NORTHERN TERRITORY GOVERNMENT
Department of
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Our ref: DEPWS2022/0084

Lisa Bradley
Department of Environment, Parks and Water Security
GPO Box 3675
Darwin NT 0801, Darwin

Dear Ms Bradley

Re: Referral under the EP Act - HMAS Coonawarra - Dredging

The Department of Environment, Parks and Water Security (DEPWS) has assessed the information contained in the above referral and provides the following comments:

Flora and Fauna Division

The Division has reviewed the referral and identified the potential for significant impacts to natural values but information gaps mean there are uncertainties about the extent of these impacts. Detailed comments are provided to you in Appendix 1.

Based on the information provided, it is likely that impacts from the proposal will be localised, and that impacts to ecological values of the Harbour more broadly will be minor. However, some significant gaps in the information provided in the referral means that there remains some uncertainty about the extent of potential impacts, and it would be appropriate that these gaps are addressed to ensure robust impact assessment and comprehensive risk management through the Construction Environmental Management Plan (CEMP) and the Dredging Disposal Management Plan (DDMP). This particularly applies to modelling of sediment deposition, the potential impacts of turbidity and sedimentation.

Water Resources Division

The proposed dredging and dredged material disposal activities are not anticipated to impact groundwater or surface water systems near the site. Water Resources have no issues to raise in relation to this application.

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email DevelopmentAssessment.DEPWS@nt.gov.au or phone (08) 8999 4446.

Yours sincerely

Maria Wauchope
A/Executive Director, Rangelands

30 May 2022

APPENDIX 1 - Environmental impact assessment under the *Environmental Protection Act 2019*

Theme or issue	Comment
Land **Terrestrial Ecosystems**	The coastal escarpment adjacent to the proposal is mapped as monsoon vine thicket with some mangrove vegetation likely to occur along the coastal foreshore. These vegetation types are considered to be significant and/or sensitive vegetation in the Northern Territory and may provide habitat for threatened species. The referral identifies that these vegetation types are present but provides no information on whether there will be impacts associated with the proposal. Given the proximity of works to these vegetation types, it is recommended that the proponent provide further information on the predicted impacts to these communities.
	The monsoon vine thicket along the coastal escarpment is highly likely to support the vulnerable (*Environment Protection and Biodiversity Conservation Act 1999*) Common Brushtail Possum (north-west). The referral does not include any consideration of the potential impacts or risks to this species or its habitat. The Flora and Fauna Division has reviewed the available records which confirms that the species is common in urban and semi-urban environments in the Darwin region. Current knowledge of the species' ecology suggests that suitable and occupied habitat is extensive along the Darwin Esplanade and coastal escarpment. This habitat extends beyond the Coonawarra Naval Base and it is unlikely this species will be significantly impacted by the proposed works.
Coastal Processes *Currents, hydrodynamic and wave models.*	The proponent has used Delft3D as their modelling tool, and the hydrodynamic model is based on a 2D depth average. The WA Dredge Science node recommends that 3D modelling is necessary to understand the impacts to hydrodynamics, plume and sediment transport modelling. The Flora and Fauna Division recommends that the proponent revisits plume modelling and sediment transport modelling and considers using 3D modelling techniques in conjunction with the long-term monitoring data (referred to in Marine Environmental Quality). The models should be calibrated and verified.
Coastal Processes *Sediment deposition dredge spoil disposal.*	The referral has not included models of sediment deposition, nor does it model the potential for sediment to be remobilised after deposition. Further, it is expected that coarser material will remain in the vicinity of the disposal site and will not be readily transported by currents. It is unclear if the fate of this coarse material has also been considered by the proponent when assessing the extent and severity of impacts from the proposed disposal. The Flora and Fauna Division recommends that sediment deposition and sediment transport modelling is undertaken for fine and coarse material. The sediment transport model should be calibrated and validated. The referral should at least report on the extent, deposited sediment thickness, time duration and fate of deposited sediments.

Marine Ecosystems *Marine and migratory fauna*	The referral identifies the following potential environmental risks and impacts associated with the proposed action: • impacts to sensitive receptors such as coral and seagrass habitats from elevated suspended sediments and excessive sedimentation • direct loss of habitat through dredging and placement of the breakwall • indirect impacts from decline in water and sediment quality with potential loss of ecosystem function, • potential impacts from vessel interaction and underwater noise on marine megafauna such as turtles, dugong and coastal dolphins The Flora and Fauna Division accepts the referral's conclusion that with proposed mitigation actions (e.g. vessel speed, soft starts when piling, lighting design) risks to migratory species is low. There is potential for turtle and dugong habitat to be directly impacted through sediment transport and sedimentation. The risks to these habitats from a regional context is likely to be low, however there is potential for local impacts which may alter the use of the area by individual marine megafauna.
	The infrastructure build associated with the proposal will create light pollution and may impact on threatened and migratory fauna. The Flora and Fauna Division recommends that lighting design follows national light pollution guidelines[1].
	A range of marine megafauna utilise the waters within the wider area of Darwin Harbour including turtles, dugong, dolphins and sawfish. To the south of the site, the East Arm (over 4 km south) and Middle Arm (over 2 km south-south-west) of Darwin Harbour are considered to be important foraging areas for the Indo-Pacific Humpback dolphin, and to a lesser extent both the Indo-Pacific bottlenose and the Australian snubfin dolphins. The proponent has noted that the foreshore is lined with mangroves and mudflats. These habitats may support migratory and threatened bird species. The referral provides no assessment of the potential impacts or risks to these species or their habitats. While there has been no assessment provided, the Division notes that the mangroves and mudflats within the proposal area are unlikely to provide important foraging, staging or roosting habitat for these species. The Flora and Fauna Division is satisfied that the risk to these species from the proposal is low.
Marine Ecosystems *Benthic habitats*	The proponent has provided information on the benthic habitats that are likely to be present within the proposal area. This information is based on monitoring from the 2006 and 2013 dredge campaigns as well as the 2019 DEPWS

[1] National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020

	predictive habitat model. Staff from the Division have considered the zone of influence using the most recent information (Streten et al 2021[2]). The Flora and Fauna Division agrees with the referral's conclusion that the Coonawarra Naval basin is a highly modified environment and that the risks to benthic flora and fauna within the basin is low. However, there are remaining uncertainties on the risks to the zone of influence (ZoI) outside of the Coonawarra Naval basin. The Division has benthic habitat data for the western side of the Fannie Bay modelled as sand bar, however the remaining zone of influence remains unmapped. Without this information it is not possible to determine the value of these habitats or assess the potential impact on these ecosystems from elevated suspended solids and reduced light quality/availability. As the zone of influence is relatively large and occurs over an extended period (2-3 months) there is uncertainty over the benthic communities present in this zone and the potential for those communities to be significantly impacted. To resolve this uncertainty, the Division recommends that further information is sought on the distribution of benthic communities in the modelled zone of influence. This information would inform a more comprehensive assessment of the values within the zone of influence as well as the assessment of the risks from elevated total suspended solids and reduced light availability/quality due to the proposal.
Marine Ecosystems *Benthic Primary Producer habitats*	Plume generation, reduced light conditions, sedimentation and liberation of contaminants pose greater risk to sensitive benthic habitats. Results from plume modelling indicate that areas on either side of the Fannie Bay sand bank and subtidal areas between Coonawarra basin and Fort Hill wharf will have elevated suspended sediments as a result of dredge spoil disposal. The referral considers this a low risk to sensitive habitats as water quality will return baseline conditions within 12-24 hours. However, sediment deposition rates have not been estimated, nor has the proponent modelled the resuspension of deposited dredge spoil material. Thus there is insufficient information to assess the impact from sedimentation on sensitive receptors. Sediment deposition is not the only environmental parameter that is influenced by sediment plumes. Light availability at the seafloor, which is a physical environmental parameter that drives a number of ecosystem processes, is another parameter to consider.

[2] Streten, C. (editor). Revised predictive benthic habitat map for Darwin Harbour. Report prepared for Department of Environment, Parks and Water Security. Australian Institute of Marine Science, Darwin, 127 pp. including appendices

	Flora and Fauna Division is concerned about the exposure duration of TSS and the consequences for light availability/quality at the seafloor, especially for a 2-3 month dredging campaign. As benthic primary producers rely on light, and with dredging occurring during day time hours, there will be no recuperation period for light dependant organisms. To inform the risk assessment there is a need to understand the TSS / turbidity – light intensity relationship at the seafloor, which when coupled with the plume modelling will allow a more comprehensive risk assessment. It will also assist with setting appropriate turbidity triggers for benthic communities and primary productivity. The Flora and Fauna Division recommends that, in conjunction long-term WQ monitoring, the proponent undertake monitoring of light availability and quality and turbidity at the seafloor at the proposed monitoring sites. The Flora and Fauna Division also recommends that two additional sites are included into the monitoring program, one along the western side of the Fannie Bay sand bank, as this lies in the major axis of most dredge plume modelling outputs; and at Bennett Shoal, which is likely to contain benthic primary producer habitats. The proponent should also inform their approach using the research undertaken by WAMSI under the NESP Dredging node[3] To link the WQ parameters and health of benthic communities, monitoring of benthic primary producer habitats should be undertaken at the proposed monitoring sites (including the two sites proposed by Flora and Fauna Division).
Marine Env. Quality *Background TSS* *Triggers*	To establish background Total Suspended Solid (TSS) concentrations, the referral relies on the following datasets: • National monitoring station at the mouth of Darwin Harbour, • DEPWS monitoring stations in the main navigation channel passing Coonawarra Navy Base, • INPEX monitoring for South Shell Island • Monitoring undertaken during previous dredge maintenance programs for the Coonawarra basin. The Flora and Fauna Division considers that the data from the National monitoring station and INPEX are not sufficient for establishing a baseline condition for nearshore waters around Coonawarra basin. These monitoring sites represent marine environmental conditions that are more typical for open water or within an arm of Darwin Harbour, respectively. The Coonawarra basin also lies within a transitional zone between Beagle Gulf (open water) and the 'closed harbour' environments of inner Darwin Harbour and its arms and therefore are likely to have different baseline settings.

[3] Dredging Science Program – Western Australian Marine Science Institution (wamsi.org.au)

	The Flora and Fauna Division cautions the use of DEPWS monitoring data as this is collected for surveillance or ambient purposes which is skewed for dry season and neap tidal conditions. Its applicability for predicting conditions during spring tide and/or wet season is also constrained. The results of monitoring during previous Coonawarra basin dredge maintenance programs may well be appropriate. If this data is used, the Division recommends that details of the monitoring parameters (locations, duration, seasonality, baseline or impact sites) are also provided. The Flora and Fauna Division is satisfied with the proposed triggers levels and recommends that the proponent collects time-series data for TSS and turbidity over tides and seasons (Wet, Dry and transitional periods) for the zone of influence from dredging activities. This information would provide useful information for characterising water quality condition at a local scale, particularly for turbidity, TSS and light. Flora and Fauna Division recommends that turbidity, TSS and light data is at least collected continuously during the NCIS-5 dredging campaign and continues until the works for the development of the eastern area of the basin is completed. This long-term data set would allow statistically robust analysis of turbidity and TSS at an appropriate scale and allow for appropriate trigger levels to be set for the Eastern Project dredging campaign.