harbour (EnSTaR 2021)
- Darwin–Bynoe Harbours predictive mapping of benthic communities (Galaiduk et al 2019)
- Benthic habitat survey using towed video at East Arm (Case et al 2021) (Appendix F Draft EIS)
- Revised predictive benthic habitat map for Darwin Harbour (Case et al 2021)
- Benthic habitat mapping update for South Shell Island and Catalina Island (AECOM 2022)
- Brooks L, Palmer C, Griffiths AD and Pollock KH (2017) monitoring variation in small coastal dolphin populations: An example from Darwin, Northern Territory, Australia. *Front. Mar. Sci. 4:94*
- Darwin region coastal dolphin monitoring program: Final report – 2011 to 2019. flora and fauna division, Department of Environment, Parks and Water Security 2020
- Cardno (2014) A summary of the Ichthys LNG Project nearshore environmental monitoring program

6.2.3. Consultation

Matters raised during consultation on the draft TOR, Draft EIS and Supplement to the Draft EIS relating to potentially significant impacts to marine environmental factors include:

- cumulative impacts from multiple dredging projects in Darwin Harbour
- uncertainty in the prediction of sediment generation from land reclamation
- uncertainty around management of dredging activity and dredge spoil placement
- the potential for increased sedimentation and reductions in sub-surface light availability to affect benthic habitat
- impacts on marine megafauna from underwater noise due to pile driving.

6.2.4. Potential significant impacts

Marine environmental factors and associated values have the potential to be significantly impacted as described below:

- exposure of potential acid sulfate soils (PASS) through excavation and dredging of marine muds leading to acid formation and poor water quality
- mobilisation and deposition of sediment during dredging, dredging tail water discharges, dredge spoil disposal and land reclamation resulting in reduced sub-surface light availability for benthic primary producers and smothering of benthic habitat
- night lighting and underwater noise generated by construction activities, vessel traffic, dredging, and pile driving, and operation of the facility resulting in physiological and behavioural impacts on marine fauna
- increased vessel movements leading to more interactions/collisions with marine megafauna.

6.2.5. Avoidance and mitigation of impacts

The proponent has proposed the following measures to avoid and minimise impacts on marine environmental quality and marine ecosystems:

- Mangrove sediments within reclamation areas will be filled over rather than excavated to avoid exposure to air.
- A rock revetment would be established on the seaward side of the reclamation area prior to commencement of reclamation activities, to minimise mobilisation of sediments into the marine environment from placement of engineered fill and dredged material.
- Dredging and spoil placement methods would be selected to minimise sediment mobilisation such as limiting cutter head, dredge bucket, and pump speeds, maintaining pipeline integrity and ensuring that there is no overflow from dredge barges. Monitoring of turbidity during dredging with triggers to implement further management measures as required.
- Dredged material would be disposed of within the Darwin Port dredge spoil ponds (Ponds K and E) and managed to ensure supernatant tailwater quality is appropriate before passive discharge to Darwin Harbour.
- Silt curtains would be used to manage sediment movement within dredge spoil ponds and beyond the reclamation area during construction of rock revetments and placement of dredge spoil and fill material.
- Pile driving would occur during daylight hours only and with soft start procedures.
- Trained marine fauna observers would be employed during dredging and piling operations to monitor with protocols implemented in response to sightings.
- Speed restrictions and vessel approach distances for marine fauna would be applied to support vessels for the proposal.
- The biosecurity management plan would include a procedure for management of waste and wastewater including ballast water and compliance with the *Biosecurity Act 2015*.

6.2.6. Assessment of impacts to environmental values

6.2.6.1. Modification of coastal processes

While the coastal processes factor was identified early in the assessment process as having the potential to be significantly impacted by the proposal, the hydrodynamic modelling undertaken by the proponent predicted that any substantial changes in tidal currents would generally be restricted to the proposal area and adjacent waters. During flood tides, small decreases in current speeds are predicted to occur at locations towards Catalina Island, while during ebb tides small increases in current speeds near South Shell Island are predicted to occur. These changes are expected to be minor but may have some impacts on sediment accretion and suspension in East Arm. Changes in currents near the mangroves east of the proposal area are predicted to be minimal.

The NT EPA considers that the extent of expected changes in tidal currents, and consequent changes to erosion and accretion of sediments in East Arm, are unlikely to result in significant impacts to coastal processes.

6.2.6.2. Decreased water quality

Mobilisation of sediments

Water quality may be reduced through the suspension of sediments into the water column during construction. Suspended sediments will increase turbidity and reduce the availability of light to benthic habitats. Darwin Harbour is naturally turbid, particularly during the wet season months with stormwater inflows and during the spring tides when current speeds are higher, and suspended sediments from proposal works will add to the sediment in the water column.

Sediment plume modelling conducted by the proponent predicted that the zone of influence (where at some time during works changes in sediment-related environmental quality outside of natural ranges may be detectable but impacts would be low) would be limited to the vicinity of the dredging footprint within the East Arm area. The thresholds assigned for the zone of moderate impact and the zone of influence (where excess sediment from dredging is below 10 mg/L in the dry season and 25 mg/L in the wet season [the tolerance level for benthic communities] for 90% and 95% of the time, respectively) were not predicted to be reached. Within 20 m beyond the dredging footprint, sediment-related influences are expected to be within the natural range.

The modelling undertaken was based on dredging of up to 324,800 m^3 of unconsolidated sediments assuming that up to 50% of the material consisted of fine particles (clay and silt). The estimated volume of unconsolidated sediments was subsequently revised down to 200,000 m^3 in the supplement. While further modelling was not conducted on the revised volume, the outcome would likely be that the duration and extent of sediment plumes in East Arm are less than predicted. It is noted that a large percentage of the sediments to be dredged (65 – 75%) are likely to be sand and coarse material, which will drop out of suspension within or close to the dredging area. The NT EPA is satisfied that the modelling, without considering reclamation, is sufficiently conservative to predict worst case potential impacts in Darwin Harbour from proposal dredging.

The proponent's commitment in the Supplement to establish a rock revetment at the seaward extent of the reclaim area ahead of fill placement, which is a considerable change to the reclaim strategy proposed in the draft EIS (progressive fill from the shoreline in a seaward direction), should mitigate sediment mobilisation from reclamation activities beyond the development footprint. The Supplement considers both an enclosed revetment, and a partially enclosed revetment allowing barges to enter the reclaim area and deposit dredge spoil. A partially enclosed revetment would rely on silt curtains to minimise suspended sediment entering the harbour. There will still be sediment displaced from the seabed footprint during construction of the rock revetment but this is likely to be localised and for a short duration. The NT EPA supports the proponent's changes to the reclamation strategy. To reduce sediment mobilisation further, the proponent is considering removal of the sediments beneath the rock revetment footprint prior to rock placement or deployment of silt curtains during rock revetment construction.

The NT EPA considers that there will be short term suspension of sediments from dredging and spoil placement but that the impacts will be of short duration and localised. A dredging and dredge spoil placement management plan (DMP) was prepared by the proponent and submitted with the Supplement (Supplement Appendix C). The plan includes strategies to reduce the potential for sediment mobilisation beyond the dredging and reclamation footprint, including not allowing overflows from hopper barges and installing silt curtains at locations where suspended sediments may enter the harbour, such as within Pond E prior to discharges.

The NT EPA considers that the impacts on water quality from suspended sediments are not likely to be significant due to the expected localised and limited turbidity increases relative to natural conditions in East Arm and the implementation of the measures in the proponent's dredging and dredge spoil placement management plan (as per the NT EPA's recommended condition for marine environmental quality and marine ecosystems). These measures will maintain suspended sediments at low concentrations beyond the dredge footprint such that impacts to water quality in the East Arm area and Darwin Harbour will not be significant.

Sediment geochemistry

Assessment of sediment geochemistry by the proponent recorded elevated arsenic levels, which, in Darwin Harbour, can generally be attributed to local geological influence rather than from anthropogenic sources. Arsenic species detected in sampling were considered to be predominantly unavailable to biota, although acidification of PASS in dredge spoil could increase the risk of toxic effects. The impacts and management of PASS is discussed in the next section.

The EIS indicates that within the dredging footprint, all contaminants of concern with potential anthropogenic origin were either not detected or were present at concentrations below the NAGD (2009) screening levels. Such levels are unlikely to have toxic effects on organisms.

The NT EPA is satisfied that the proponent has conducted adequate investigations to characterise contaminants of concern in the proposal area and that dredging for the proposal is unlikely to mobilise contaminants at concentrations that would significantly impact marine environmental quality.

Acid sulfate soils

Sediment sampling confirms that PASS are present within the intertidal flats associated with the remnant stand of intertidal mangrove habitat, subtidal zones that are permanently inundated, and the area between the mangrove line boundary and mean low tide (Draft EIS Appendix H). Excavation of remnant mangroves within the reclamation area and disposal of unconsolidated dredge spoil within the Darwin Port dredge spoil ponds may expose PASS to air leading to acid formation and contamination of marine waters.

The proponent proposes to remove the above-ground parts of remnant mangroves, retain the mangrove root material in-situ and place fill over the top of the mangrove muds within the bunded reclamation area. This will minimise disturbance to the sediments and limit PASS exposure. The NT EPA is satisfied that implementation of these measures will mitigate the potential for acid generation in the reclamation area.

Dredged spoil is proposed to be managed between the bunded reclamation area and the Darwin Port dredge spoil ponds. Tailwater from unconsolidated spoil is proposed to be monitored for quality and its movement controlled between ponds to maximise settlement of sediments. The EIS states that the dredge spoil ponds have been used successfully to manage tailwater during previous dredge campaigns. However, the NT EPA is concerned that sections of the pond walls are permeable and the potential for uncontrolled discharges to the marine environment is high.

The dredging and dredge spoil placement management plan includes measures to manage tailwater within the East Arm dredge spoil ponds, including tailwater quality testing and dosing (with an appropriate ameliorant) if necessary to manage acid conditions. The NT EPA considers that the implementation by the proponent of these measures (as per the NT EPA's recommended condition for marine environmental quality and marine ecosystems) will minimise the potential for impacts to marine environmental quality from PASS.

6.2.6.3. Benthic habitat degradation or loss

Mobilisation of sediment

Potential impacts on benthic habitat from increased suspended sediment can result from direct effects of turbidity attenuating sub-surface light, and sedimentation. As described in section 6.2.6.2 of this report, the predicted zones of moderate impact and influence are expected to be limited to within the vicinity of the dredging footprint in the East Arm area. Further modelling will be undertaken by the dredge contractor to refine the potential zones of impact and influence to be considered in development of the final dredging and dredge spoil placement management plan.

Within the proposal area, the benthic substrates appear to be relatively bare of epifauna, based on video surveys undertaken by AIMS in 2020 and further surveys at South Shell and Catalina Islands by SLR Consulting in May and June 2022.

Monitoring for the Ichthys LNG Project dredging campaign reported that an increase in sediment on coral was observed at the South Shell Island monitoring site later in the monitoring program with increased partial mortality of tagged corals and a slight reduction in coral cover, probably related to dredging (Cardno 2014). The Ichthys monitoring program included South Shell Island as a worst-case study site to better understand dredging related impacts to benthic communities in Darwin Harbour. The most recent surveys indicate that relatively diverse benthic habitats including coral communities continue to persist in East Arm

at South Shell Island and Catalina Island since the dredging campaign for the Ichthys Project and subsequent campaigns for East Arm Wharf infrastructure were completed. Given that the Ichthys dredging campaign occurred over two wet seasons (2012 – 2014), dredged greater than 30 times the volume of seabed material (~16 Mm^3) than the proposal, and extended from Bladin Point directly past South Shell Island to East Arm wharf, it demonstrates the resilience to reduced sub-surface light availability and sedimentation of these habitats in East Arm.

The NT EPA considers that the dredging, rock revetment construction and reclamation activities can be managed to minimise benthic habitat impacts at South Shell and Catalina Islands and beyond the East Arm area. It is expected, however, that there will be increased suspended sediments generated in the proposal area likely resulting in impacts to benthic habitats within East Arm immediately adjacent to the dredging footprint. With the implementation of the proponent's commitments (implemented as per the NT EPA's recommended conditions for marine environmental quality and marine ecosystems), the NT EPA does not consider that the impacts to the benthic communities in East Arm outside of the dredging footprint will be significant and these habitats are expected to persist.

Organotin compounds

Organotins are organic compounds which were previously commonly used in marine anti-fouling paint. The compounds are highly toxic at even low concentrations, cause endocrine disruption in some invertebrates, and bioaccumulate in marine mammals. Although the application of organotin in marine paints has been prohibited internationally since 2003, there is some chance of organotin antifouling paint occurring on older vessels undergoing abrasive blasting at the proposal.

The NT EPA considers that organotins are unlikely to occur, and where they do, impact to Darwin Harbour can be avoided by appropriate mitigation measures (as per the NT EPA's recommended condition for marine environmental quality and marine ecosystems).

6.2.6.4. Marine megafauna

The NT EPA considers that pile driving presents the greatest risk to marine megafauna in the proposal area in terms of underwater noise from the proposal. The Draft EIS included the proposed installation of 485 piles over approximately 240 days during construction. This was considered a worst case scenario and has since been revised to 300 piles over an unspecified duration. The Supplement indicates that the duration and intensity of the program will be significantly reduced, which will mitigate impact to some extent. Pile driving remains a significant risk to megafauna, particularly coastal dolphin species, if they are within the proposal area during construction. The implementation of controls to reduce the risk of injury to marine megafauna such as employing trained marine megafauna observers, undertaking pile driving during daylight hours with safeguards for marine megafauna sightings, and soft start procedures for pile driving is considered critical.

Dredging and vessel movement will contribute additional noise to the underwater environment. While high-intensity piling noise may be attenuated in the shallow waters of the proposal footprint, the noise of the dredging cutter head, backhoe bucket, and support vessels is likely to propagate further in deeper waters. Cumulatively, noise from construction of the proposal is likely to have a sustained impact on the behaviour of marine megafauna within the East Arm area during construction.

In addition to noise impacts on the underwater environment, more vessel traffic movements during construction and potentially operation are likely to increase the number of interactions between vessels and marine megafauna, with greater risk of collisions. Adherence to speed limits and minimum approach distances proposed in the EIS will reduce the frequency and magnitude of impacts to marine megafauna from vessel interactions.

The NT EPA anticipates that impacts to marine megafauna will be unavoidable during construction and operation of the proposal, and there is the potential for some megafauna to avoid East Arm for longer

periods while works are undertaken. Populations of these species are likely to continue to forage in suitable habitats around Darwin Harbour more broadly. The NT EPA is satisfied that the proponent's commitments and proposed management measures (implemented as per the NT EPA's recommended conditions for marine ecosystems) can minimise to as low as reasonably practicable impacts from the proposal to marine megafauna such that the populations of these species in Darwin Harbour are not significantly impacted by the proposal.

6.2.6.5. Cumulative impacts

The NT EPA considers that the duration of construction works and the ongoing operation of the proposal will increase stressors to marine ecosystems in the East Arm area, primarily within the immediate vicinity of the proposal. It may be difficult to attribute impacts to marine environmental quality and ecosystems specifically to proposal activities given other concurrent anthropogenic activities occurring in the harbour, but there is a high likelihood that with continued development and increasing activity in Darwin Harbour, sensitive marine species will be adversely impacted. Best-practice management measures applied to the proposal, as discussed above, will minimise the proposal's contribution to cumulative impacts in the harbour. In addition, monitoring data from this proposal could contribute to the detection of cumulative impacts in the harbour and thereby improve understanding and management of such impacts, ideally applied through a harbour-wide dredging strategy (see section 8).

6.2.7. Conclusion against the NT EPA objective

With the implementation of relevant management plans and recommended conditions identified in Appendix 1, the NT EPA considers that the proposal could be conducted in such a manner that its objectives for coastal processes, marine environmental quality and marine ecosystems are likely to be met.

6.2.8. Summary of factor assessment and recommended regulation

The NT EPA has considered the potential significant impacts of the proposal on coastal processes, marine environmental quality and marine ecosystems. In doing so, the NT EPA has considered whether conditions are necessary to ensure the NT EPA's factor objectives are likely to be met. The NT EPA's assessment findings are presented in **Table 4**.

The NT EPA has also taken into account the objects and principles of the EP Act and the EA Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objectives and whether reasonable conditions can be imposed.

Table 4 Summary of assessment for coastal processes, marine environmental quality and marine ecosystems

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Impacts to coastal processes within and around the proposal footprint resulting from dredging and land reclamation.	Dredging and land reclamation have the potential to change erosion and accretion patterns in marine habitats within and around the proposal footprint. These habitats are well represented elsewhere in East Arm and throughout Darwin Harbour. The residual impacts are not significant and the environmental outcome is likely	No conditions recommended.

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
	to meet the NT EPA's objective for marine environment quality.	
Impacts to marine habitat and water quality from suspension of sediment due to land reclamation.	The risk of impacts from land reclamation can be effectively mitigated by ensuring that all material placed within the reclaimed area is contained and any tailwater from dredge spoil is appropriately managed.	Regulated through recommended condition: **Condition 2 Marine environmental quality and marine ecosystems - Construction**
Impacts to marine habitat and water quality from suspension of sediment due to dredging and dredge spoil placement. Impacts to benthic ecosystems resulting from sediment mobilisation as a result of dredging - including smothering and reduction in available light.	Impacts can be mitigated if the revetment area is enclosed prior to spoil placement and through implementation of measures in the proponent's dredging and dredge spoil placement management plan, consistent with contemporary best practice.	Regulated through recommended condition: **Condition 2 Marine environmental quality and marine ecosystems- Construction**
Impacts to marine ecosystems resulting from organotins.	The risk of impact to the marine ecosystem from organotin from organotin anti-fouling paint can be avoided by conducting abrasive blasting within an appropriate blast and paint facility.	Regulated through recommended condition: **Condition 3 Marine environmental quality – Operation**
Disturbance of marine megafauna from vessel traffic, dredging operations, pile driving and associated underwater noise, and lighting.	With implementation of the marine megafauna management plan, residual impacts are not considered significant and the environmental outcome is likely to meet the NT EPA's objectives for the marine ecosystems factor.	Regulated through recommended condition: **Condition 2 Marine environmental quality and marine ecosystems- Construction**

6.3. Air (air quality)

6.3.1. Environmental values

The proposal is located in the industrial area adjacent to East Arm Wharf within Darwin Port. The nearest receptors of air quality impact are industrial premises, with the closest residential areas being the Darwin Waterfront and CBD (6 km), Haileybury Rendell School (5.5 km), Marlow Lagoon (6 km) and the Northcrest development (6 km). The Elizabeth River Boat Ramp and Weddell and Mitchell future residential developments were identified as additional sensitive receptors.

Current air emissions in the vicinity of the proposal include particulates and pollutants generated by operations in the surrounding industrial area, wind erosion from uncovered areas, vehicle movements on unsealed roads and hardstand areas, and heavy vehicle traffic along Berrimah Road. The NT Government

monitors ambient air quality in the Darwin region in accordance with the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM), and the Darwin Port Corporation undertakes monitoring of particulate matters (PM_{10}) at four locations at East Arm. Monitoring indicates that concentrations of carbon monoxide, oxides of nitrogen, ozone and sulfur dioxide are very low, while PM_{10} frequently exceeds NEPM triggers, primarily due to vegetation burning.

6.3.2. Investigations and surveys

The following investigations and surveys were used to inform the NT EPA's assessment of the potential impacts on air quality:

- AECOM 2021b, (EIS Appendix J), Air quality impact assessment (ASIA) including emission inventory and air dispersion modelling.

Sensitivity analysis (in the Supplement to the EIS) comparing the A*pproved methods for modelling and assessment of air pollutants in NSW* (NSW EPA 2017) and the approach developed in the EIS which demonstrated that the approach adopted was generally consistent with the NSW approved approach, and that the assessment of significance of impacts would not change if the NSW method were adopted.

6.3.3. Consultation

Matters raised during consultation related to potentially significant impacts and risks to air quality resulting from fugitive emission of particulates (including heavy metals), volatile organic compounds (VOCs), odours or other pollutants (xylene and other toxic compounds in paint emissions).

6.3.4. Potential significant impacts

Air quality has the potential to be significantly impacted through:

- fugitive emissions during construction and operation, including:
    - dust generated by vehicle movements, material handling and wind
    - volatile chemicals originating from vats, open vessels, or spills and materials handling
- fugitive emissions to air during operation from blast and paint activities, which may produce particulate matter (including heavy metals), VOCs, odour and other pollutants.
- cumulative impact of primary air pollutants at identified receptor sites and incremental impact of toxic air pollutants assessed at and beyond the boundary of the development.

6.3.5. Avoidance and mitigation of impacts

The proposal will be managed according to a construction and operation air quality management plan (AQMP). The plan will require:

- minimisation of dust production by covering potential sources, applying dust suppression technologies to handled material, limitations of movement of materials in response to environmental conditions, sealing surfaces as soon as practicable, and operating machinery and equipment efficiently
- prevention of volatilisation of vapours or spills, by restrictions on open vessels, containers and vats.

In addition to the avoidance and mitigation measures implemented under the AQMP, operational procedures will be implemented for the blast and paint facility. The procedures will specify that the facility will maintain a controlled environment (negative or positive pressure) with all exhaust material passing though best practice filtration systems. The filtration system parameters have not been finalised; the use of carbon adsorption and particulate filters are likely to be selected, these can reduce VOC emissions by

90%-95%, and particulate emissions by 90% (Eastern Research Group Inc, 2001). Filtration will be installed, operated and maintained to reduce particulate matter, VOC, odour and other toxic compound emissions from the exhaust stacks to levels which are not significant and do not pose a risk to surrounding sensitive receptors. Disposal of filtered material would be regulated by the *Waste Management and Pollution Control Act 1998* (WMPC Act), which requires disposal of the material at a licensed site.

6.3.6. Assessment of impacts to environmental values

The NT EPA considers that fugitive emissions of VOCs from open vessels or spills will be a minor emission source which will be suitably avoided and mitigated through the AQMP.

The NT EPA considers that there will be short term air quality impacts resulting from fugitive emissions of particulate matter (including heavy metals), VOCs, odour resulting from operational activities within the proposal footprint. With the implementation of the NT EPA's recommended condition for air quality, the NT EPA does not consider that the impacts air quality outside of the approved extent will be significant.

The blast and paint facility will house activities including surface preparation and painting where practicable. Real-time monitoring using a permanent monitoring station is required to ensure that Air Quality objects are met at the proposal boundary.

6.3.7. Conclusion against the NT EPA objective

With the implementation of relevant management plans, operational procedures, and recommended conditions identified in Appendix 1, the NT EPA considers that the proposal could be conducted in such a manner that its objective for air quality is likely to be met.

6.3.8. Summary of factor assessment and recommended regulation

The NT EPA has considered the potential significant impacts of the proposal on their air quality factor. In doing so, the NT EPA has considered whether conditions are necessary to ensure the NT EPA's factor objective is likely to be met. The NT EPA assessment findings are presented in **Table 5**.

The NT EPA has also taken into account the objects and principles of the EP Act and the EA Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objective and whether reasonable conditions can be imposed.

Table 5 Summary of assessment for air quality

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Impacts on air quality resulting from blast and paint activities including emission of VOCs, particulates, odour or other pollutants.	The proponent would be required conduct real-time monitoring and to meet air quality objectives at the project boundary.	Regulated through the WMPC Act. Regulated through recommended condition: **4 Air quality**

6.4. People (community and economy & culture and heritage)

6.4.1. Environmental values

6.4.1.1. Community and economy

The proposal is located approximately 6.5 km south-east of the Darwin central business district, on the East Arm Peninsula within Darwin Harbour. The nearest residential areas to the proposal are Northcrest housing development in Berrimah and Palmerston's outer suburbs of Marlow Lagoon and Durack. The intent of the proponent in developing the proposal is to deliver enabling infrastructure to underpin growth in the Darwin-based marine service and supply industry, and to generate economic benefits, including long-term economic uplift, jobs and increased skills levels. The Darwin area is likely to be the key source of potential employees for the construction and operational workforce (approximately 100 construction workers and 187 to 369 employees during long term operation) and services for the proposal.

The natural state of Darwin Harbour contributes to the use and enjoyment by, and prosperity of Aboriginal people, recreational fishers, tourism agencies and operators.

6.4.1.2. Culture and heritage

The East Arm Peninsula falls within the traditional country of the Larrakia people who historically used natural resources in the East Arm area. The project area is close to two registered sacred sites protected under the *Northern Territory Aboriginal Sacred Sites Act 1989*, Catalina Island and Old Man Rock. A single Aboriginal midden site known as 'East Arm 1' was identified in the NT Archaeological Database as occurring within the proposal area. An archaeological and cultural heritage assessment was conducted for the proposal including a targeted site survey (EIS Appendix M). The targeted survey examined a small area of extant mangrove community did not record any archaeological sites of Aboriginal origin in the proposal area (Appendix M: Cultural Heritage Assessment). The field assessment also determined that the original coordinates for 'East Arm 1' were incorrect, and the site is not within the proposal footprint, but rather is located in approximately 90 m from the eastern boundary of the proposal. An Aboriginal Areas Protection Authority (AAPA) certificate is current for the proposal with conditions including avoiding impacts on the sand bar on the northern end of Catalina Island.

The heritage of East Arm dates from the founding of Palmerston and the Port of Darwin in 1869. The area has been used as a quarantine station, leprosarium, railway, and during WWII as defence headquarters, RAAF Flying Boat Base (FBB) and a refuelling base. There have been previous maritime and geophysical surveys conducted within the proposal footprint including those conducted during the development of the neighbouring Multi User Barge Ramp Facility channel (Cosmos Archaeology 2015). The archaeological and cultural heritage assessment conducted for the proposal (EIS Appendix M) identified that part of the proposal will overlay some remaining features of the FBB including associated underwater cultural objects. The remaining features of the WWII era Z Special Unit 'Lugger Maintenance Section' lies within 100 m of the site but will not be impacted by the construction or operation of the ship lift. There are currently no declared heritage places or objects, or declared / registered shipwrecks within the proposal area.

6.4.2. Investigations and surveys

The following investigations and surveys were used to inform the NT EPA's assessment of the potential impacts community and economy and culture and heritage:

- Social Impact Assessment Darwin Ship Lift Project (True North Strategic Communication 2021) (EIS Appendix C)
- Guide to Social Impact Assessment. Darwin (Munday 2020)

- Archaeological and heritage assessment: proposed Darwin ship lift, NT (Earthsea Pty Ltd 2021) (EIS Appendix M)
- Archaeological Survey of the East Arm Wharf Expansion Darwin, NT (Earthsea Pty Ltd 2011)
- East Arm Multi-user Barge Ramp Facility: recovered cultural objects maritime archaeological analysis report. (Cosmos Archaeology 2015).

6.4.3. Consultation

Matters raised during consultation on the draft Terms of Reference, Draft EIS and Supplement relating to potentially significant impacts to people factors include:

- exclusion of underwater cultural objects from the definition of the WWII era RAAF FBB site
- mitigating loss of FBB by additional site recording measures and heritage informational signage.

6.4.4. Potential significant impacts

Environmental values associated with the People factor have the potential to be significantly impacted as described below:

- encroachment onto Aboriginal sacred sites
- removal or damage to European heritage objects and places
- long term changes to the natural state of Darwin Harbour may impact the use and enjoyment of Darwin Harbour by Aboriginal people, recreational fishers, tourism agencies and operators.

6.4.5. Avoidance and mitigation of impacts

6.4.5.1. Community and economy

The proponent committed to implementing a social impact management plan (SIMP, draft presented in EIS Appendix C), which includes commitments to:

- conduct an annual review to assess progress and effectiveness of the SIMP
- prepare an ongoing communication and engagement strategy for construction.

The proponent will require the construction contractor to comply with the SIMP and to develop and implement a territory benefit plan and an Aboriginal engagement plan

6.4.5.2. Culture and heritage

An AAPA certificate is current for the proposal with conditions including avoiding impacts on the sand bar on the northern end of Catalina Island. The proponent committed to implementing a heritage management plan, which will include undertaking additional maritime archaeological and photographic recording surveys of the proposal footprint, including the former FBB site, to recover, record and analyse any important artefact deposit prior to the commencement of construction works. In addition, heritage interpretation signage (of a size and level of detail in line with the significance of the FBB site) will be installed at the entrance to the ship lift facility (or other location decided in consultation with the NT Government Heritage Branch).

6.4.6. Assessment of impacts to environmental values

6.4.6.1. Community and economy

The NT EPA considers that the proposal is unlikely to cause long term changes to the natural state of Darwin Harbour. Community confidence in the effectiveness of the delivery of the proposal will be managed through environmental performance reporting required by the NT EPA's recommended condition for whole of environment.

6.4.6.2. Culture and heritage

The NT EPA considers that if implemented in accordance with the proposals AAPA certificate, the construction and operation of the proposal will not have a significant impact on Aboriginal cultural values.

6.4.6.3. Other heritage

No sites listed on the NT Heritage Register or protected by the provisions of the NT *Heritage Act 2011* would be impacted by the proposal. Heritage features that will be removed will be documented in interpretation signage. The NT EPA considers that the project will not have a significant impact on culture and heritage.

6.4.7. Conclusion against the NT EPA objective

With the implementation of relevant management plans and commitments contained in the EIS, the NT EPA considers that the proposal could be conducted in such a manner that its objective for community and economy and culture and heritage is likely to be met.

6.4.8. Summary of factor assessment and recommended regulation

The NT EPA has considered the potential significant impacts of the proposal on community and economy, and culture and heritage factors. In doing so, the NT EPA has considered whether conditions are necessary to ensure the NT EPA's factor objectives are likely to be met. The NT EPA assessment findings are presented in **Table 6**.

The NT EPA has also taken into account the objects and principles of the EP Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objectives and whether reasonable conditions can be imposed.

Table 6 Summary of assessment for community and economy, culture and heritage

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Opportunities for employment, increased economic activity,	The proponent has committed to developing the proposal according to a Territory benefit plan, Aboriginal engagement plan and an Australian industry participation plan. If implemented in accordance with these plans, the proposal is considered likely to meet the NT EPA's objective for community and economy.	No conditions recommended.

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
The proposal will cover the remaining RAAF East Arm Flying Boat Base sites with fill and concrete.	These sites are not on the NT Heritage Register and are not protected by the provisions of the NT *Heritage Act 2011*.	No conditions recommended. The Heritage Branch of Territory Families, Housing and Communities is supportive of an approval for the proposal without conditions related to culture and heritage.

7. Whole of environment considerations

The NT EPA has considered connections and interactions between the key environmental factors (marine environmental quality, marine ecosystems, and air quality) together with other environmental factors (including coastal processes, community and economy and culture and heritage) in its consideration of impacts to the whole of environment. The NT EPA is of the view that these impacts would not lead to any substantial effect on achievement of the NT EPA's environmental objectives.

The NT EPA considers that environmental performance reports are required from the proponent 12 months from completion of dredging, and each two years following commencement of operation. The NT EPA has recommended a condition to this effect. The purpose of the environmental performance reporting is to provide the proponent and the Minister with a current evaluation of the performance of the proposal with respect to actual impacts on environmental values over the life of the action compared to those predicted during the environmental impact assessment process.

8. Other advice

The NT EPA provides the following advice for consideration by the proponent and the Minister.

8.1. Cumulative impacts

Darwin Harbour and its surrounding catchment are recognised as significant and valuable assets for Territorians, due to the unique environmental, social and cultural values of the region. The residual impacts from this proposal, combined with potential impacts from other capital and maintenance dredging projects proposed in Darwin Harbour in the near future, may result in significant cumulative impacts to the values of Darwin Harbour if not managed carefully.

As the cumulative impacts of development in Darwin Harbour cannot be attributed to a single proposal, it is critical that a strategic, harbour-wide approach is developed and implemented. The NT Government's proposed harbour-wide dredging strategy, comprising a long-term monitoring program supported by a management and decision-making framework, is appropriate for effective long term management of cumulative impacts on the values of Darwin Harbour.

The NT EPA strongly supports such an approach and it is its expectation that the relevant Government agencies will finalise and implement the strategy as soon as possible so as to inform future NT EPA assessments of dredging campaigns in Darwin Harbour.

9. Conclusion

The NT EPA has considered the proposal by the Department of Infrastructure, Planning and Logistics to develop the Ship Lift and Marine Industries Project at East Arm, Darwin. The NT EPA's assessment of the proposal identified potentially significant environmental impacts associated with the environmental factors of coastal processes, marine environmental quality, marine ecosystems, air quality, community and economy and culture and heritage.

The NT EPA considers that the proposal can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted subject to the conditions recommended in Appendix 1.

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Appendix 1 – Draft Environmental Approval

ntepa Northern Territory Environment Protection Authority

Draft Environmental Approval

PURSUANT TO SECTION *69* OF THE *ENVIRONMENT PROTECTION ACT 2019*

Approval number	EP2023/028-001
Approval holder	Chief Executive Officer of the Northern Territory Department of Infrastructure, Planning and Logistics
Australian business number (ABN)	84 085 734 992
Registered business address	Level 3, Manunda Place 38 Cavenagh Street Darwin, Northern Territory 0800
Address for notices	Level 5 Energy House, 18-20 Cavenagh Street Darwin, Northern Territory 0800
Proposed Action	Darwin Ship Lift and Marine Industries Project

Proposed Action description

Construct and operate a common user ship lift, repair and maintenance facility and adjoining marine facility approximately 700 m east of the existing East Arm Wharf and Marine Supply Base in Darwin Harbour including:

- disturbance of no more than 11 ha of seabed within the approved extent
- capital dredging (excluding maintenance dredging) shall not exceed 520,000 m^3 and shall occur within the approved extent
- disposal of dredged material within the East Arm Ponds or beneficial reuse of dredged material through placement in the revetment area; and
- land disturbance area (including, infrastructure, hardstand and revetments) must not exceed 22.2 ha.

Advisory notes

Approval is granted under section 69 of the EP Act for the action to be undertaken in the manner described, including with implementation of the environmental management measures, commitments and safeguards documented in the Notice of Intent (NOI) and Environmental Impact Statement (EIS) (including the draft EIS and the Supplement to the draft EIS). If there is an inconsistency between the NOI or EIS and this environmental approval, the requirements of this environmental approval prevail.

This approval does not authorise the approval holder to undertake an activity that would otherwise be an offence under the *Water Act 1992*.

Submission of all notices, reports, documents or other correspondence required to be provided to the CEO and/or Minister as a condition of this approval must be provided in electronic form by emailing environmentalregulation@nt.gov.au

Address of proposed action	Parcels 5163, 5167, 5420, 6370, part of parcels 7146, 7147and part of Section 7398 (to be declared) Hundred of Bagot, Berrimah (Figure 1)
NT EPA Assessment Report number	101
Person authorised to make decision	Hon Lauren Jane Moss MLA, Minister for Environment, Climate Change and Water Security
Signature	NOT FOR SIGNING
Date of decision	NOT FOR APPROVING

Recommended Environmental approval conditions

Construction phase conditions

1 Limitations

1-1 When implementing the action, the approval holder must ensure the action does not exceed the following:

Action element	Context	Limitation
Dredging	Figure 1	Capital dredging shall not exceed 520,000 m^3 and shall occur within the **approved extent** (Figure 1)
		Disturbance of no more than 11 ha of seabed within the approved extent

2 Marine environmental quality and marine ecosystems - Construction

2-1 The approval holder must carry out the construction phase of the action to achieve the following environmental objectives:

(1) no **material environmental harm** to the environmental values and declared **beneficial uses** of Darwin Harbour beyond the **approved extent**, including but not limited to the quality and productivity of water, sediment and biota; and

(2) dredging and land reclamation activities must not cause any **material environmental harm** to water quality, or the condition or distribution of **benthic communities** beyond the **approved extent**, as indicated by monitoring required by condition **2-4(3);** and

(3) risks of physical injury, mortality, behavioural changes and health impacts on marine megafauna are minimised.

2-2 To support the achievement of condition **2-1**, the approval holder must implement the action in such a manner that:

(1) the external revetment walls are designed and constructed to wholly contain all material placed within the reclaimed area and to prevent the release of sediment to tidal waters during construction;

(2) the generation of sediment plumes during construction of the rock revetment, land reclamation, dredging and dredged material management, is minimised.

2-3 At all times during construction, the approval holder must implement an erosion and sediment control plan (ESCP) that has been prepared by a Certified Professional in Erosion and Sediment Control (CPESC) in accordance with Best Practice Erosion and Sediment Control (BPESC) guidelines for Australia (International Erosion Control Association).

2-4 The Dredging and dredge spoil disposal management plan 17-Jun-2022 Darwin ship lift project. Doc no. M&C4172/R1891 prepared by AECOM Australia Pty Ltd for the

Department of Infrastructure, Planning and Logistics (Dredging Management Plan (**DMP**)) must be revised to include:

(1) a requirement for all dredging activity to achieve the environmental objectives and outcomes required by condition **2-1**;

(2) details of mitigation measures and controls that would be implemented to prevent sediment from entering tidal waters of Darwin Harbour during dredging, dredged material management and land reclamation activities, including but not limited to the requirement that there will be no overflow of entrained water or porewater from hopper barges;

(3) details of the program for monitoring water quality and **benthic communities** during construction including;

(a) identification of the locations and methods for monitoring, measurement, analysis and evaluation to ensure valid results;

(b) defining when monitoring must be performed (including prior to **substantial implementation,** during dredging, and post-dredging), when the results from monitoring must be analysed and evaluated, how monitoring results will be communicated and reported and to whom; and

(c) quality assurance and quality control methods.

(4) quantitative **trigger values** to initiate investigative and/or adaptive management actions when water quality or **benthic communities** monitoring results exceed **trigger values**;

(5) quantitative **thresholds** to initiate stop work, recommencement and/or investigative actions when water quality or **benthic communities** monitoring results exceed **thresholds**;

(6) a description of how and when monitoring exceedances of **trigger values** or **thresholds** and the outcomes of investigative, adaptive management, stop work or recommencement actions would be notified to the **Minister**;

(7) measures for avoidance and minimisation of impacts on marine megafauna including:

(a) piling undertaken during daylight hours only;

(b) soft-start procedures implemented during piling activities;

(c) restriction of vessel speed limits and use of marine megafauna approach distances for all vessels used during construction;

(d) trained marine megafauna observers on duty during daylight dredging and piling;

(e) appropriate exclusion zones and protocols for marine megafauna sightings;

(f) night and low visibility marine megafauna observation procedures;

(g) measures to minimise direct entrainment impacts on marine megafauna; and

(h) lighting design for above-water infrastructure in accordance with national guidelines[1].

(8) procedures for reporting any incidents relating to marine megafauna injury or mortality to the relevant regulator;

(9) the date of expiry of the DMP.

2-5 The revised DMP required in condition 2-4 must be provided to the **Minister** at least 20 business days prior to the commencement of **dredging activity**, together with a written review and endorsement from an **independent qualified person** stating that the revised DMP appropriately identifies and mitigates any environmental risk and complies with the conditions of this approval.

2-6 The approval holder must revise the DMP as and when directed by the **Minister.**

2-7 The approval holder may revise the updated DMP for its own purposes.

2-8 The approval holder must provide a revised DMP prepared in accordance with condition 2-6 or condition 2-7 to the **Minister** within 10 business days prior to any amendment(s) being implemented, accompanied by:

(1) a tabulated summary of the amendment(s) with document references;

(2) reasons for the amendment(s);

(3) an assessment of environmental risks and potential impacts associated with the amendment(s); and

(4) a written review and endorsement from an **independent qualified person** that the revised DMP appropriately identifies and mitigates any environmental risk and complies with the conditions of this approval.

2-9 The approval holder must implement the action to comply with the latest revision of the DMP provided in accordance with condition 2-5 or condition 2-8.

Operations phase conditions

3 Marine environmental quality – Operation

3-1 The approval holder must operate the action to achieve the following environmental objectives:

(1) no **material environmental harm** to the environmental values and declared beneficial uses of Darwin Harbour beyond the **approved extent**, including but not limited to the quality and productivity of water, sediment and biota

3-2 To support the achievement of condition **3-1**, the approval holder must implement the action in such a manner that there is no release of contaminated material to Darwin Harbour.

[1] National light pollution guidelines for wildlife including marine turtles, seabirds and migratory shorebirds, Commonwealth of Australia 2020.

3-3 Blasting activities that involve the removal of organotin; or heavy metal protective coatings; or contaminants of concern, must be conducted within a painting and blasting facility that:

(1) is appropriately sealed so that abrasive and abraded material is contained; and

(2) incorporates pollution control equipment to minimise emissions.

4 Air quality - Operation

4-1 The approval holder must operate the action to meet the following environmental objective:

(1) Protect air quality so that the air quality assessment criteria in **4-2(1)** are not exceeded at the boundary of the **approved extent** due to point source air pollutant emissions generated by the action.

4-2 To support the achievement of condition **4-1** the approval holder must operate the action in such a manner that:

(1) concentrations of air pollutants, as monitored by the approval holder in real time at the boundary of the **approved extent:**

(a) do not exceed the ambient air quality National Environment Protection (Ambient Air Quality) Measure goals; and

(b) do not exceed the impact assessment criteria provided in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW published by the NSW Environment Protection Authority (September 2022).

4-3 Painting activity must be carried out in a painting and blasting facility at all times, where practicable. The painting and blasting facility must:

(1) be appropriately sealed so that all painting material is contained; and

(2) incorporate pollution control equipment (such as air filtration) that is used during painting and blasting to minimise emissions of air pollutants (including but not limited to volatile organic compounds, particulates, odour or other air pollutants).

General conditions

5 Commencement of action

5-1 This approval expires five (5) years after the date on which it is granted, unless **substantial implementation** has commenced on or before that date.

5-2 Within 10 business days of **substantial implementation** of the action the approval holder must provide notification in writing to the **Minister**.

5-3 Within 10 business days of commencement of the operational phase of the action, the approval holder must provide notification in writing to the **Minister**.

6 Change of contact details

6-1 The approval holder must provide notification in writing to the **Minister** of any change of its name, physical address or postal address for the serving of notices or other correspondence within 10 business days of such change.

7 Environmental Performance Report

7-1 The approval holder must submit a report on the environmental performance of the construction phase of the action to the **Minister** no later than 12 months after completion of **dredging activity**, unless otherwise directed by the **CEO** in writing.

7-2 The approval holder must submit a report on the environmental performance of the action to the **Minister** within two years of the commencement of the operational phase of the action, and thereafter biennially, unless otherwise directed by the **CEO** in writing.

7-3 The reports required by conditions **7-1** and **7-2** must be prepared by an **independent qualified person**.

7-4 The reports required by conditions 7-1 and 7-2 must:

(1) include an analysis and interpretation of monitoring data to demonstrate whether compliance with the requirements of conditions 2, 3 and 4has been achieved;

(2) include a comparison of the predicted impacts of the action, including dredging and dredged material management activities as identified in a baseline survey, and the actual impacts of the action as verified by environmental monitoring data;

(3) be endorsed by the approval holder or a person delegated to sign on the approval holder's behalf;

(4) include a statement as to whether the approval holder has complied with the conditions of this approval; and

(5) identify all non-compliances and describe corrective and preventative actions taken.

8 Provision of environmental data

8-1 All environmental monitoring data required to be collected or obtained under this environmental approval must be retained by the approval holder for a period of not less than 10 years commencing from the date that the data is collected or obtained.

8-2 The approval holder must, as and when directed by the **Minister**, provide any validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (such as maps)) relevant to the assessment of the action and implementation of this environmental approval, to the **Minister** in the form and manner, and at the intervals specified, in the direction.

Definitions

The terms used in this approval have the same meaning as the terms defined in the *Environment Protection Act 2019* and Environment Protection Regulations 2020.

Term	Definition
approved extent	The extent identified in Figure 1 of this approval which includes the land and water on which the action is situated.
benthic communities	Biological communities that live in or on the seabed.
CEO	Has the same meaning as in section 4 of the *Environment Protection Act 2019*.
DMP	Dredging Management Plan, which includes management and disposal of dredged material.
dredging activity	Dredging works carried out under this approval including dredging and dredged material management.
EP Act	*Environment Protection Act 2019*.
independent qualified person	A qualified person as defined under section 4 of the **EP Act**; and who also meets the following requirements: a) was not involved in the preparation of the approval holder's **NOI** or **EIS**; and b) is independent of the personnel involved in the design, construction and operation of the action; and c) has obtained written approval from the **CEO** to be the qualified person to satisfy the **independent qualified person** reporting requirements under this approval.
life of the action	The period of time from **substantial implementation** until the issue of a closure certificate under section 213 of the **EP Act**, or revocation of the environmental approval by the Minister at the request of the approval holder under section 114 of the **EP Act**.
material environmental harm	Has the same meaning as in section 8 of the *Environment Protection Act 2019*.
Minister	NT Minister for Environment, Climate Change and Water Security.
NT EPA	Northern Territory Environment Protection Authority.
substantial implementation	The first works of the proposed action defined as any ground disturbing activity relating to the **action** within the **approved extent**, including, but not limited to, **dredging activity**, civil works or construction works. **Substantial implementation** does not include

	preliminary works such as geotechnical investigations and other preconstruction activities.
threshold value	Values of monitored environmental parameters that represent the limit of acceptable impact beyond which the environmental values and objectives are not being met.
trigger value	Values of monitored environmental parameters that indicate when response actions are required to prevent exceedance of thresholds.

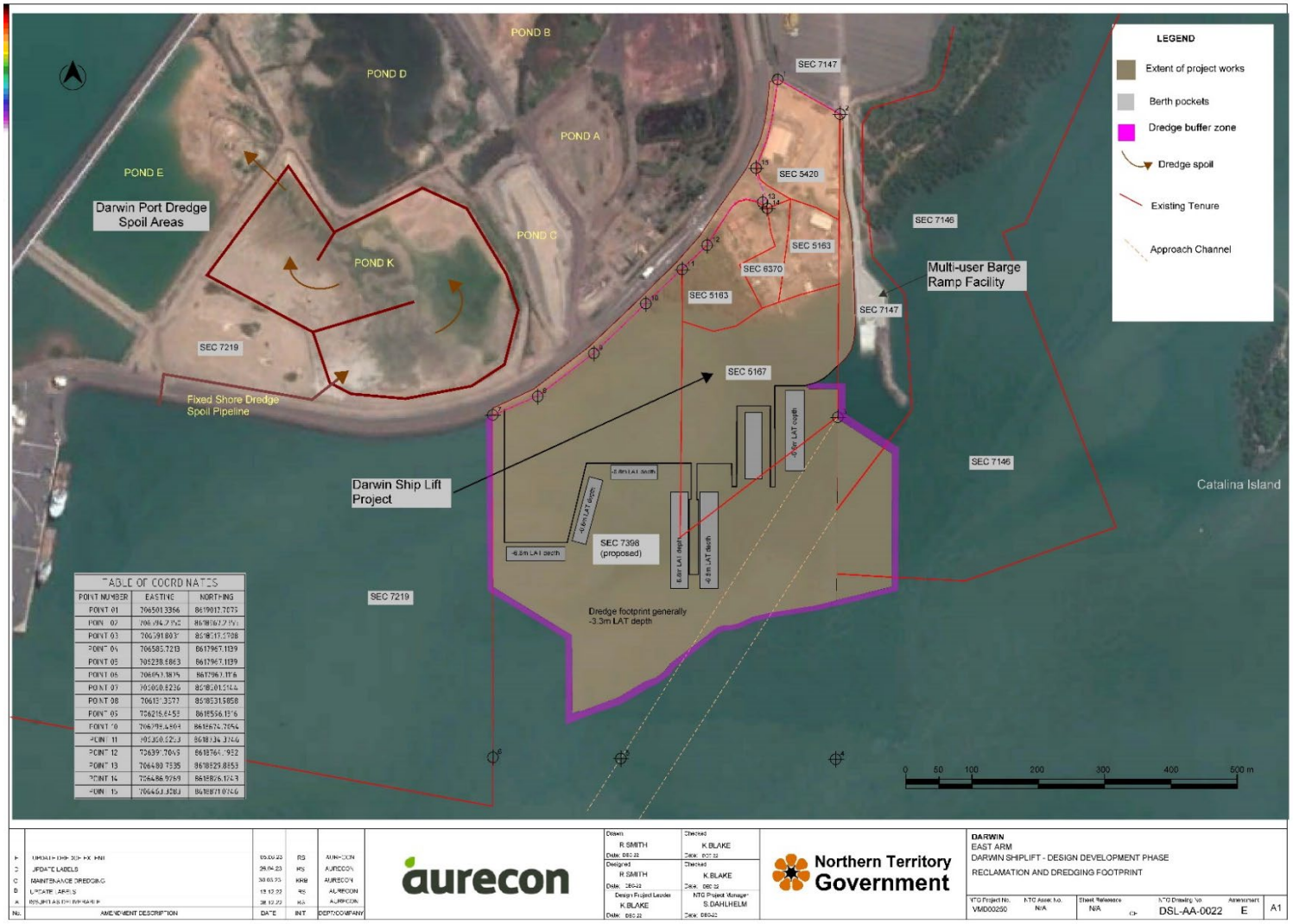

Figure 1 Approved extent (shaded polygon) and 'dredge buffer zone' (pink)

Appendix 2 – Matters taken into account during the assessment

Matters taken into account during the assessment	Consideration
Object of *Environmental Assessment Act 1982* (EA Act)	
4 Subject to section 6, the object of this Act is to ensure, to the greatest extent practicable, that each matter affecting the environment which is, in the opinion of the NT EPA, a matter which could reasonably be considered to be capable of having a significant effect on the environment, is fully examined and taken into account in, and in relation to: (a) the formulation of proposals; (b) the carrying out of works and other projects; (c) the negotiation, operation and enforcement of agreements and arrangements (including agreements and arrangements with, and with authorities of, the Commonwealth, the States and other Territories); (d) the making of, or the participation in the making of, decisions and recommendations; and (e) the incurring of expenditure, by, or on behalf of, a person, either alone or in association with another person.	The NT EPA's assessment of the proposal has considered the object of the EA Act. The NT EPA has taken into account the information provided by the proponent in the Environmental Impact Statement (EIS), which consists of the Draft EIS and the Supplement to the Draft EIS. Conditions have been recommended to manage the potential significant environmental impacts from the proposal. The NT EPA has also provided advice to the NT Minister for Environment, Climate Change and Water Security about the environmental acceptability of the proposal, for consideration in deciding whether to grant an environmental approval.
Objects of the EP Act	
3(a) To protect the environment of the Territory	The proponent's referral and this assessment report, including the NT EPA's recommended conditions for an environmental approval, provide detail about how the environment of the Territory would be protected from potentially significant environmental impacts that could occur as a result of implementation of the proposal.
3(b) To promote ecologically sustainable development so that the wellbeing of the people of	The proposal integrates the relevant environmental considerations and seeks to avoid potentially serious or irreversible environmental damage. The NT EPA is satisfied the development can be

Matters taken into account during the assessment	Consideration
the Territory is maintained or improved without adverse impact on the environment of the Territory	carried out in a manner consistent with the principles of ecologically sustainable development (ESD) (refer below for further detail on how individual ESD principles have been taken into account).
3(c) To recognise the role of environmental impact assessment and environmental approval in promoting the protection and management of the environment of the Territory	The NT EPA has assessed the proposal in accordance with the requirements of the EA Act and the relevant transitional provisions of the EP Act. The proponent has recognised the importance of environmental impact assessment and provided an EIS including measures to ensure protection and management of the environment of the Territory throughout the life of the proposal. The NT EPA's assessment concludes that with the imposition of conditions of approval and implementation of all recommended mitigation measures, any potentially significant environmental impacts would be adequately mitigated and managed.
3(d) To provide for broad community involvement during the process of environmental impact assessment and environmental approval	The NT EPA's public consultation undertaken during its assessment of the proposal provides for community involvement during the environmental impact assessment process. Submissions received in relation to the proposal have been taken into account in the preparation of the recommended conditions for an environmental approval. The proponent also undertook its own community and stakeholder consultation as detailed in the Consultation report, Appendix to the social impact assessment (Appendix C to the EIS).
3(e) To recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes.	The NT EPA recognises the role of Aboriginal people as stewards of their country and the importance of participation by Aboriginal people and communities in environmental decision-making. The public consultation process provided an opportunity for interested persons to make a submission in relation to the proposal. In its environmental assessment the NT EPA gave consideration to aboriginal cultural values under the culture and heritage factor, including the protection of scared sites under the *Aboriginal Scared Sites Act 1989*, and concluded that implementation of the proposed mitigation measures, would ensure that any potentially significant impacts on Aboriginal cultural values would be adequately managed.
Principles of ecologically sustainable development	
Decision-making principle (1) Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations.	The NT EPA has considered the decision-making principle in its assessment and notes the interconnectedness between environmental factors and recognises that the mitigation measures to avoid and minimise impacts on coastal processes, marine environmental quality, and marine ecosystems, may also reduce the significance of impacts on other factors. The NT EPA considers that its environmental impact assessment has provided the community opportunities for involvement during public consultation on the proposal, and the submissions

Matters taken into account during the assessment	Consideration
(2) Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.	received have been taken into account in the preparation of this report and the recommended conditions to inform the Minister's decision on environmental approval.
Precautionary principle (1) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. (2) Decision-making should be guided by: (a) a careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and (b) an assessment of the risk-weighted consequences of various options.	The NT EPA considers that it has sufficient certainty that the proposal would be environmentally acceptable, and meet the objects of the EA Act and the EP Act. The proponent has identified measures to avoid or minimise impacts on the environment. Serious and irreversible damage is likely to be avoided by the limited scale and duration of the dredging program. The NT EPA gave risk-weighted consideration to the consequences of not containing dredge spoil in enclosed facilities, and decided that the potential impacts of this option are unacceptable. It has therefore recommended a condition to manage dredge spoil in enclosed facilities. The proposal will result in irreversible changes to limited areas of benthic habitats. Those impacts are unavoidable and not considered significant due to their extensive representation. The NT EPA has recommended conditions for environment protection outcomes to be achieved. From its assessment of this proposal the NT EPA has concluded that the environmental values will be protected provided its recommended conditions, and the proponent's commitments are implemented. Alternative locations for the proposal were considered and the project layout was optimised through the project design phase.
Principle of evidence-based decision-making Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.	The NT EPA has considered the available evidence during the course of its assessment of the proposal, and this scientific evidence provides the foundation for its decision-making and recommended conditions. The evidence made available to the NT EPA during the course of the assessment was adequate to inform the NT EPA's recommendation to the Minister. Where the NT EPA considered that further evidence is required to inform the management of potentially significant impacts on the environment, it has recommended conditions requiring the proponent to demonstrate how impacts would be effectively avoided and/or mitigated.
Principle of intergenerational and intragenerational equity The present generation should ensure that the health, diversity and productivity of the	The NT EPA acknowledges that it is important to protect the sensitive environmental and water resource values of Darwin Harbour for the benefit of future generations. It considers that the recommended conditions for an environmental approval would provide an appropriate degree of protection for these values and not constrain the ability of future generations to continue to access the harbour for a range of beneficial uses.

Matters taken into account during the assessment	Consideration
environment is maintained or enhanced for the benefit of present and future generations.	The NT EPA has considered the principle of intergenerational equity and intragenerational equity in its assessment. From the assessment of this proposal the NT EPA has concluded that the environmental values will be protected and that the health, diversify and productivity of the environment will be maintained for the benefit of future generations.
Principle of sustainable use Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.	The NT EPA acknowledges the importance of sustainable use of resources and has considered this principle during the environmental impact assessment process. It considers that this principle is closely linked to the principles of intergeneration and intragenerational equity, and conservation of biological diversity and ecological integrity.
Principle of conservation of biological diversity and ecological integrity Biological diversity and ecological integrity should be conserved and maintained.	This principle was considered by the NT EPA when assessing the impacts of the proposal on the environmental values of Darwin Harbour. In considering this principle, the NT EPA notes that marine environmental quality could be significantly impacted by the proposal. The assessment of these impacts is provided in this report. Biological diversity and ecological integrity are likely to be conserved due to the avoidance, minimisation and mitigation measures that will be implemented by the proponent and the conditions recommended by the NT EPA to ensure that environmental protection outcomes are achieved. From its assessment of this proposal the NT EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected areas.
Principle of improved valuation, pricing and incentive mechanisms (1) Environmental factors should be included in the valuation of assets and services. (2) Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement. (3) Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes.	This principle was considered by the NT EPA when assessing the impacts of the proposal. The NT EPA notes that the proponent would bear the costs relating to containment of contaminants, avoidance and abatement of pollutants to the marine and air environment.

Matters taken into account during the assessment	Consideration
(4) Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems.	
Environmental decision-making hierarchy	
(1) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must apply the following hierarchy of approaches in order of priority: (a) ensure that actions are designed to avoid adverse impacts on the environment; (b) identify management options to mitigate adverse impacts on the environment to the greatest extent practicable; (c) if appropriate, provide for environmental offsets in accordance with this Act for residual adverse impacts on the environment that cannot be avoided or mitigated.	In its assessment of the proposal, the NT EPA considered the extent to which the proponent has applied the environmental decision-making hierarchy in its design of the proposal and the proposed measures to avoid and then mitigate significant impacts. Where the NT EPA was not satisfied that this hierarchy had been applied, it has recommended conditions requiring that the proponent take reasonable measures to avoid and/or mitigate impacts. The NT EPA recognises the proponent's application of the environmental decision-making hierarchy extends to its contractors during implementation and operation of the proposal. The NT EPA did not identify any residual impacts that would require offsetting.
(2) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must ensure that the potential for actions to enhance or restore environmental quality is identified and provided for to the extent practicable.	The proposal is located within an existing industrial area, on land that is highly disturbed, or reclaimed land. There are limited practicable options for enhancement of restoration of environmental quality.

Matters taken into account during the assessment	Consideration
Waste management hierarchy	
(1) In designing, implementing and managing an action, all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment. (2) For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority: (a) avoidance of the production of waste; (b) minimisation of the production of waste; (c) re-use of waste; (d) recycling of waste; (e) recovery of energy and other resources from waste; (f) treatment of waste to reduce potentially adverse impacts; (g) disposal of waste in an environmentally sound manner.	The NT EPA has considered the waste management hierarchy in its assessment and has had particular regard to this principle in its assessment of 6 factors. Where the NT EPA considered that the proponent's application of the waste management hierarchy was not sufficient, it has recommended conditions requiring that the proponent implement further measures to avoid and/or minimise waste from the proposal. The NT EPA has had regard to the waste management hierarchy during the assessment of the proposal, and recommended conditions to ensure that the waste management hierarchy is applied by the proponent for the duration of the proposal.
Ecosystem-based management	
Management that recognises all interactions in an ecosystem, including ecological and human interactions.	The NT EPA acknowledges the importance of ecosystem-based management for achieving both sustainable development and biodiversity protection goals. With consideration of the link between marine environmental quality and marine ecosystems, the NT EPA also considered the connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment. From its assessment of this proposal the NT EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected areas. The NT EPA formed the view that the impacts from this proposal can be managed to be consistent with the NT EPA's environmental factors and objectives.

Matters taken into account during the assessment	Consideration
The impacts of a changing climate	
The effects of a changing climate on the proposal and resilience of the proposal to a changing climate	The NT EPA considered the life of the proposal in the context of resilience to climate change, and how climate change may impact the proposal. The NT EPA had regard to measures and controls relating to storm surge and cyclonic conditions. The NT EPA considered that specific conditions did not need to be recommended to address this requirement. The NT EPA had regard to this matter during its assessment of the proposal.

Appendix 3 – Environmental impact assessment timeline

Date	NT assessment stages
26 April 2018	Notice of intent received
14 November 2018	NT EPA decided environmental impact assessment required – at the level of an environmental impact statement
16 to 30 November 2019	Period for public comment on the draft terms of reference
12 December 2019	NT EPA issued the final terms of reference for the Environmental Impact Statement (EIS)
12 November 2021 to 14 January 2022	Period for public comment on the draft EIS
8 July 2022	Supplement to the draft EIS received
6 October 2022 to 23 June 2023	Consultation with proponent and statutory decision makers on the draft environmental approval
20 July 2023	NT EPA provided assessment report and draft environmental approval provided to the Minister