EPBC Act referral

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Title of proposal	2021/9068 - Darwin Ship Lift Project

Section 1

Summary of your proposed action

1.1 Project industry type Transport - Water

1.2 Provide a detailed description of the proposed action, including all proposed activities

The Northern Territory Government (NTG) is delivering the Darwin Ship Lift Project ('the Project') which comprises construction and operation of a ship lift facility and an adjacent maintenance facility at East Arm.

The Project will enable maintenance and servicing of a broad range of industries, including the Australian Defence Force and Australian Border Force vessels, as well as commercial and private vessels, including those servicing the oil, gas, pearling, fishing and other marine industries. The Project will support the continued economic growth of Darwin as a logistics and marine services hub of the Northern Territory (NT), and Northern Australia.

The Project is planned to be operational in 2025 and will be Northern Australia's largest common user ship lift. The Project is expected to include the following elements which are discussed in more detail below:

- Waterside infrastructure, including:
  - 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 platforms, blocking trestles and vessel transfer system)
  - six (6) 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, including:
  - vessel transfer area and equipment including a Self-propelled Modular Transporter (SPMT) system and SPMT 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
  - services and utilities
  - internal roads and car parks.
  - stormwater management system
- ancillary buildings including workshops and administrative offices.

The site will be fully secured with fencing along the land boundary, security lighting, a visual monitoring system, a gatehouse and electronic gated access.

A development concept for the Project was originally prepared in 2016 by Northern Ship Support Pty Ltd (NSS). Following the Front End Engineering Design (FEED) process undertaken in 2018, a referral under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), was submitted to the Commonwealth Department of the Environment and Energy (DoEE) in April 2018. On 25 September 2018, DoEE determined the Project to be not a controlled action (Reference No. 2018/8195).

The NTG has further reviewed the design and identified areas where enhanced functionality and supporting marine facilities would provide additional benefit to the overall Project. This led to several post-FEED studies and updates to the development concept from 2019 to 2021. As a result, the original Project design was amended . As the Project has undergone material changes since the original referral, the NTG has decided to resubmit the Project for referral.

While there are changes to previous design, these are not considered to materially change the level of impact to Matters of National Environmental Significance (MNES). A notable difference from the previous referral project footprint is a 12.4 ha increase in development footprint (comprising both land and water areas), from 17.3 ha to 29.7 ha.

The increase in Project footprint includes a revetment (protective armouring to prevent erosion) around the perimeter of the facility, and also makes allowance for a disturbance area of 3.5 ha. While the additional reclamation is to create the Privately-owned Facility along the adjacent coastline which will impact the same types of intertidal habitats originally proposed to be disturbed, principally disturbed rocky and soft, muddy substrate (i.e. no substantial seagrass, macroalgae or other epibenthic macrobiota are present).

Further differences in Project design include:

- Utilising the existing Multi-user Barge Ramp Facility (MUBRF) access channel to reduce dredging volume in this area. No further dredging of the channel is proposed.
- The previous referral did not include Project specific sediment transport modelling of the proposed dredging. The current Project will require approximately 500,000 m3 of dredged material composed of approximately 185,000 m3 of unconsolidated material and approximately 315,000 m3 of consolidated material. Sediment transport modelling has been undertaken to predict sediment plumes associated with dredging of approximately 325,000 m3 of unconsolidated material

from the Project site (a conservative scenario).

- This modelling, when considered with the likely tolerance of local sensitive receptors to elevated suspended sediment concentrations, suggests that potential impacts are likely to be limited to the dredging footprint and immediate vicinity and is not expected to impact marine MNES habitat. Impacts were not predicted to occur in the vicinity of South Shell Island (where sensitive hard coral communities exist) which is located 1.5 km away and well outside of the modelled dredge plume.
- Import of 400,000 m3 of suitable fill material by road (from an approved offsite supply) to develop hardstand areas associated with the Project reclamation area. This material will be sourced from local borrow pit site(s) or clean fill sources within 20 km of the site.
- Additional marine pile construction (up to 485 piles [final number to be confirmed during detailed design] as opposed to 150 piles) although this will be within the same marine setting and using the same management measures as assessed previously.

The Project is currently at a concept design level and will continue to undergo design refinement. The NTG is undertaking a staged procurement process for the Project to support the design development and construction planning. The final procurement stage will include shortlisted construction contractors providing design submissions. The successful contractor will then deliver the Project through a design and construct contract. Final design changes are not expected to significantly change the Project conceptual design footprint, insofar as it relates to potential impacts on MNES.

Disturbance activities during construction and operation of the Project that may have a direct or indirect impact on the environment include:

- site preparation
- vegetation clearing
- dredging and reclamation
- construction of:
  - hardstand area
  - facility
  - ship lift
  - marine structures.
- vessel traffic
- vessel maintenance
- stormwater runoff.

These activities and the proposed operational activities are discussed further in Att C – Construction and operational activities (page 1).

Att-A: Figures (1) shows the conceptual design of the Project including the extent of the existing MUBRF access channel which will be utilised by vessels to access the Project.

1.3 What is the extent and location of your proposed action?

See Appendix B

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland)

The Project is situated approximately 6.5 Kilometres (km) south-east of the Darwin Central Business District, on the East Arm Peninsula within Darwin Harbour. The site is adjacent to the recently constructed MUBRF, approximately 700 m east north-east of the EAW and the Marine Supply Base (MSB), and west of the Darwin Business Park.

The location of the Project is shown in Figure 5 and 6 in Att A - Figures. There are no residences in close proximity to the Project area.

The existing land portion of the site is fully fenced and is used for the provision of marine service activities by a private company. It currently accommodates a car park, site office, marine equipment, material hardstand/laydown area, a works depot, marine workshop and a boat ramp. Photos of the existing site are shown Plate B-1 in Att B - Plates

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

The footprint of the Project when constructed will cover 29.7 ha and incorporate both land and water components.

Based on the current design, the current area of land within the proposed Project footprint is 5.5 ha. Once constructed the land component will total approximately 17 ha and will include 8.8 ha of new reclaimed land and 2.7 ha of revetments.

To account for possible changes in concept design and construction activities, a 30 m buffer has been applied to the current design. This has been designated as a “potential disturbance area”.

Based on the current design, the area of water within the proposed Project footprint is approximately 9.2 ha which will require dredging for construction of the:

- ship lift and wet berths at -6.8 m (lowest astronomical tide) LAT (6 ha)
- manoeuvring basin areas at -3.3 m LAT (3.2 ha).

No avoidance area is proposed for the Project.

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A summary of the Project footprint is shown in Table D-1 in Att D - Project footprint table.

1.7 Proposed action location

Address - 869 Berrimah Rd, East Arm, NT, 0822, Australia

1.8 Primary jurisdiction Northern Territory

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

☑ Yes ☐ No

1.9.1 Provide detail

The Project has received a $300,000,000 concessional loan from the Northern Australia Infrastructure Facility.

1.10 Is the proposed action subject to local government planning approval?

☑ Yes ☐ No

1.10.1 Is there a local government area and council contact for the proposal?

☐ Yes ☑ No

1.11 Provide an estimated start and estimated end date for the proposed action

Start Date 01/07/2022
End Date 01/07/2025

1.12 Provide details of the context, planning framework and state and/or local Government requirements

The East Arm Peninsula has been earmarked for port and industrial related development since the late 1970s, with the intent formalised in the Darwin Regional Structure Plan 1984, and subsequent Darwin Regional Land Use Structure Plan 1990 (NTG, 1990) and the East Arm/Middle Arm Peninsula Masterplan 2008 (NTG, 2008).

More recently, East Arm's significance as an industrial area, related to port operations and connections to the Darwin/Adelaide railway line, was established through its designation as Strategic Industry under the Darwin Regional Land Use Plan (NTG, 2015). Strategic Industry in this context includes the use of East Arm for the purposes of a logistics precinct, designed to assist business to grow and capitalise on future projects in the region, with a particular focus on the region's expanding oil and gas, marine and logistics industries. The development of the Project in this location is consistent with this strategic industry designation under the Darwin Regional Land Use Plan (2015).

The existing land area of the Project covers approximately 5.5 ha which has been cleared and disturbed as a result of past and present activities at the site (refer to Plates B1 and B3 in Att B - Plates).

The Project site is zoned DV (Development) under the Northern Territory Planning Scheme (NTG, 2020a) and used for marine services. As defined in the NTPS 2020 (NTG, 2020a) the purpose for Zone DV is to facilitate the development of major strategic industries that are of importance to the future economic development of the NT, including gas, road, rail or port related industries.

The Project is consistent with the purpose of the Zone, as well as the nature of development anticipated under the strategic framework. Proposed developments will be subject to Development Applications. Post-EIS, Development Permits will be required for dredging, excavation, land-filling, clearing of native vegetation, constructing buildings, constructing or upgrading roads and drains as per the requirements of the NT Planning Act.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders

The NTG has consulted with key stakeholders while completing the Project feasibility studies over the past five years.

A communication and engagement strategy was prepared in 2020 to support formal regulatory approvals, including consultation to support the EIS and Development Consent Process. The overall objectives of this strategy are to:

- provide objective and appropriate communication on the project to key stakeholders, so they can give informed feedback
- identify and map stakeholders and issues to ensure the consultation strategy is tailored to the needs and interests of relevant stakeholder groups

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- provide timely reports on issues raised during consultation to guide good decision-making.

It is noted that the NTG requested assessment under the NT Environmental Assessment Act 1982 at the level of an EIS was required to further contribute to providing:

- transparency to the community
- certainty around future approval process requirements.

A stakeholder consultation program for the EIS is in line with the above strategy and with the NT EPA's Stakeholder Engagement and Consultation, Environmental Impact Assessment, Guidance for Proponents (NT EPA, 2021). Engagement has included preparation and distribution of fact sheets, briefings and interviews of targeted stakeholders, including local Larrakia organisations environment groups, industry groups and amateur fishermen.

A separate cultural heritage study describes cultural heritage sites of importance to Larrakia people. The finding of this report are summarised in Section 3.9.

The NTG has obtained an Aboriginal Sacred Sites Certificate under the NT Aboriginal Sacred Sites Act 1989 (C2019/004). The authority certificate is included within Att G - Aboriginal Areas Protection Authority Certificate.

A consultation report, social impact assessment and social impact management plan will be prepared and implemented for the Project which will include an outline of suggested communication and engagement during construction and operations.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project

A referral under the EPBC Act was made on 24/04/2018. The referred action was determined not to be a controlled action (Reference No. 2018/8195). The potential impacts to MNES from the Projects construction and operation have been reassessed and updated following changes to the Project as a result of technical assessments and stakeholder consultation.

Environmental impact assessments are being undertaken in accordance with the Terms of Reference (ToR) issued by the NT EPA in December 2019 for the Project. Several studies have been commissioned as part of this EIS:

-Social impact assessment
-Risk assessment
-Water quality reports
-Benthic habitat modelling
-Marine sediment geochemical assessments
-Sediment transport modelling
-Air quality and greenhouse gas technical report
-Noise and vibration technical reports
-Traffic impact assessment
-Cultural heritage assessment
-Preliminary site investigation.

These studies have also been used to inform this EPBC referral.

1.15 Is this action part of a staged development (or a component of a larger project)?

☐ Yes ☑ No

1.16 Is the proposed action related to other actions or proposals in the region?

☐ Yes ☑ No

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Section 2

Matters of national environmental significance

2.1 Is the proposed action likely to have any direct or indirect impact on the values of any World Heritage properties?

☐ Yes ☑ No

2.2 Is the proposed action likely to have any direct or indirect impact on the values of any National Heritage places?

☐ Yes ☑ No

2.3 Is the proposed action likely to have any direct or indirect impact on the ecological character of a Ramsar wetland?

☐ Yes ☑ No

2.4 Is the proposed action likely to have any direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

☑ Yes ☐ No

Species or threatened ecological community

Although these species have not been recorded at the site, and there is no habitat present which is valuable to these species, it is possible that the following species may occasionally visit the Project area.

Red knot (Calidris canutus)
Curlew sandpiper (Calidris ferruginea)
Great knot (Calidris tenuirostris)
Eastern curlew (Numenius madagascariensis)
Lesser sand plover (Charadrius mongolus)
Greater sand plover (Charadrius leschenaultia)
Nunivak Bar-tailed godwit (baueri) (Limosa lapponica baueri)
Northern brushtailed possum (Trichosurus vulpecula arnhemensis).

Further information on these species can be found in Att H – Likelihood of occurrence assessment, page 1, while individual species assessments can be found in Table H-1 (page 7) of this attachment.

Impact

No threatened shorebirds have been observed within the Project area despite bird surveys being undertaken as part of the EAW Expansion project (EPBC referral 2010/5403). While none of these species have been recorded, it is possible that individuals of these species from the wider region may opportunistically visit the intertidal area of the Project as they move in the vicinity of the Project area.

A potential mechanism by which individuals could possibly be impacted by the Project is the removal of the isolated intertidal habitat. It is considered the removal of this habitat would not impact these species as:

- there are no records of a population within the Project area
- there are no known or potential shorebird roost sites within the Project area
- the area of disturbed intertidal habitat to be removed (approximately 14.6 ha) is small when compared to the area (over 800 ha) of higher value habitat available within the surrounding Darwin Harbour region (within 3 km of the Project area) which is better separated from anthropogenic disturbances.

If these species were to occur within the Project area it is likely to be limited to individuals occasionally visiting the area in moving between areas of preferred habitat such as the EAW Dredge Pond D (Pond D) (refer Figure 2 and 3 in Att A).

Noise and lighting impacts associated with the construction and operation of the facility would not impact the species while they utilise East Arm Dredge Pond D and the surrounding suitable intertidal habitats, as the notable noise and light generating activities (e.g. pile driving and pond wall placement) are located over 500 m from this feature. The works are also separated

from Pond D by Berrimah Road, earthen bunds, vegetation and stockpiles in the port land which ensures there is no 'line of sight' to the dredge spoil ponds. Additionally, the habitat utilised by these populations in this region (the dredge ponds within the East Arm port area) is already surrounded by marine infrastructure which operates 24 hours a day and generates both noise and lighting.

Att H – Likelihood of Occurrence, Table H-1 provides an assessment of likelihood of occurrence of threatened species in the Project area (page 7).

Species or threatened ecological community

Although these species have not been recorded at the site, and there is no habitat present which is valuable to these species, it is possible that the following species may occasionally visit the Project area.

Olive Ridley turtle (Lepidochelys olivacea)
Hawksbill turtle (Eretmochelys imbricata)
Flatback turtle (Natator depressus)
Green turtle (Chelonia mydas).

Further information on these species can be found in Att H – Likelihood of occurrence assessment, page 2, while individual species assessments can be found in Table H-1 of this attachment (Page 7).

Impact

The risk of significant impacts to marine turtles associated with the construction and operation of the Project are considered to be unchanged from the previously assessed Project. The additional dredging and reclamation proposed does not increase the potential for significant impact to turtle populations in the region. Limited exposure to small numbers of turtles means that any residual impacts after mitigation and management measures are applied will not significantly impact populations of these species.

All of these species are known to occur within the wider Darwin Harbour region, although records show that only the Hawksbill turtle, Flatback turtle and the Green turtle have been observed within the vicinity of the Project (within approximately 1 km of the Project site); there are no records of the Olive ridley turtle in the vicinity of the Project area.

While the Project area contains some limited foraging resources it contains no nesting habitat for any of these turtle species. It is likely that any occurrence of these turtle species within the area would be associated with movements between more suitable foraging areas.

During construction, disturbance to the near shore area where these species may only occasionally visit, will be temporary and restricted to periods when dredging and pile driving activities are occurring.

Underwater noise would not pose a risk of significant impact such that a decrease in the long-term population of these species would be seen. Turtles are more likely to initially exhibit avoidance behaviour and then eventually habituate to noise (Moein Bartol & Musick 2003). Mitigation measures will be applied to further reduce the risk of injury to turtles during all piling and dredging operations.

Impacts to habitats of value to EPBC listed species as a result of increased suspended sediment concentrations associated with Project construction is considered unlikely. Dredging related suspended sediment concentrations were modelled for the Project dredging (AIMS, 2020). When considered with tolerance limits for sensitive benthic communities it is apparent that sustained elevations in suspended sediment concentrations resulting from dredging activities that could potentially affect the condition of these habitats are predicted to be generally limited to the vicinity of the dredging footprint, well clear of the nearest sensitive hard coral communities at South Shell Island and habitats of value to EPBC listed species.

There is expected to be an increase in smaller vessels operating within the Project area during construction (e.g. support boats and tenders for dredging and piling operations). The increase in these vessels during construction is considered unlikely to increase the risk of boat strikes, particularly with the proposed mitigation measures in place and considering that turtles are likely to occur only occasionally in the Project area.

The operation of all vessels will be managed to reduce the risk of any adverse interactions with marine life. Management measures (Section 4) to mitigate potential vessel interaction with marine fauna during construction, will be implemented to reduce the potential for impacts to the species if they are present at the site.

Once operational, the Project will cater for a wide range of vessels and provide a variety of marine services which will likely result in a minor increase in vessel traffic beyond what is already experienced in the vicinity of the Project location. The vessels which will utilise the facility are expected to range between 30 – 80 m in length. While vessel traffic is likely to increase to some degree during the operation of the Project, the expected vessel traffic associated with the facility is consistent with surrounding marine facilities. Furthermore, the Project is adjacent to the operating Port, MUBRF, MSB and marine services business which currently generate vessel traffic on a daily basis. Vessels will typically navigate slowly in the approach channel and when manoeuvring through the facility.

Management measures (Section 4) to mitigate potential vessel interaction with marine fauna during operations, will be implemented to reduce the potential for impacts to the species if they are present at the site.

Att H – Likelihood of Occurrence, Table H-1 provides an assessment of likelihood of occurrence of threatened species in the Project area (page 7).

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Species or threatened ecological community

Although these species have not been recorded at the site, and there is no habitat present which is valuable to these species, it is possible that the following fish species may occasionally visit the Project area.

Dwarf sawfish (Pristis clavata)

Green sawfish (Pristis zijsron)

Freshwater sawfish (Pristis pristis).

Further information on these species can be found in Att H – Likelihood of occurrence assessment, page 3, while individual species assessments can be found in Table H-1 (page 7) of this attachment.

Impact

These species have not been recorded within the Project area but are known in a number of estuarine rivers in the Darwin region. While the Project area contains some limited habitat features which could be utilised by these sawfish species (i.e. shallow inshore coastal waters which are present throughout Darwin Harbour), the area does not contain important feeding or breeding habitat and no individuals of these species have been recorded within 10 km of the Project area.

Given this, and that the changes to the project proposal since it was previously assessed are not likely to change the level of risk, the risk of significant impacts to sawfish populations in Darwin Harbour is considered to be highly unlikely.

Additionally, the records of these species in the Darwin region are within estuarine rivers. It is likely that any occurrence of any sawfish species within the Project area would be associated with its movements between more suitable foraging areas.

The subtidal area of the Project site will only be temporarily impacted during dredging works.

Sawfish are less susceptible to effects of underwater noise as they are similar to rays and sharks in that they have a skeletal structure consisting of cartilage and do not have a swim bladder (McCauley & Salgado Kent, 2008).

An increase in suspended sediment in habitats of value to EPBC listed species is considered unlikely. Dredging related suspended sediment concentrations were modelled for a previous Project footprint (AIMS 2020). The modelled dredging scenario is used in this assessment based on the conclusion that it provides a conservative prediction of areas of potential impact associated with the proposed dredging because:

- The volume of unconsolidated material to be dredged and the area over which dredging will occur has been reduced substantially compared to that on which the modelling is based.
- Dredging and removal of consolidated material is expected to produce less intense plumes which are expected to extend over a smaller area than those generated by dredging unconsolidated material.
- Results of the modelling show that turbidity during dredging is still predominantly affected by tidal currents and does not continue to increase over time as dredging continues.

When considered with tolerance limits for sensitive benthic communities it is apparent that sustained elevations in suspended sediment concentrations resulting from dredging activities that could potentially affect the condition of these habitats are predicted to be generally limited to the vicinity of the dredging footprint, well clear of the nearest sensitive hard coral communities at South Shell Island (1.5 km to the south west of the Project) and habitats of value to EPBC listed species.

Att H – Likelihood of Occurrence, Table H-1 provides an assessment of likelihood of occurrence of threatened species in the Project area (page 7).

2.4.2 Do you consider this impact to be significant?

☐ Yes ☑ No

2.5 Is the proposed action likely to have any direct or indirect impact on the members of any listed migratory species or their habitat?

☑ Yes ☐ No

Migratory species

The site provides limited habitat attributes that may be utilised by the following migratory shorebird species:

Common greenshank (Tringa nebularia)

Terek sandpiper (Xenus cinereus)

Common sandpiper (Actitis hypoleucos)

Gull-billed tern (Gelochelidon nilotica)

Bridled tern (Onychoprion anaethetus)

Eastern osprey (Pandion cristatus)

Whitewinged tern (Chlidonias leucopterus)

Little tern (Sternula albifrons)

Red-necked stint (Calidris ruficollis)

Oriental plover (Charadrius veredus)

Pacific golden plover (Pluvialis fulva)

Grey plover (Pluvialis squatarola)

Grey-tailed tattler (Tringa brevipes)

Asian dowitcher (Limnodromus semipalmatus)

Black-tailed godwit (Limosa limosa)
Whimbrel (Numenius phaeopus)
Sharp-tailed sandpiper (Calidris acuminata)
Swinhoe's snipe (Gallinago megala)
Oriental, horsfield's cuckoo (Cuculus optatus)
Ruddy turnstone (Arenaria interpres)
Osprey (Pandion haliaetus)
Sanderling (Calidris alba)

Impact

Changes to the Project proposal since the original Project was assessed under the EPBC Act have not resulted in a change to the likelihood of a significant impact to migratory shorebirds. While there is an increase to the Project footprint, the activities remain similar and no change to the species or use of this Project site have resulted from the change in the proposal description.

Individuals from eight of the 22 migratory shorebird species (identified above) have been observed within the Project area. With individuals from the remaining 14 species known to occur from the wider region.

The Project area does not contain important habitat for any of the migratory shorebird species identified above. The area may occasionally be visited by these species but there is little evidence of utilisation or of the area being relied upon for any foraging, roosting or breeding activities.

A potential mechanism by which individuals could possibly be impacted by the Project is the removal of the isolated intertidal habitat. However, given that there are no known or potential shorebird roost sites within the Project area, and that individuals only occasionally visit the area on their way to the preferred habitat of the Dredge Pond D, it is considered unlikely that loss of this small area of limited habitat (approximately 14.6 ha) would result in any significant impact to these species.

When considered in the context of the wider region, this intertidal area of approximately 14.6 ha of limited value intertidal habitat is small compared to the area of over 800 ha of higher value habitat available within the surrounding Darwin Harbour region (within 3 km of the Project area) which is also better separated from disturbances.

Dredge Pond D (the preferred habitat location for migratory bird species at EAW) will not be used for placement of dredged material or treatment of tailwater during any dredging operations.

Noise and lighting impacts associated with the construction and operation of the facility are not likely to impact the species while they utilise Dredge Pond D and the surrounding suitable intertidal habitats, as the most substantial noise and light generating activities (e.g. pile driving and pond wall placement) are located over 500 m from these utilised habitats. The works are also separated from Pond D by Berrimah Road, earthen bunds and stockpiles in the port land which provide a noise and lighting barrier. Additionally, the habitat favoured by these populations in the East Arm port area Pond D is already surrounded by heavy marine infrastructure which operates 24 hours a day and generates both noise and lighting impacts.

Att H – Likelihood of Occurrence provides an assessment of likelihood of occurrence of threatened species in the Project area (Table H-1, page 7).

Migratory species

The three dolphin species listed below may occasionally move through the Project area as part of their movement in Darwin Harbour.

Australian snubfin dolphin (Orcaella heinsohni)
Australian humpback dolphin (Sousa sahulensis)
Spotted bottlenose dolphin, Indian Ocean bottlenose dolphin (Tursiops aduncus).

Impact

The waters within the Project area may be utilised by these species as they move between areas of preferred habitat within Darwin Harbour. There is, however, no evidence to suggest that the Project area represents important habitat for these species given the similar widespread habitat values available throughout Darwin Harbour.

Underwater noise impacts associated with dredging and construction vessels will be temporary and are unlikely to result in any significant impact to dolphins as each of these activities produces low frequency noise which does not cause hearing loss or interfere with communications with these species (Richardson et al., 1995). Also given the slow moving and predictable nature of these sources they would be easily avoided by the dolphins. Underwater noise associated with pile driving will be temporary but does have the potential to affect this species if they are in close proximity to the source. There is no evidence to suggest that dolphins utilise this area; however, as a precautionary approach, management measures (Section 4) to mitigate potential underwater noise impacts will be implemented to reduce the potential for impacts to occur if the species is present.

There is expected to be an increase in smaller vessels operating within the Project area during construction (e.g. support boats and tenders for dredging and piling operations). The increase in these vessels during construction is considered unlikely to increase the risk of boat strikes, particularly with the proposed mitigation measures in place and considering that turtles are likely to occur only occasionally in the Project area.

Once operational, the Project will cater for a wide range of vessels and provide a variety of marine services which will likely

result in a minor increase in vessel traffic beyond what is already experienced in the vicinity of the Project location. The vessels which will utilise the facility are expected to range between 30 – 80 m in length. While vessel traffic is likely to increase to some degree during the operation of the Project, the expected vessel traffic associated with the facility is consistent with surrounding marine facilities. The Project is adjacent to the operating Port, MUBRF, MSB and marine services business which currently generate vessel traffic on a daily basis. Vessels will typically navigate slowly in the approach channel and when manoeuvring through the facility.

Notwithstanding this, it will be necessary to manage the potential for vessel related impacts. The operation of all vessels will be managed to reduce the risk of any adverse interactions with marine life, the principal focus being on the smaller faster vessels (although the issue will be managed for all vessels). Management measures (Section 4) to mitigate potential vessel interaction with marine fauna will be implemented to reduce the potential for impacts to the species if they are present at the site.

Att H – Likelihood of Occurrence provides an assessment of likelihood of occurrence of threatened species in the Project area (Table H-2, page 10).

Migratory species

Dugong (Dugong dugon).

Impact

This species has not been recorded within the Project area but is known to occur with Darwin Harbour. There is no important Dugong habitat within the Project area as it does not contain any suitable foraging habitat (seagrass or macro algae) and no biologically important areas have been shown within Darwin Harbour on the National Conservation Values atlas (DoEE, 2018).

While Dugongs have been recorded within Darwin Harbour, they are recorded in relatively low numbers due to the lack of seagrass in the region. If the species were to occur within the Project area it would be as a transient visitor and would likely only occur in the portion of the site where disturbances would be temporary.

Other impact mechanisms which have the potential to impact these species are underwater noise and potential interactions with vessels.

Underwater noise impacts associated with dredging and construction vessels will be temporary and are unlikely to result in any significant impact to Dugongs as each of these activities produces low frequency noise which does not cause hearing loss or interfere with communications with these species (Richardson et al., 1995). Also given the slow moving and predictable nature of these sources they would be easily avoided by the Dugongs. Underwater noise associated with pile driving will be temporary but does have the potential to affect this species if they are in close proximity to the source. There is no evidence to suggest that Dugongs utilise this area; however, as a precautionary approach, management measures (Section 4) to mitigate potential underwater noise impacts will be implemented to reduce the potential for impacts to occur if the species is present.

There is expected to be an increase in smaller vessels operating within the Project area during construction (e.g. support boats and tenders for dredging and piling operations). The increase in these vessels during construction is considered unlikely to increase the risk of boat strikes, particularly with the proposed mitigation measures in place and considering that turtles are likely to occur only occasionally in the Project area.

Once operational, the Project will cater for a wide range of vessels and provide a variety of marine services which will likely result in a minor increase in vessel traffic beyond what is already experienced in the vicinity of the Project location. The vessels which will utilise the facility are expected to range between 30 – 80 m in length. While vessel traffic is likely to increase to some degree during the operation of the Project, the expected vessel traffic associated with the facility is consistent with surrounding marine facilities. The Project is adjacent to the operating Port, MUBRF, MSB and marine services business which currently generate vessel traffic on a daily basis. Vessels will typically navigate slowly in the approach channel and when manoeuvring through the facility.

Notwithstanding this, it will be necessary to manage the potential for vessel related impacts. The operation of all vessels will be managed to reduce the risk of any adverse interactions with marine life, the principal focus being on the smaller faster vessels (although the issue will be managed for all vessels). Management measures (Section 4) to mitigate potential vessel interaction with marine fauna will be implemented to reduce the potential for impacts to the species if they are present at the site.

Att H – Likelihood of Occurrence provides an assessment of likelihood of occurrence of threatened species in the Project area (Table H-2, page 10).

Migratory species

Estuarine crocodile (Crocodylus porosus).

Impact

contain any nesting habitat, which consists of elevated, isolated freshwater swamps that do not experience the influence of tidal movements.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

The only impacts to individual crocodiles as a result of the proposed action are temporary sub-tidal impacts associated with the dredge and pile driving activities and the permanent removal of potential basking habitat in the intertidal area. However, there is no evidence that crocodiles frequent the Project area for basking or other activities and this is likely due to the active nature of the existing site.

This species has been recorded throughout Darwin Harbour and the East Arm port area, however, numbers of this species are currently controlled by a trapping and removal program for public safety within the harbour.

Att H – Likelihood of Occurrence provides an assessment of likelihood of occurrence of threatened species in the Project area (Table H-2, page 10).

Migratory species

Narrow sawfish (Anoxypristis cuspidata).

Impact

While the Project area contains some limited habitat features which can be utilised by the Narrow sawfish (i.e. inshore waters which are present throughout Darwin Harbour), there is no evidence to suggest that it contains suitable foraging or breeding habitat with the closest observation of this species located within an estuarine river. If this species were to occur within the Project area it would likely only be associated with its movements between more suitable foraging areas.

The only potential impact to individuals of this species is associated with the temporary disturbance of near shore habitat. If the species happens to be within the vicinity of the works, it will likely move away until construction activities are complete.

Att H – Likelihood of Occurrence provides an assessment of likelihood of occurrence of threatened species in the Project area (Table H-2, page 10).

2.5.2 Do you consider this impact to be significant?

☐ Yes ☑ No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

☑ Yes ☐ No

2.6.1 Is the proposed action likely to have any direct or indirect impact on the Commonwealth marine environment?

☐ Yes ☑ No

2.7 Is the proposed action likely to be taken on or near Commonwealth land?

☑ Yes ☐ No

2.7.1 Is the proposed action likely to have any direct or indirect impact on the Commonwealth land?

☐ Yes ☑ No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

☐ Yes ☑ No

2.9 Is the proposed action likely to have any direct or indirect impact on a water resource from coal seam gas or large coal mining development?

☐ Yes ☑ No

2.10 Is the proposed action a nuclear action?

☐ Yes ☑ No

2.11 Is the proposed action to be taken by a Commonwealth agency?

☐ Yes ☑ No

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2.12 Is the proposed action to be undertaken in a Commonwealth Heritage place overseas?

☐ Yes ☑ No

2.13 Is the proposed action likely to have any direct or indirect impact on any part of the environment in the Commonwealth marine area?

☐ Yes ☑ No

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 3

Description of the project area

3.1 Describe the flora and fauna relevant to the project area

The Project area comprises, marine, intertidal and terrestrial areas. The existing marine portion is approximately 24.2 ha and comprises bare sandy substrate with occasional encrusting sponges. The intertidal portion comprises approximately 14.6 ha of mudflats, which become more rocky to the east of the site, and an isolated stand of remnant mangrove habitat approximately 1.0 ha in area. The portion of the Project area located above highest astronomical tide (HAT) is approximately 5.5 ha and consists of cleared bare and gravelled surfaces with occasional patches of grass and weed species.

Within the Project site, minimal native vegetation remains, restricted to fringing vegetation at the mangrove edges. A native vegetation assessment conducted during a site walkover on September 2020 identified a remnant mangrove area (approximately 1.0 ha), located along the western edge of the Project Area. The assessment confirmed a mix of wattles, including the Northern black wattle (Acacia auriculiformis), and introduced species including Coffee bush (Leucaena leucocephala) and Upland cotton (Gossypium hirsutum) were found to fringe the landward edge of the mangrove habitat (Att I - Soils and vegetation).

A search of the DENR's NT Flora atlas in July 2021 shows that no native, threatened, significant, restricted or introduced terrestrial flora have been recorded within the Project area. The DENR NT Fauna atlas recorded sightings of both the Green turtle (Chelonia mydas) and the Flatback turtle (Natator depressus).

Benthic Habitats

A substantial amount of benthic habitat data exists for Darwin Harbour. The data available provides a good understanding of the habitat types within, and adjacent to, the Project area.

The key interest is the benthic habitat types which are important for MNES species, and whether these are located close enough to the Project area to be affected by suspended sediment impacts resulting from Project dredging and construction to the extent that any effects could have significant impacts on the MNES species.

Predictive modelling of the benthic habitats within, and in the vicinity of, the Project area was encompassed within the modelling of major habitat classes within Darwin and Bynoe Harbours that was undertaken by the Australian Institute of Marine Science (AIMS) in 2019 (Galaiduk et al 2019). This extensive program considered bathymetric, physical seabed and biological data collected during Project specific and historical field sampling campaigns to produce spatial predictive habitat models (Galaiduk et al 2019).

A targeted marine benthic habitat survey of the original Project footprint and the surrounding region was conducted by AIMS to verify habitat mapping and modelling of East Arm and the Project site. The survey included towed video transects and subsequent analysis of imagery that was able to confirm the absence of sensitive hard coral habitats and seagrass along targeted transects within and surrounding the disturbance footprint.

This study also confirmed that the nearest sensitive hard coral benthic habitat communities are located in the vicinity of South Shell Island to the west of the Project site.

The modelled benthic habitat mapping, updated based on field survey data is provided in Figure 7, Att - A Figures and shows that the seabed in and surrounding the Project site is predominantly comprised of bare sediment and filter feeder habitats which are present extensively across the region.

Available information regarding marine flora and fauna mapping was also provided by the Northern Territory Department of Environment and Natural Resources (DENR, now the Department of Environment, Parks and Water Security) for the proposed Project area and surrounding waters in mid-2018. Data provided for the area includes detailed data for seagrass and other marine benthic habitat types within and surrounding the Project site which DENR have processed and collated.

Mapping (provided by DENR) indicates that the substantial seagrass areas within Darwin Harbour are located north of Darwin City, along the intertidal foreshore area of Fannie Bay, and to the west of the City around Talc Head and the entrance to Woods Inlet. These areas are in excess of 12 km from the proposed Project works (Figure 7, Att A - Figures).

The closest location to the Project area where seagrass has been recorded is at Wickham Point, approximately 4.5 km west of the Project area (Figure 7, Att A - Figures). Other recorded locations where seagrass is present include the intertidal foreshore areas around Stokes Point and Blackmore Point, located between Middle Arm and West Arm channels which are over 9 km from the Project works area.

None of the studies, monitoring or observations undertaken to date suggest that the Project area contains potentially significant foraging areas for Dugongs or turtles. Favourable habitat of this type is primarily located to the north of Darwin City.

3.2 Describe the hydrology relevant to the project area (including water flows)

Surface Water

Surface runoff at the Project site is entirely modified and occurs as sheet flow across gravelled or paved surfaces collected in minor constructed flow channels which drain southwards to the Harbour. Within the Project footprint there are minor drains in the east, west and south. These drainage channels only carry water flow during and immediately after rainfall and do not contain persistent standing water.

Hydrodynamics and Sediment Transport

The tidal range in Darwin Harbour is from 0.0 m (lowest astronomical tide; LAT) up to 8.1 m above LAT. The mean spring

tide range is approximately 5.5 m and the mean neap tide range is 1.9 m. Tides within Darwin Harbour are predominantly semidiurnal, with a slight inequality between the successive tides during a single day.

The daily harbour inflow and outflow is 216 million m3 on a spring tide and 71 million m3 on a neap tide. These flows represent 69% and 29% of water flows in Darwin Harbour respectively (Williams, Wolanski and Spagnol 2006). Tidal flows are strongest in the narrowest sections of the harbour, including some sections of the East Arm channel.

Previous investigations within the harbour have demonstrated that a complex circulation occurs near headlands and embayments that includes jets, eddies, separation points and stagnation zones. These currents are different at ebb and flood tides and the asymmetric dispersion of sediment particles results in trapping at headlands and embayments.

Currents within the waters surrounding the Project area are typically low velocity. During recent site studies the minimum current velocity recorded inshore was less than 0.1 m/s with a maximum velocity of 0.24 m/s. Velocities recorded offshore within the deep section of Bladin Point Channel on the southern side of East Arm, outside the Project area, were stronger. Measured currents in this location ranged between 0.85 m/s and 1.1 m/s.

Sediment is delivered to the upper arms of the harbour via catchment scale runoff and channel erosion. Despite the harbour being macro-tidal, much of the riverine fine sediment remains trapped in mud flats and mangroves.

The waters of Darwin Harbour are generally well protected, with the majority of waves generated within the harbour itself or in Beagle Gulf to the north-west. The ambient wave height during the wet season can reach up to 1.0 m, however the average wave height is less than 0.5 m and is even lower during the dry season.

3.3 Describe the soil and vegetation characteristics relevant to the project area

Soils

The landform above HAT is characterised by level to gently undulating plains on deeply weathered rocks associated with ferric red, brown and yellow kandosols. Land units associated with the Project area are summarised in Table I-1 in Att I – Soils and vegetation (page 1). The intertidal area is largely characterised by poorly drained tidal flats consisting of saline muds and grey cracking clays. The marine sediments are characterised as soft marine muds or loose sands and gravels (approximately 1 m) overlying firm to stiff clays (approximately 2.5 m) which overly sedimentary rocks.

Mapping of ASS (ASRIS 2013) within the Darwin Region indicates that material present in the western section of the Project area contains potential ASS (PASS). The bottom sediments associated with the offshore area of the site are also mapped as PASS. However, sediment sampling and analysis carried out for the MSB and MUBRF and within the proposed dredging footprint for the Project all showed that although marine sediments contain pyrite, they have a large excess of inherent neutralising capacity. Monitoring of tailwater within the EAW settlement ponds during these dredging campaigns did not identify any indicators of ASS being placed within the ponds. Mapping of the eastern portion of the site indicates that there is no known occurrence of ASS within this section of the Project area.

Vegetation Characteristics

East Arm peninsula is part of the Darwin Coastal bioregion featuring vegetation communities consistent with this bioregion; primarily lateritised Cretaceous sandstones and siltstones dominated by Darwin stringybark (Eucalyptus tetrodonta) and other common canopy species. East Arm peninsula is within a planned industrial and port precinct, and, whilst patches of native vegetation are still present, in general much of the area has been disturbed through previous land use and development. Within the Project site, minimal native vegetation remains, restricted to fringing vegetation at the mangrove edges.

A native vegetation assessment conducted during a site walkover identified a remnant mangrove area (approximately 1.0 ha), located along the western edge of the Project area. A mix of wattles, including the Northern black wattle (Acacia auriculiformis), and introduced species including Coffee bush (Leucaena leucocephala) and Upland cotton (Gossypium hirsutum) were found to fringe the landward edge of the mangrove habitat.

The mangrove habitat in the upper intertidal is largely dominated by Grey mangrove (Avicennia marina) and Myrtle mangrove (Osbornia octodonta). A distinct zonation exists between the upper and lower tidal areas of the mangrove habitat. As the lower tidal area becomes rocky, with significant rock outcrops located to the east, the area becomes characterised by large individual Mangrove apple species (Sonneratia alba) with some Stilted mangroves (Rhizophora stylosa) scattered throughout the lower intertidal area.

Native vegetation recorded during the survey is presented in Table I-2 in Att I – Soils and vegetation (page 1).

Sparse patches of grass and weed species occur at the site (refer Plate B-3 in Att B - Plates). The NT weeds database identifies Coffee bush and Mission grass have previously been recorded at the site, with a single instance of Gamba grass recorded within the Berrimah Road Corridor leading to the entrance of the Project area. Perennial Mission grass and Gamba grass are declared weeds in the Northern Territory, with Gamba grass also listed as a Weed of National Significance (WoNS). (KBR, 2018).

Weeds and introduced species recorded during the site visit in September 2020 are listed in Table I-3 and I-4 in Att I - Soils and vegetation, respectively (page 2).

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area

The Project area is located within a disturbed marine industry area and does not contain any outstanding natural features.

3.5 Describe the status of native vegetation relevant to the project area

A number of native mangrove species have been identified within the Project area (refer Section 3.3); these are not listed under the EPBC Act.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area

Bathymetry of the Project area ranges between 6 m above LAT at the existing landward edge of the site, to -4 m LAT at the outer extent of the Project area within the proposed wet berth area. The connection between the facility and the MUBRF channel and the existing access channel itself are below the required dredge depth of -1.5 m LAT. The MUBRF channel starts to the east of the Project at the MUBRF, and largely follows the naturally deeper sections of the harbour heading west, where it connects with Bladin Point Channel. The MSB channel located to the west of the Project also connects with the Bladin Point channel and is maintained to a depth of –7.7 m LAT (Figure 8 in Att A - Figures).

3.7 Describe the current condition of the environment relevant to the project area

The Project area above HAT is highly disturbed and has been completely cleared and developed and is made up of gravel and bare soil. The small remnant patch of mangroves provides only limited habitat values and is located directly adjacent to marine industrial areas. The mangrove area is subject to edge effects associated with the surrounding industrial land uses which are noisy and result in heavy and light vehicle traffic in close proximity to this area.

3.8 Describe any Commonwealth Heritage places or other places recognised as having heritage values relevant to the project

There are no Commonwealth Heritage Places in the Project area or surrounds.

Previous studies have identified two World War II sites in the Project area, the East Arm Flying Boat (FBB) Base and the Lugger Maintenance Section (LMS). The East Arm FBB comprised a number of components including a large tarmac hardstand, hangar, workshop and stores with associated maritime infrastructure including a large concrete ramp enabling Catalinas to be taken in and out of the water (and a concrete slipway with iron rails to serve the Marine Section vessels and a timber jetty (Cosmos, 2015). The East Arm FBB also included a range of offshore infrastructure, including Catalina and vessel moorings comprising of at least twenty-two seaplane moorings, nine craft buoys, five lugger buoys, three warping and steadying buoys, three marker buoys, and one submarine buoy (Cosmos, 2015).

A heritage assessment undertaken by (EarthSea, 2021) identified there are few remaining features of the FBB. These consist of:

- The original slipway used to launch rescue vessels to assist aircraft returning with damage or wounded air crew and small vessel maintenance.
- The original Catalina ramp used to remove aircraft from the water for maintenance.
- Parts of the Catalina taxi apron at the top of the ramp. It is unknown if all the apron is WWII vintage, or only parts thereof.
- A concrete mooring buoy near the ramp, it is likely this feature was used to anchor aircraft while awaiting removal from the water.

In the 1980s, the former Catalina Ramp was opened to the public by the NTG for use as a recreational boat ramp prior to the construction of the current East Arm Boat Ramp at Casey Street (1200 m to the northeast)t.

Construction of the facility will cover the Catalina ramp, apron, slipway and the mooring buoy with fill and concrete.

The LMS is located on the north eastern side of the MUBRF outside the Project area. It is unlikely that the construction of the facility will impact on this area.

There are no mitigation measures proposed for these sites. It is recommended that appropriate heritage signage, describing the FBB and the LMS and their role in Darwin's history, be installed in a public place, possibly the current recreational boat ramp to the north east of the LMS site.

An archaeological assessment was undertaken for the adjacent MUBRF in 2014/2015. This investigation noted that the seabed within and surrounding the footprint of the MUBRF has served as a 'rubbish dump' from the early to middle years of the 20th century, and up to the present day. The majority of artefacts recovered during the survey represent discard into the harbour associated with various land-based and water-based activities, primarily relating to World War II use of the area.

To the north but outside the Project area, is another archaeological site at the East Arm Quarantine Station, this is also outside the Project area.

A search of the Australian Underwater Cultural Heritage Database noted that there are no registered shipwrecks within the proposed works footprint. The search identified, within the general East Arm area, four registered shipwrecks including two Vietnamese refugee boats (ID3429 and ID3430), a two-part barge (ID3428) and HMAS Kelat. There is also one registered shipwreck, Vietnamese refugee boat Con Dao 3 (ID3408), located on the northern side of EAW. Of the above listed registered shipwrecks, none have been placed on any heritage registers.

The database search also identified a number of aircraft wreck sites within the general East Arm area. The Catalina 2 (RAAF Catalina A24-69) site is located within the investigation area but outside the extent of proposed works 880 m away. The Catalina 3 (RAAF Catalina A24-206) site is located to the south of Catalina Island over 1km from the Project site. Although these are not declared, an exclusion zone for large vessels during construction will be defined and monitoring of the Catalina 2 site is recommended prior and post construction. Catalina 3 is not considered to be at risk of unintentional damage as a result of this Project but will be monitored prior and post construction.

There are also three other maritime wreck sites within the general east arm region, located to the south of the Project area, including Catalina 4 and Catalina 5 and 6. These three sites are listed on the NT Heritage Register.

The Catalina wreck sites are not protected under the Historic Shipwrecks Act 1976 and none are considered to be war graves.

3.9 Describe any Indigenous heritage values relevant to the project area

The onshore Project area has been previously disturbed by earthworks and built form over several decades however, some sections of the intertidal zone consist of relatively intact but disturbed mangrove habitat and mudflats, which have some potential to contain evidence of historical Indigenous activities.

An Archaeological and Heritage assessment undertaken to assess the Project impacts (EarthSea, 2021) found there are no registered Aboriginal archaeological sites within the Project area. There is a record of a cultural shell midden site within the Project area however this site was not located during the survey (Earthsea, 2015) possibly indicating that the coordinates in the NT database were incorrect, The original site recording indicates that the site should be near the eastern boundary of the Project Area, however its true location is more likely to be within the LMS boundary to the east of the Project area.

The site can be described as a small midden site approx. 3 metres in radius and 150 mm in depth eroding out of a sand bank on the high tide line. The shell material was noted as Anadara granosa. Excavations and dating of similar middens around Darwin Harbour have resulted in dates between 2500 and 500 years BP (i.e. Earthsea, 2008; Bourke, 2005). The same authors note that these sites are very common along the Darwin Harbour shoreline. As noted above, the midden site is outside of the Ship Lift Project area and unlikely to be disturbed as a result of construction of the Facility.

The Project area is close to two registered Sacred Sites protected under the NT Aboriginal Sacred Sites Act 1989. These sites, Catalina Island and Old Man Rock, are both on the AAPA register of sacred sites.

The sand bar on the northern extremity of Catalina Island is of special significance to Larrakia people. There are concerns within the Larrakia community that changing the coastline around Quarantine Island will cause this sand bar to erode (Earthsea, 2015). A hydrodynamic modelling study undertaken by MetOcean (2020), investigated the potential impacts of planned changes in the shoreline on tidal currents in East Arm and around Catalina Island was commissioned as part of the EIS. While the scenario modelled featured an earlier Project design iteration, it is thought to provide an appropriate estimate of potential effects of the currently proposed Project design as the overall Project footprint (reclaimed area and dredging footprint) has been reduced, likely resulting in reduced differences than those shown in the model outputs. The study indicates that, while some changes in tidal currents may occur as a result of the construction of the Project, they are relatively minor and unlikely to significantly affect Catalina Island (MetOcean 2020).

Old Man Rock is approximately 1 km south east of the Project area. MetOcean (2020) did not note specific impacts on the rock due to changes in hydrodynamic regime. The report does indicate that minor changes in current regime are possible due to the change in coastline shape resulting from land reclamation works; however, as these changes are predicted to be of a relatively small magnitude, it is considered unlikely to result in substantial impacts on Old Man Rock.

An AAPA certificate is current for the Project with conditions including avoiding impacts on the sand bar on the northern end of Catalina Island (refer Att G - Aboriginal Areas Protection Authority Certificate).

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area

The Project site covers one marine and three land parcels including freehold, leasehold and perpetual lease land. The remaining over-water land component of the project is unalienated Crown land that is shown as part administrative section 7398, Hundred of Bagot (excluding the access channel).

The land based Project area principally consists of Sections 5163, 6370 and 5420, which are privately owned.

A summary of the current tenure applicable to the Project area is provided in Table E-1 in Att E – Tenure (page 1).

3.11 Describe any existing or any proposed uses relevant to the project area

The existing land portion of the site is fully fenced and is used for the provision of marine services activities by a private company. It currently accommodates a car park, site office, marine equipment, material hardstand/laydown area, a works depot, marine workshop and a boat ramp. The boat ramp was constructed in World War II and was used in more recent times for recreational boating purposes, prior to the construction of the current East Arm Boat Ramp at Casey Street. The site is now fully fenced and used for the provision of marine services activities. The existing use of the site is shown in Figure A-7 in Att A - Figures and Plate B-1 in Att B - Plates .

The East Arm area has been primarily developed for marine industry as part of the East Arm Marine Industry Park. Typical land uses in this area are for port operations, storage and transport logistics.

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Section 4

Measures to avoid or reduce impacts

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action

Management and Mitigation Methods

Since the initial Referral of the Project in 2018, an Environmental Management Framework (EMF) has been developed for the delivery of the Project. It is designed to provide the parameters for the preparation of subsequent management plans to ensure that potential impacts and risks associated with the construction and operation of the Project are appropriately managed and monitored and to ensure that the Projects environmental and social commitments are fulfilled.

This EMF includes:

-environmental management objectives and performance criteria

-proposed mitigation measures that are designed to reduce or mitigate risk

-a system of monitoring, reporting and reviewing the effectiveness of these measures.

If required, management actions will be adjusted or revised, over time, to ensure objectives are able to be met.

Design and construction of the Project will be undertaken by a lead contractor that will be required to have a certified Environmental Management System (EMS) and submit a construction environmental management plan (CEMP) to the Department of Infrastructure Planning and Logistics, (DIPL) for approval prior to commencement of any site works. Once constructed, the site will be leased to an operator. The operator will be required to submit an operational environmental management plan (OEMP) to DIPL prior to commencing operations.

At the completion of the NT EIS process, secondary approvals and permits under other NT legislation will be required for the construction and operation of the Project. Imposed conditions and legislative requirements , such as development consent under the NT Planning Act 1999, associated with these secondary approvals and permits will be incorporated into subsequent CEMP and OEMPs.

This EMF exists within a suite of documents that will guide the delivery of the Project, these will include but not be limited to:

Social Impact Management Plan

Construction Noise and Vibration Management Plan

Marine and Terrestrial Construction Noise and Vibration Management Plan

Traffic Management Plans

Dredging and Dredge Spoil Placement Management Plan

Erosion and Sediment Control Plan

Biosecurity Management Plan

Heritage Management Plan.

Environmental Management

Environmental and social impacts and risks will vary significantly in their nature and severity during the construction and operational phases of this Project. The CEMP will be developed to include all activities associated with the construction phase of the proposed action and will include a particular focus on key aspects that have the potential to impact on MNES including:

dredging

reclamation and dredge material handling

pile driving

noise including underwater noise

lighting

surface water runoff and receiving water quality.

The OEMP will cover all aspects of the operation of the site and will include a particular focus on key aspects that have the potential to impact on MNES during the operational phase of the Project, such as:

large and small vessel movements

ship lift operation

waste management

stormwater runoff and wastewater management

noise and lighting

maintenance dredging.

Table K-1 (page 1) and Table K-2 (page 2) in Att K – Management and mitigation measures present management commitments for each of the key aspects listed above that will be included in CEMPs and OEMPs to address the issues and impacts identified within the MNES impact assessment presented in Section 2.

It is acknowledged that there are potential impacts which will need to be assessed and managed effectively during construction activities. However, based on the information available and assessment undertaken to date, and given the scale of the Project, the potential impacts can be effectively mitigated such that they are limited to the immediate area of the works.

Potential impacts associated with dredging and pile driving to marine megafauna during construction will be further assessed following completion of the construction design and methodology. Modelling studies are underway to further inform this. Risks and mitigation measures will continue to be reviewed and updated if necessary to account for changes in design.

Environmental Monitoring

Detailed environmental monitoring programs will be developed for both the construction and operation phases of the Project. Monitoring and inspection requirements will be detailed within the CEMP and OEMP and other management plans

relevant to the construction and operation of the Project facility, such as the:
Social Impact Management Plan
Dredging and Dredge Spoil Placement Management Plan
Construction Noise and Vibration Management Plans
Erosion and Sediment Control Plans
Biosecurity Management Plan
Heritage Management Plan.

The monitoring programs will be designed to measure compliance with the above management plans, imposed conditions and legislative requirements associated with any secondary approvals and permits.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved

Based on the desktop assessment and field survey findings, no threatened ecological communities (TECs) or threatened flora species are considered likely to occur within the Study Area. Occurrences of MNES fauna species are likely to be limited to individuals occasionally visiting the area in moving between areas of preferred habitat such as of the East Arm's dredge Pond D.

The land and marine based areas within the Project site contain some limited habitat attributes which could occasionally be used by listed threatened and migratory species. Att H – Likelihood of occurrence assessment describes the likelihood of each of the listed threatened and migratory species that could occur within the Project Area (Table H-1, page 7 and Table H-2, page 10) based upon the information in Att J – PMST Report.

For those species that do occasionally occur within the Project area impacts are expected to be minor and temporary. These impacts are not considered to be significant.

Table K-1 (page 1) and Table K-2 (page 3) in Att K – Management and mitigation measures present management commitments for each of the key aspects listed above that will be included in CEMPs and OEMPs to address the issues and impacts identified within the MNES impact assessment presented in Section 2.

It is acknowledged that there are potential impacts which will need to be assessed and managed effectively during construction and operation. Mitigation measures for these impacts will continue to be reviewed and updated if necessary to account for changes in design.

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Section 5

Conclusion on the likelihood of significant impacts

5.1 You indicated the below ticked items to be of significant impact and therefore you consider the action to be a controlled action

- ☐ World Heritage properties
- ☐ National Heritage places
- ☐ Wetlands of international importance (declared Ramsar wetlands)
- ☐ Listed threatened species or any threatened ecological community
- ☐ Listed migratory species
- ☐ Marine environment outside Commonwealth marine areas
- ☐ Protection of the environment from actions involving Commonwealth land
- ☐ Great Barrier Reef Marine Park
- ☐ A water resource, in relation to coal seam gas development and large coal mining development
- ☐ Protection of the environment from nuclear actions
- ☐ Protection of the environment from Commonwealth actions
- ☐ Commonwealth Heritage places overseas
- ☐ Commonwealth marine areas

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action

Impacts to listed threatened and migratory fauna species are not considered to be significant.

The land and marine based areas within the Project site contain some limited habitat attributes which could occasionally be used by listed threatened and migratory species. Att H – Likelihood of occurrence assessment (Table H-1, page 7 and Table H-2, page 10) describes the likelihood of each of the listed threatened and migratory species that could occur within the Project Area based upon the information in Att M – PMST Report.

Species that do occasionally occur within the Project area are likely to only use the area temporarily, as such impacts are not considered to be significant.

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Section 6

Environmental record of the person proposing to take the action

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Explain in further detail

Yes, the NTG has a satisfactory record of responsible environmental management. There are no past or present proceedings against the NTG in relation their environmental management. The NTG has undertaken multiple projects in compliance with Commonwealth and Territory legislation where applicable, including several projects in the East Arm area since 2004. These projects have included management plans, permits and other mitigation and preventative measures to appropriately manage the potential for impacts to the environment.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application

There have been no past proceedings, nor are there any present proceedings, under Commonwealth and Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the NTG or the person making the application.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

☐ Yes ☑ No

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

☑ Yes ☐ No

6.4.1 EPBC Act No and/or Name of Proposal

Reference number 2021/8932 Department of the Chief Minister and Cabinet/Energy Generation and Supply (renewable)/, Jabiru township, Kakadu, 250km south-east of Darwin/Northern Territory/Jabiru Hybrid Power Station Project, NT.

Reference number 2018/8197NORTHERN TERRITORY OF AUSTRALIA/Transport - Land/NT Portion 220, Kakadu National Park/Northern Territory/Gimbat Road-Kambolgie Creek crossing upgrade, Kakadu NP, NT

Reference number 2017/7911. Northern Territory of Australia/Transport - Land/Tjukaruru Road, Petermann, NT, 0872/Northern Territory/Tjukaruru Road Intersection Realignment and Road Sealing - Uluru Kata-Tjuta National Park

Reference number 2016/7730 DEPARTMENT OF PRIMARY INDUSTRY AND RESOURCES/Natural Resources Management/Near Batchelor, approx 105km south of Darwin/Northern Territory/Rehabilitation of former Rum Jungle mine site, near Batchelor, NT

Reference number 2011/6090. Northern Territory Department of Lands and Planning/Residential development/10km south of Palmerston /NT/Proposed City of Weddell

Referral number 2010/5304 DEPARTMENT OF PLANNING AND INFRASTRUCTURE - MAJOR PROJECTS UNIT/Manufacturing/Darwin Harbour/Northern Territory/East Arm Wharf Expansion Works

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 7

Information sources

Reference source

AIMS, 2020
Australian Institute of Marine Science, 2020. Sediment Transport Modelling Technical Report. Prepared for AECOM, Darwin. Unpublished report for NTG.

Reliability

High
Highly credible environmental organisation, assumed to be reliable

Uncertainties

None applicable

Reference source

Armstrong et al 2020
Armstrong, A.J., Armstrong, A.O., Bennet., M.B., McGregor, F., Abrantes, K.G., Barnett, A., Richardson, A.J., Townsend, K.A. and Dudgeon, C.L. 2020. The geographic distribution of reef and oceanic manta rays (Mobula alfredi and Mobula birostris) in Australian coastal waters. Journal of Fish Biology. Vol. 96, Issue 3, pp. 835-840.

Reliability

High
Peer reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

ASRIS 2017
Australian Soil Resource Information System

Reliability

High
Highly credible environmental organisation, assumed to be reliable

Uncertainties

None applicable

Reference source

Moein Bartol & Musick 2003
Bartol, S. M., Mellgren, R. L., & Musick, J. A. 2003. Visual Acuity of Juvenile Loggerhead Sea Turtles (Caretta caretta): A Behavioral Approach. International Journal of Comparative Psychology, 16(2-3), pp 143–155.

Reliability

High
Peer reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

Carter 1980
Carter, M. 1980. Streaked Shearwaters in Northern Australia. Australian Bird Watcher. Vol. 10, No. 4, pp. 113-121.

Reliability

High

Peer reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

Cosmos. 2015
Cosmos Archaeology Pty Ltd. 2015.'East Arm Multi-User barge Ramp Facility (MUBRF) Darwin Harbour Northern Territory Recovered Cultural Objects Maritime Archaeological Analysis Report'. Unpublished report for Cosmos Archaeology Pty Ltd. and Land Development Corporation, Northern Territory. Author Caroline Wilby.

Reliability

High
Highly credible environmental organisation, assumed to be reliable

Uncertainties

None applicable

Reference source

Cogger 1993
Cogger, H.G., Cameron, E.E., Sadlier, R.A., and Egler, P. 1993. The Action Plan for Australian Reptiles. Australian Nature Conservation Agency, Canberra.

Reliability

High
Highly credible environmental organisation, assumed to be reliable

Uncertainties

High
Highly credible environmental organisation, assumed to be reliable None applicable

Reference source

DAWE 2020
Department of Agriculture, Water and the Environment. 2020. Green turtle (Chelonia mydas). Australian Government, ACT. <https://www.environment.gov.au/marine/marine-species/marine-turtles/green>.

Reliability

High
Commonwealth Government Department, assumed to be reliable

Uncertainties

None applicable

Reference source

DERM 2010
Department of the Environment and Resource Management (DERM). 2010. National recovery plan for the water mouse (false water rat) Xeromys myoides. Queensland Government, Brisbane, Queensland.

Reliability

High
State Government Department, assumed to be reliable

Uncertainties

None applicable

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

EarthSea 2021
EarthSea, 2021. Archaeological and Heritage Assessment: Proposed Darwin Ship Lift Project. Unpublished Report

Reliability

High
Reputable consultant.

Uncertainties

None applicable

Reference source

Earthsea, 2015
Earthsea Pty Ltd. 2015. Marine Industry Park, Terrestrial Heritage Assessment, East Arm, Darwin, Northern Territory. Unpublished Report for AECOM Australia Pty Ltd.

Reliability

High
Reputable consultant.

Uncertainties

None applicable

Reference source

Earthsea, 2008
Earthsea Pty Ltd. 2008. Hudson Creek Shell Midden Investigation, Unpublished report for NT Land Development Corporation and Heritage Branch, NT Department of Natural Resources, Environment and the Arts, Authors: Ben Keys and Jason T. Raupp.

Reliability

High
Reputable consultant.

Uncertainties

None applicable

Reference source

EMS 2011
Ecological Management Services (EMS). 2011. East Arm Wharf Expansion Project – Terrestrial Flora and Fauna Assessment. Report prepared for URS Australia/ Northern Territory Department of Lands and Planning.

Reliability

High
Reputable consultant. Survey undertaken by experienced field ecologist (Paul Barden). Assumed to be reliable

Uncertainties

This report is based on surveys at East Arm Wharf. The survey areas are split into different sections, one of which (Area 2/3 foreshore) comprises the Project area for this assessment.

Reference source

Geering et al. 2007
Geering, A., Agnew, L. & Harding, S. (eds). 2007. Shorebirds of Australia. CSIRO Publishing, Melbourne, Victoria.

Reliability

High
Credible scientific publishing source (CSIRO). Authors are experienced ornithologists. Source assumed to be reliable.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Uncertainties

None applicable

Reference source

Galaiduk et al 2019
Galaiduk R, Radford B, Harries S, Case M, Williams D, Low Choy D and Smit N, 2019, Technical Report: Darwin – Bynoe Harbours predictive mapping of benthic communities. Australian Institute of Marine Science, Perth. pp 42

Reliability

High
Peer reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

Hale et al 2000
Hale, P.T., Barreto., A.S. and Ross, G.J.B. 2000. Comparative Morphology and Distribution of the aduncus and truncatus forms of Bottlenose Dolphin Tursiops in the Indian and Western Pacific Oceans. Aquatic Mammals. Vol. 26.No. 2, pp. 101-110.

Reliability

High
Peer reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

Higgins et al. 2006
Higgins, P.J., Peter, J. M. & Cowling, S.J. 2006. Handbook of Australian, New Zealand and Antarctic Birds. In: Part A. Boatbill to Larks. Volume 7. Melbourne, Victoria: Oxford University Press

Reliability

High
The volumes of Handbook of Australian, New Zealand and Antarctic Birds (HANZAB) are the most comprehensive summary of scientific literature on Australian birds (at the time they are published) and are a highly referenced source of information. Assumed to be reliable.

Uncertainties

None applicable

Reference source

Higgins, 1999
Higgins, P.J. (ed.) .1999. Handbook of Australian, New Zealand and Antarctic Birds. Volume Four - Parrots to Dollarbird. Oxford University Press, Melbourne.

Reliability

High
See above

Uncertainties

None applicable

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

Higgins and Davies, 1996
Higgins, P.J. & S.J.J.F. Davies (eds).1996. Handbook of Australian, New Zealand and Antarctic Birds. Volume Three - Snipe to Pigeons. Oxford University Press, Melbourne.

Reliability

High
See above

Uncertainties

None applicable

Reference source

KBR 2018
Kellogg Brown and Root Pty Ltd (KBR). 2018. Notice of Intent: Darwin Ship Lift Facility and Marine Industries Project. Report prepared for Northern Ship Support Pty Ltd, Darwin, NT.

Reliability

High
Reputable consultant, assumed to be reliable

Uncertainties

The original Notice of Intent produced in 2018 assesses a project area that is larger than the one assessed as part of this assessment

Reference source

Larson et al 2012
Larson, H., Woinarski, J., Stirrat, S. and Ward, S. 2012. Threatened Species of the Northern Territory: Dawrf sawfish broad-billed sawfish Pristis clavata. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0003/206391/dwarf-sawfish.pdf>.

Reliability

High
Northern Territory Government publication, assumed to be highly reliable

Uncertainties

None applicable

Reference source

Larson and Ward 2012
Larson, H. and Ward, S. 2012. Threatened Species of the Northern Territory: Northern river shark new guinea river shark Glyphis garricki. Northern territory Department of Environment and Natural resources, Berrimah, NT. < https://nt.gov.au/__data/assets/pdf_file/0005/206384/northernr-river-shark.pdf>.

Reliability

High
See above

Uncertainties

None applicable

Reference source

Larson et al 2006a
Larson, H., Woinarski, J., and Stirrat, S. 2006a. Threatened Species of the Northern Territory: Freshwater sawfish Pristis microdon. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0005/206393/freshwater-sawfish.pdf>.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reliability

High
See above

Uncertainties

None applicable

Reference source

Larson et al 2006b
Larson, H., Woinarski, J., and Stirrat, S. 2006b. Threatened Species of the Northern Territory: Green sawfish Pristis zijsron. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0006/206394/green-sawfish.pdf>.

Reliability

High
See above

Uncertainties

None applicable

Reference source

Last and Stevens 2009
Last, P.R. and Stevens, J.D. 2009. Sharks and Rays of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia.

Reliability

High
Credible scientific publishing source (CSIRO). Assumed to be reliable

Uncertainties

None applicable

Reference source

Lilleyman et al 2018
Lilleyman, A., Alley, A., Jackson, D., O'Brien, G. and Garnett, S. 2018. Distribution and abundance of migratory shorebirds in Darwin Harbour, Northern territory, Australia. Northern Territory Naturalist. Vol. 28, pp. 30-42.

Reliability

High
Peer-reviewed journal, assumed to be credible

Uncertainties

None applicable

Reference source

Lilleyman et al 2013
Lilleyman, A., Lawes, M.J. and Garnett, S. 2013. Migratory Shorebirds in Darwin Harbour, Northern Territory. Report for the Northern territory government. Research Institute for the Environment and Livelihoods, Charles Darwin University, Darwin, Northern Territory.

Reliability

High
Report prepared by PHD candidate (migratory shorebirds) and experienced and credible university supervisors. Assumed to be reliable.

Uncertainties

None applicable

Reference source

McCauley and Kent, 2008
McCauley, R. D., and CP Salgado Kent. 2008, Pile driving underwater noise assessment, proposed bell bay pulp mill wharf development.(2008).

Reliability

High
Peer-reviewed journal, assumed to be credible

Uncertainties

None applicable

Reference source

Marchant and Higgins, 1990
Marchant, S. & Higgins, P.J. (eds.). 1990. Handbook of Australian, New Zealand and Antarctic Birds. Volume One - Ratites to Ducks. Oxford University Press, Melbourne, Victoria.

Reliability

High
The HANZAB publications are the most comprehensive summary of scientific literature on Australian birds and are a highly referenced source of information. Assumed to be reliable.

Uncertainties

None applicable

Reference source

Marchant and Higgins, 1993
Marchant, S & Higgins, P.J. (eds.).1993. Handbook of Australian, New Zealand & Antarctic Birds, Vol.2 Raptors to Lapwings, Oxford University Press, Melbourne.

Reliability

High
See above

Uncertainties

None applicable

Reference source

Marsh et al 2011
Marsh, H., O'Shea, T.J. and Reynolds, J.R. 2011. The ecology and conservation of sirenia; dugongs and manatees. Cambridge University Press, London

Reliability

High
Credible publishing source (Cambridge University Press). Assumed to be reliable.

Uncertainties

None applicable

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

Marshall et al 2011
Marshall, A., Kashiwagi, T., Bennett, M. B., Deakos, M. H., Stevens, G., McGregor, F., Clark, T., Ishihara, H. and Sato, K. 2011. Manta alfredi. In IUCN Red List of Threatened Species. Version 2011. 1.

Reliability

High
IUCN is an international conservation organization. Membership includes more than 1,400 governmental and non-governmental organizations and 16,000 scientists. Assumed to be reliable

Uncertainties

None applicable

Reference source

MetOcean, 2020
MetOcean, 2020. Impact of SLAMI proposed reclamation and dredged area on currents and sediment transport, unpublished report for SMEC.

Reliability

High
Reputable consultant.

Uncertainties

None applicable

Reference source

Northern Territory Government, 2021. Declared Weeds in the Northern Territory. Accessed at https://nt.gov.au/__data/assets/pdf_file/0016/252133/declared-weeds-in-the-nt.pdf. Accessed September 2021

Reliability

High
Government Department. Assumed to be reliable

Uncertainties

None applicable

Reference source

Parra and Cagnazzi, 2016
Parra, G.J., & D. Cagnazzi. 2016. Conservation Status of the Australian Humpback Dolphin (Sousa sahulensis) Using the IUCN Red List Criteria. Advances in Marine Biology. Vol. 73, pp. 157-192.

Reliability

High
Peer-reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

Parra 2006
Parra, G.J. 2006. Resource partitioning in sympatric delphinids: Space use and habitat preferences of Australian snubfin and Indo-Pacific humpback dolphins. Journal of Animal Ecology. Vol. 75. Pp. 862-874.

Reliability

High
See above

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Uncertainties

None applicable

Reference source

Pizzey and Knight 2007
Pizzey, G. & F. Knight. 1997. The Graham Pizzey and Frank Knight Field Guide to the Birds of Australia. Angus & Robertson, Sydney.

Reliability

High
Widely used and popular bird field guide from a credible publisher. Assumed to be reliable.

Uncertainties

None applicable

Reference source

Richardson et al. 1995
Richardson, W.J., C.R. Greene, Jr., C.I. Malme, and D.H. Thomson. 1995. Marine mammals and noise. Academic Press, San Diego.

Reliability

High
Peer-reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

Taylor et al 2013
Taylor, R., Chatto, R., Whiting, S. and Ward, S. 2013. Threatened Species of the Northern Territory: Loggerhead turtle Caretta caretta. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0010/206398/leatherback-turtle.pdf>.

Reliability

High
Northern Territory Government publication, assumed to be highly reliable

Uncertainties

None applicable

Reference source

Taylor et al 2012a
Taylor, R., Chatto, R., Woinarski, J. and Ward, S. 2012a. Threatened Species of the Northern Territory: Hawksbill turtle Eretmochelys imbricata. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0003/206454/hawksbill-turtle.pdf>.

Reliability

High
See above

Uncertainties

None applicable

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

Taylor et al 2012b
Taylor, R., Chatto, R., Woinarski, J., Whiting, S. and Ward, S. 2012b. Threatened Species of the Northern Territory: Olive ridley Pacific ridley Lepidochelys olivacea. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0004/206455/olive-ridley-turtle.pdf>

Reliability

High
See above

Uncertainties

None applicable

Reference source

Taylor et al 2006b
Taylor, R., Chatto, R., and Woinarski, J. 2006b. Threatened Species of the Northern Territory: Flatback turtle Natator depressus. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0008/376172/flatback-turtle.pdf>.

Reliability

High
See above

Uncertainties

None applicable

Reference source

Taylor et al 2006a
Taylor, R., Chatto, R., and Woinarski, J. 2006a. Threatened Species of the Northern Territory: Leatherback turtle Dermochelys coriacea. Northern territory Department of Environment and Natural resources, Berrimah, NT. <https://nt.gov.au/__data/assets/pdf_file/0019/206452/loggerhead-turtle-vu.pdf>.

Reliability

High
See above

Uncertainties

None applicable

Reference source

TSSC 2020
Threatened Species Scientific Committee (TSSC). 2020. Conservation Advice -Trichosurus vulpecula arnhemensis Northern Brushtail Possum. Conservation advice provided to Commonwealth Minister.

Reliability

High
The TSSC is established under the EPBC Act and comprises scientific experts in the field being assessed. Assumed to be reliable.

Uncertainties

None applicable

Reference source

Williams, Wolanski and Spagnol 2006
Williams, D., Wolanski, E., and Spagnol, S. 2006. Hydrodynamics of Darwin Harbour. The Environment in Asia Pacific Harbours pp 461-476

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reliability

High
Peer-reviewed scientific journal, assumed to be reliable

Uncertainties

None applicable

Reference source

Webb et al 1987
Webb, G.J.W., Whitehead, P.J. and Manolis, S.C. 1987. Wildlife Management: Crocodiles and Alligators. Surrey Beatty & Sons, Sydney, NSW.

Reliability

High
The authors are experienced crocodile researchers. Assumed to be reliable.

Uncertainties

None applicable

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 8

Proposed alternatives

Do you have any feasible alternatives to taking the proposed action?

Yes ☑ No

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 9

Person proposing the action

9.1.1 Is the person proposing the action an organisation or business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	NORTHERN TERRITORY OF AUSTRALIA
Business name	
ABN	84085734992
ACN	
Business address	GPO Box 4396, Darwin, 0801, Northern Territory, Australia
Postal address	
Main Phone number	+61 8 8936 5666
Fax	
Primary email address	craig.smith@nt.gov.au
Secondary email address	

9.1.2 I qualify for exemption from fees under Regulation 5.23(1)(ii) of the EPBC Regulations because I am:

☐ Small business
☑ Not applicable

9.1.2.2 I would like to apply for a waiver of full or partial fees under Regulation 5.21A of the EPBC Regulations

☐ Yes ☑ No

9.1.3 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Craig
Last name	Smith
Job title	Project Director, Department of Infrastructure, Planning and Logistics
Phone	+61 8 8936 5666
Mobile	+61 436 942 375
Fax	
Email	craig.smith@nt.gov.au
Primary address	GPO Box 4396, Darwin, 0801, Northern Territory, Australia
Address	

Declaration: Person proposing the action (To be signed by the person at 9.1.3)

I, CRAIG SMITH **, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity.**

Signature: ..... **Date:** 5/11/21

I, _____, the person proposing the action, consent to the designation of _____ as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature:.....Date: .....

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Proposed designated proponent

9.2.1 Is the proposed designated proponent an organisation or business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	NORTHERN TERRITORY OF AUSTRALIA
Business name	
ABN	84085734992
ACN	
Business address	GPO Box 4396, Darwin, 0801, Northern Territory, Australia
Postal address	
Main Phone number	+61 8 8936 5666
Fax	
Primary email address	craig.smith@nt.gov.au
Secondary email address	

9.2.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Craig
Last name	Smith
Job title	Project Director, Department of Infrastructure, Planning and Logistics
Phone	+61 8 8936 5666
Mobile	+61 436 942 375
Fax	
Email	craig.smith@nt.gov.au
Primary address	GPO Box 4396, Darwin, 0801, Northern Territory, Australia
Address	

Declaration: Proposed Designated Proponent

I, CRAIG SMITH **,the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.**

Signature: ..... **Date:** 5/11/21

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Referring party (person preparing the information)

9.3.1 Is the referring party an organisation or a business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	AECOM AUSTRALIA PTY LTD
Business name	
ABN	20093846925
ACN	
Business address	Level 5, 7-13 Tomlins Street, South Townsville, 4810, QLD, Australia
Postal address	
Main Phone number	M +61 450 617 847
Fax	
Primary email address	rouven.lau@aecom.com
Secondary email address	

9.3.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Rouven
Last name	Lau
Job title	Environment Group Lead, North Queensland & Northern Territory
Phone	M +61 450 617 847
Mobile	
Fax	
Email	rouven.lau@aecom.com
Primary address	Level 5, 7-13 Tomlins Street, South Townsville,, 4810, QLD, Australia
Address	

Declaration: Referring party (person preparing the information)

I, _____, **declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.**

Signature: ..... **Date:** 13/10/21

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Appendix A

Attachment

Document Type	File Name
action_area_images	*Att A - Figures.pdf
action_area_images	Att B - Plates_Rev 2.pdf
action_area_images	Att A - Figures Rev 1.pdf
supporting_tech_reports	Att H - Likelihood of occurrence assessment.pdf
supporting_tech_reports	Att J - PMST report.pdf
flora_fauna_investigation	Att I - Soils and vegetationRev1.pdf
impact_reduction_docs	Att C - Construction and operational activities.pdf
impact_reduction_docs	*Att D - Project footprint table_Rev2.pdf
impact_reduction_docs	*Att E - Tenure.pdf
impact_reduction_docs	**Att G - Aboriginal Areas Protection Authority Certificate.pdf
impact_reduction_docs	Att K - Management and mitigation measures.pdf
impact_reduction_docs	Att F - Indicative concept design construction schedule.pdf
impact_reduction_docs	Att D - Project footprint table_Rev3.pdf
impact_reduction_docs	Att E - Tenure_Rev1.pdf

* NOT PUBLISHED - SUPERSEDED
** NOT PUBLISHED - SENSITIVE

Appendix B

Coordinates

Area 1
-12.486794408441,130.90095136229
-12.487990920781,130.90105930005
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-12.488008560724,130.90107108338
-12.488059472643,130.90108219187
-12.48826341362,130.90108547067
-12.488674836965,130.9010884765
-12.488987787141,130.90109255149
-12.489038686871,130.90110544965
-12.48909491201,130.9011112284
-12.489145913546,130.90110981181
-12.489184909588,130.90109558203
-12.489380025977,130.90129702362
-12.489408561062,130.90127501457
-12.489419077741,130.90126647723
-12.489436157288,130.90125058033
-12.489451842281,130.90123325895
-12.489501840388,130.90117308258
-12.489621307853,130.90103954639
-12.489767119986,130.90088093824
-12.489768321188,130.90087962391
-12.489894196649,130.90074090215
-12.489934580377,130.90069634068
-12.490172571839,130.90069794916
-12.490196239303,130.90069917558
-12.492681880098,130.90071733441
-12.492683826836,130.90071734111
-12.492703342073,130.90071662499
-12.492722569549,130.90071521276
-12.492750145395,130.90071173629
-12.492764992808,130.90070863412
-12.492783761594,130.90070415293
-12.492814574057,130.90069480428
-12.492824633832,130.90069084478
-12.492842472967,130.9006834071
-12.492859134803,130.90067578335
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-12.492880770932,130.90066370428

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

-12.492897233069,130.90065349474
-12.492914286069,130.90064200077
-12.492930439383,130.90062923191
-12.492931998218,130.90062789126
-12.492946671836,130.90061516677
-12.492962453281,130.90060034579
-12.49297703216,130.90058430201
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