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Our ref: DLPE2025/0014

Ms Holly Durrant
Department of Lands, Planning and Environment
PO Box 3675
DARWIN NT 0801

Dear Ms Durrant

Re: Invitation to comment - Department of Logistics and Infrastructure (DLI) - Adelaide River Off-stream Water Storage - proponent initiated EIS referral

The information submitted for the above referral has been assessed by the relevant environmental divisions within the department and the following comments are provided:

Flora and Fauna Division

The Flora and Fauna Division has reviewed the draft Terms of Reference (ToR) and the referral and provides a number of recommendations in **Attachment 1**. It is recommended that the Northern Territory Environment Protection Authority (NT EPA) consider the suggested changes and update the draft ToR as appropriate.

Water Resources Division

The referral has been reviewed by the Water Resources Division and comments have been provided in **Attachment 2.**

Mining Division

The Mining Division have reviewed the referral and provides comment in **Attachment 3**.

Environment Division

Heritage Branch

The Heritage Branch have reviewed the referral and provides comment in **Attachment 4.**

Environmental Operations

If the proponent will collect, transport, store, recycle or treat listed wastes on a commercial or fee for service basis as part of the development or operations of the activity, then an Environment Protection Approval or Licence will be required to authorise the activity under the *Waste Management and Pollution Control Act 1998* (NT).

If the activity requires the discharge of waste to water or could cause water to be polluted, then a waste discharge licence under the *Water Act* 1992 Northern Territory (NT) will be required. Please refer to the Guidelines[1].

The proponent should note that all persons are required to comply at all times with the General Environmental Duty under section 12 of the *Waste Management and Pollution Control Act 1998* (NT) (WMPC Act). To help satisfy the General Environmental Duty, the proponent is advised to take notice of the list of environmental considerations below. The list is not exhaustive, and the proponent is responsible for ensuring their activities do not result in non-compliance with NT laws.

A non-exhaustive list of environmental issues that should be considered to meet requirements under NT law are listed below:

1. **Dust**: The proposed activities have the potential to generate dust, particularly during the dry season. The proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.
2. **Noise**: The proponent is to ensure that the noise levels from the proposed premises comply with the latest version of the NT EPA Northern Territory Noise Management Framework Guideline available online[2].
3. **Erosion and Sediment Control (ESC):** The proponent must ensure that pollution and/or environmental harm do not result from soil erosion.

   ESC measures should be employed prior to and throughout the construction stage of the development. Larger projects should plan, install and maintain ESC measures in accordance with the current International Erosion and Sediment Control Association (IECA) Australia guidelines and specifications. Where sediment basins are required by the development, the NT EPA recommends the use of at least Type B basins, unless prevented by site specific topography or other physical constraints.

   Basic advice for small development projects is provided by the NT EPA document: Guidelines to Prevent Pollution from Building Sites[3] and Keeping Our Stormwater Clean[4].
4. **Storage:** If an Environment Protection Approval or Environment Protection Licence is not required, the proponent should store liquids only in secure bunded areas in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Where these guidelines are not relevant, the storage should be at least 110% of the total capacity of the largest vessel in the area.

[1] https://ntepa.nt.gov.au/__data/assets/pdf_file/0005/950603/guidelines-waste-discharge-licensing.pdf
[2] https://ntepa.nt.gov.au/__data/assets/pdf_file/0004/566356/noise_management_framework_guideline.pdf
[3] https://ntepa.nt.gov.au/__data/assets/pdf_file/0010/284680/guideline_prevent_pollution_building_sites.pdf
[4] https://ntepa.nt.gov.au/__data/assets/pdf_file/0006/284676/guideline_keeping_stormwater_clean_builders_guide.pdf

Where an Environment Protection Approval or Environment Protection Licence is required, the proponent must only accept, handle or store at the premises listed waste, including asbestos, as defined by the WMPC Act, in accordance with that authorisation.

5. **Site Contamination**: If the proposal relates to a change of land use or if the site is contaminated, including as a result from historical activities such as cyclones, a contaminated land assessment maybe required in accordance with the National Environment Protection (Assessment for Site Contamination) Measure (ASC NEPM). The proponent is encouraged to refer to the information provided on the NT EPA website[5], and the NT Contaminated Land Guidelines[6].
6. **Waste Management - Import and Export of Fill**: The proposed activities have the potential to generate fill and/or involve the importation of fill for use on-site. Untested fill material may already be present on the site. All fill imported or generated and exported as part of the activity must either be certified virgin excavated natural material (VENM) or be sampled and tested in line with the NSW EPA Guidelines[7].

   All imported fill material must be accompanied by details of its nature, origin, volume, testing and transportation details. All records must be retained and made available to authorised officers, upon request. The proponent should also consider the following NT EPA fact sheets: How to avoid the dangers of accepting illegal fill onto your land[8], and Illegal Dumping - What You Need to Know[9].
7. **Odour or Smoke:** The proposed activities may have the potential to create odours and/or smoke. The proponent must ensure that nuisance odours or smoke are not emitted beyond the boundaries of the premises.

Rangelands Division

Vegetation Assessment Unit

The Vegetation Assessment Unit has reviewed the referral and provides the following comments:

- Clearing of native vegetation will be required for the basin and intake infrastructure connecting infrastructure, including the pipeline to the future Strauss Water Treatment Plant.
- Within Section 1582 Hundred of Colton, 495 Marrakai Road, (part of Koolpinyah Perpetual Pastoral Lease) a clearing permit under the *Pastoral Land Act 1992* is required to clear native vegetation where the clearing is not permitted under section 38(1)(k) or (2)(f) or 91D.
- The *Pastoral Land Act 1992* defines that to clear, in relation to land, means any of the following:
  a. the killing, destruction or removal of native vegetation; and
  b. any substantial damage to native vegetation.

[5] https://ntepa.nt.gov.au/your-environment/contaminated-land
[6] https://ntepa.nt.gov.au/__data/assets/pdf_file/0020/434540/guideline_contaminated_land.pdf
[7] https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material
[8] https://ntepa.nt.gov.au/__data/assets/pdf_file/0005/285728/factsheet_avoid_danger_accepting_illegal_fill_to_your_land.pdf
[9] https://ntepa.nt.gov.au/__data/assets/pdf_file/0008/285740/factsheet_illegal_dumping_what_you_need_know.pdf

- The remaining land is subject to the *Planning Act 1999* and the Northern Territory Planning Scheme 2020 (NTPS). A clearing permit may be required for clearing of native vegetation of more than one hectare in aggregate of land (including any area already cleared of native vegetation), where not permitted under Schedule 3 Exceptions of the NTPS.

Land Assessment Branch

The development has the potential to create acid sulfate soils, and consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate Soils Guidance[10] and further information is available online[11]. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines, Version 5.1 (Dear et al. 2024)[12] and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015)[13] may also be referenced.

Essential to an investigation is the requirement for Chromium Reducible Sulfur (CRS) soil testing at an appropriate site density and to a soil depth immediately below the proposed disturbance. If acid sulfate soils are detected through CRS testing, and exposure of these soils is unavoidable then an Acid Sulfate Soil Management Plan (ASSMP) is required. Depending on the scale of the project, the ASSMP should include the following:

- exact location of the proposed disturbance;
- depth and volume of soil to be disturbed (m 3);
- clearly presented CRS results;
- acid base accounting results which clearly indicate an accurate liming rate;
- appropriately designed treatment pads; lime/soil mixing regimes; and
- an appropriate monitoring program.

Weed Management Branch

A Weed Management Plan as part of the EIS should address pre-construction (including weed survey), construction, works and decommissioning. Weed hygiene measures should be addressed at all stages of the project.

The Environmental Impact Statement (EIS) should also address the inherent risk for aquatic weeds to be further spread and established in this project site similar to other water catchment areas, e.g. Manton Dam and Darwin River Dam. Measures to be taken to prevent this should be clearly stated. Mimosa and olive hymenache both have the potential to infest the new water body and require expensive and ongoing treatments.

An assessment of the NT Weeds Database for the property, surrounding parcels and roads has revealed current and or previous data records of the following:

Common Name	Botanical Name	Declared
Gamba grass	*Andropogon gayanus*	Class B
Mimosa	*Mimosa pigra*	Class B

[10]

[11] https://www.waterquality.gov.au/issues/acid-sulfate-soils

[12] https://www.publications.qld.gov.au/dataset/acid-sulfate-soil-guidelines/resource/6d880993-4b80-45e3-9110-5c24fa7a7e75

[13] https://www.wa.gov.au/government/document-collections/acid-sulfate-soils-publications

Common Name	Botanical Name	Declared
Olive hymenachne	*Hymenachne amplexicaulis*	Class B
Snakeweed	*Stachytarpheta jamaicensis*	Class B
Grader grass	*Themeda quadrivalvis*	Class B
Sida - flannel weed	*Sida cordifolia*	Class B
Sida - spiny head	*Sida acuta*	Class B
Senna - sicklepod	*Senna obtusifolia*	Class B

Gamba grass and mimosa are preeminent and are at increased risk of spread through the proposed project footprint. Grader grass is also present in isolated infestations. Gamba grass, mimosa and grader grass are all subject to statutory weed management plans which has additional obligations. Management obligations outlined in these plans must be adhered to by all land holders. Management requirements and copies of statutory weed management plans are available online[14] .

Vehicle and equipment hygiene controls are key for weed spread prevention. The proponent should ensure that any machinery used in the construction process is free of mud and soils, weeds and weed seeds before entering the property to ensure weeds are not inadvertently introduced or spread during the construction activity. '*Preventing Weed Spread is Everybody's Business*' is a document outlining actions proponents can conduct to reduce the risk of weeds being spread during exploration and other land activities. This document is available online[15].

Consideration should also be made for methods, treatments and timing for effective weed management to be undertaken prior and throughout the life of the development so that weeds are satisfactorily managed at the site, access roads and/or tracks.

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
Executive Director Rangelands

6 March 2025

Attachment 1 – Flora and Fauna Division comments
Attachment 2 – Water Resources Division comments
Attachment 3 – Mining Division comments
Attachment 4 – Heritage Branch comments

[14] https://nt.gov.au/environment/weeds/how-to-manage-weeds/weed-management-planning
[15] https://denr.nt.gov.au/__data/assets/pdf_file/0011/257987/preventing-weed-spread.pdf

Attachment 1

Submission on the Proponent Initiated Environmental Impact Statement Referral (PIER)

Department of Logistics and Infrastructure – Adelaide River Off-water Storage Project – Proponent Initiated EIS and Draft Terms of Reference

This submission is made under regulation 53 of the Environment Protection Regulations 2020

Government authority: Department of Lands, Planning and Environment – **Flora and Fauna Division**

Section of Referral/ToR	Theme or issue	Comment
NT EPA Environmental Factor – Terrestrial Ecosystems		
Appendix C – Threatened Species Assessment	Terrestrial Ecosystems	It is not clear if adequate surveys have been undertaken for the whole project footprint. The report states information gaps remain due to access restrictions or timing of surveys, but also surveys were only planned for the basin and intake corridor. The ToR should ensure that adequate survey effort has been applied across the entire footprint.
Draft ToR	Monitoring and Reporting	The monitoring and reporting section(s) should include a requirement for setting thresholds and describe mitigating actions should thresholds be met or exceeded.
Draft ToR 3.3 Terrestrial Ecosystems	Environmental Values	The draft ToR require the proponent to "*Identify and describe the terrestrial ecological ecosystem values within the proposal area – area(s) that could be directly impacted by actions proposed to be taken under the proposal*." The values identified in the draft EIS should explicitly include the identification of all species of conservation significance, including restricted range species in addition to threatened species. This may require an evaluation of the potential significance of the project area for plant species listed as Data Deficient under the *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act).
		The draft ToR require the Proponent to provide "*A likelihood of occurrence assessment for all threatened terrestrial flora, fauna and migratory species modelled to occur, or known to occur within the 20km buffer desktop searches*." It is recommended that the wording in the draft ToR is amended to: A likelihood of occurrence assessment for all threatened or data deficient terrestrial flora and fauna, and migratory species as listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

		The draft ToR require the Proponent to provide "*Descriptive and spatial information (maps) for sensitive/significant vegetation including riparian areas, wildlife corridors, wetlands and groundwater-dependent ecosystems (per the Northern Territory Planning Scheme Land Clearing Guidelines (NTPS LCG)) found within and/or adjacent to the proposal area*". The Flora and Fauna Division recommends that this also includes 'closed forests' as a sensitive/significant vegetation type. The inclusion of the word "adjacent" should be clarified to include any area potentially affected by the development.
		The draft ToR require the Proponent to provide "*Descriptive information for listed terrestrial threatened flora and fauna and/or migratory species known or considered likely or with potential to occur within or adjacent to the proposal area. Outlining habitat types, quality and extent of suitable habitat (hectares), landscape context, listing status (TPWC Act and EPBC Act), threatening processes, estimates of population size or abundance and distribution*". • This requirement should also include spatial information and not just be based on "descriptive information". • This requirement should also apply to range restricted, and data deficient species as described above. • The descriptive information provided in the draft EIS should clearly outline the survey and identification efforts undertaken both within and outside the project area. This should include estimates of population parameters that are used to enable a regional context for any impact from the development. At a minimum, for flora this should include *Helicteres macrothrix*, *Typhonium* spp. (including *T. praetermissum*, *T. taylori*, *T. johnsonianum*, *T.* sp. Charles Darwin and *T.* sp. aff mirabile), *Cleome insolata*, *Utricularia singeriana*, *Utricularia dunstaniae*. • Information provided in the draft EIS should explicitly address uncertainty surrounding the identity, distribution and relative abundance of Typhonium species (all currently named taxa and known unidentified entities) identified in previous surveys. This should include verifiable identification records from information incorporating multiple lines of evidence to support the identity of Typhonium plants known to occur within the Project area.
		The draft ToR requires the Proponent to provide "*Spatial information of general habitats and suitable habitat requirements for relevant threatened flora and fauna*". The requirement for spatial information should be combined with the requirement for descriptive information as described above.
		The draft ToR require the "*Identification of any critical or important areas for threatened flora and fauna including consideration of the importance of both small and large areas of habitat, habitat connectivity (e.g., wildlife corridors), their location in the proposal area and areas likely to be important for maintaining terrestrial ecological integrity and functioning*".

		It is recommended that this dot point is reworded to: Identification of any critical or important areas for flora and fauna **taxa of conservation significance** including consideration of the importance of both small and large areas of habitat, habitat connectivity (e.g., wildlife corridors), their location in the proposal area and areas likely to be important for maintaining terrestrial ecological integrity and functioning.
		The draft ToR require that "*Terrestrial ecosystem baseline survey assessments of infrastructure corridors (outside the basin) are to be undertaken. Additional targeted effort within the AROWS basin for relevant listed threatened species* ". It is recommended that the dot point be reworded from "*threatened species*" to "species of conservation significance".
		The draft ToR requires the Proponent to "*Provide detailed maps to support the above descriptions. Outline studies used in the assessment, including their results, limitations and uncertainties*". It is recommended that the Proponent identify and include discussion around the key uncertainties (including taxonomic uncertainties) when undertaking the significant impact assessments.
		The draft ToR require the draft EIS to "*Include detailed technical information, studies or investigations (including data) necessary to support the draft EIS in appendices. Justify the suitability of the methodologies, surveys or processes used to identify/estimate the presence/absence, habitat condition/quality, and potential extent of values within or adjacent to the proposal area".* It is recommended that any technical information provided include the full detail of all data collection. This is necessary to support the conclusions drawn in the EIS and should not be provided as summaries or abridged versions. • Data should be provided in appropriate and readable formats (both numeric and spatial) with appropriate metadata to facilitate assessment (e.g. ESRI shapefiles for spatial data with the geospatial parameters clearly identified). • The dot point only requires the presence/absence of a biodiversity value. It is recommended that the information provided include information about relative abundance as well as presence/absence, where this is relevant to assessment of impacts and risks. • This should include all measures and methods employed to clarify taxonomic uncertainties associated with species of conservation significance (i.e. *Typhonium* spp.). • It is recommended that the following dot points address species specific population parameters (e.g. long-term decline) in accordance with species of conservation significance. It currently only addresses ecological/spatial parameters and not population ones. "Identify, describe, and assess the direct and indirect impacts, including cumulative effects, of implementing the proposal on terrestrial ecosystems and identified environmental values including:

		○ Habitat loss including loss of vegetation communities and habitats for listed threatened fauna and flora and migratory species from land clearing and/or inundation; ○ Habitat fragmentation due to infrastructure development; ○ Habitat degradation for listed threatened fauna and flora and migratory species by noise, light, vibration, dust, weeds, run-off, sedimentation etc; ○ Introduction/or spread of invasive species through workforce, vehicular and equipment movement and new access tracks that facilitate movement of feral predators; and ○ Fauna mortality and injury by collisions with construction vehicles, entrapment in excavations, and basin inundation."
		The draft ToR require the Proponent to "*Determine areas susceptible to these impacts, classifying them as: ……..".* The draft EIS should include all areas influenced by construction, inundation and operation of the Project. This will include areas that have altered hydrological characteristics as a result of inundation and operations around the entire basin. This includes areas that potentially support species of conservation significance and may be impacted by these altered hydrological regimes.
		The draft ToR requires the Proponent to "*Describe any uncertainties and further work required to increase understanding of potential significant impacts and reduce uncertainty. Where uncertainty remains, demonstrate how the precautionary principle has been applied (section 19 of EP Act). Quantify the significance and extent of impacts, at the project level and cumulatively, using relevant guideline thresholds*". No changes are recommended; however the Flora and Fauna Division would expect that any risk assessment provided in the draft EIS would include the identification and consideration of areas of taxonomic uncertainty.
NT EPA Environmental Factor – Aquatic Health		
Draft ToR	General Comments	The ToR is extremely broad. There are three critical areas of concern (i) extraction may impact the extent and duration of floodplain inundation, potentially adversely impacting system connectivity and productivity; (ii) extraction may alter salinity regimes in the tidal freshwater reach, leading to reduction in habitat availability for species with a low and narrow range of salinity tolerance (especially for spawning); and (iii) extraction may interfere with migration processes through entrainment by pump infrastructure, and reduced flows impacting the timing and duration of migration.

		Each of these is mentioned only briefly in the ToR and are not identified explicitly as key concerns. Further comments are provided below.
Main report 5.6.1.1 Aquatic Ecosystems, pp. 156 and 157	Occurrence of largetooth sawfish in project area	The main report suggests that sawfish surveys were undertaken by consultants for the Project with no individuals detected at the study sites either by boat electro-fishing or eDNA. The Flora and Fauna Division notes that this is likely due to the low detection probability of sawfish using the adopted methods. It should be noted that there are numerous records of juvenile sawfish in the freshwater reaches of the Adelaide River which is consistent with the life history of the species. In particular, pupping occurs at the mouth of river systems with juveniles migrating into freshwater reaches for increased growth rate and/or predation refuge. The timing and extent of upstream movements of migrating juveniles might be better answered using acoustic telemetry although it is acknowledged that there are challenges to overcome, including the capture of individuals for tagging.
Main report 5.6.1.4	Other species (not listed p. 161	The main report identified that an unidentified turtle species was detected through eDNA and could only be identified to the level of genus i.e. Emydura. Unassigned taxa are a common feature of eDNA data and does not necessarily imply the presence of an additional, as yet unnamed taxon; rather, a failure to allocate a species-level identification for the detection.
Main report 5.6.2.3 Fauna injury and mortality	Harvesting of organisms by water extraction pumps	The main report notes that "*Water extraction from the river has the potential to cause injury and mortality to aquatic fauna via entrapment in the intake infrastructure*". Of greater significance is the likelihood that the pump infrastructure will disrupt upstream (and downstream) migration of aquatic species including fish and invertebrates (notably including juvenile *Macrobrachium spinipes*). Impacts to these species could be avoided/mitigated by understanding the timing and flow-dependence of these migration events.
Main report 5.6.3.3 Impact mitigation p. 164	Siamese fighting fish management	The main report proposes invasive species controls including Siamese fighting fish management as an impact mitigation for the Project. It is unclear what measures to mitigate or manage this species have been successful or are being proposed by the proponent. Management of this species is likely to be difficult across large areas due to its preference for living in areas with a high density of perennial grass and shallow water with low dissolved oxygen.
Main report 5.6.4 Summary of findings	Mapping distribution of threatened species	The main report proposes that "*Species distribution maps will be developed from information available on species occurrence records and mapping of suitable habitat from field survey results aerial imagery*". This is unlikely to provide useful information due to the scale of the Project area and the sparse amount of data from the area.
Main report 5.6.4 Summary of findings	Fish migration	The main report proposes that "*A fish migration conceptual model will be developed to identify the seasonal/flow related movements patterns of the fish community*". It is recommended that this model is based on studies and literature from the Adelaide River.

Draft ToR 3.6 Aquatic Ecosystems	Environmental Values	The draft ToR require the proponent to provide a "*Field assessment of habitat, water quality, aquatic flora and fauna, and macroinvertebrates that captures seasonal and spatial variation of use in aquatic habitats within and adjacent to the proposal area".* The wording of this requirement is generalised, and it is unclear whether 'assessment' requires estimates of relative abundance or species richness. Furthermore, the inclusion of macroinvertebrates generally is of little value here, and it would be more useful to specify decapod crustacea and molluscs. The use of "seasonal variation" is confusing and appears to refer to just the early and late Dry season. To more concisely outline what is required, it is recommended that this requirement is reworded to: Conduct a field survey of aquatic vertebrate fauna, selected macroinvertebrate species, and macrophytes in representative samples of habitat present within and adjacent to the proposal area. Survey effort to be standardised and quantified; survey design to include seasonal variation i.e. early and late dry.
Draft ToR 3.5 Inland water environmental quality	Potential significant impacts and risks	The draft ToR require that the EIS includes: "*Changes to salinity and/or chemical concentrations within downstream waterways (including Adelaide River) as a result of changes to natural flow regimes from water extraction operations in the Adelaide River and/or basin releases over the spillway or via the LLO*". The Water Resources Division are collecting longitudinal and temporal data on salinity in the Adelaide River with the intention of modelling the effect of extraction scenarios on salinity regime. Increased salinity in the tidal freshwater reach may lead to a reduction in habitat availability for species with a low and narrow salinity range for spawning. There is little data on this, but Berra and Wedd (2017) suggest that Nurseryfish may be impacted. It is recommended that the wording is amended to: Review relevant studies on the effect of extraction on salinity regime and review potential impacts on tidal freshwater fish species. Conduct further studies as required to address key information gaps. Reference: Berra, T.M., Wedd, D. (2017) Salinity and spawning of nurseryfish, *Kurus gulliveri*, in the Adelaide River of northern Australia with notes on electrofishing and photos of a male carrying eggs.
Draft ToR 3.6 Aquatic Ecosystems	Potential significant impacts and risks	The draft ToR require the Proponent to "*Identify, describe and assess direct and indirect impacts of implementing the proposal, and cumulative impacts, on the quality and integrity of aquatic ecosystems*". This should include a review of current studies being undertaken by the Water Resources Division of the effect of flow/extraction scenarios on the extent and duration of inundation using LIDAR data and hydrological modelling, and consideration of the consequences for ecological values of downstream floodplain habitats.
Draft ToR	Avoidance, mitigation and management	The draft ToR requires the Proponent to "*Identify sensitive time periods for threatened and listed species, and/or key ecological functions*".

3.6 Aquatic Ecosystems		While this requirement was included in the ToR, it is noted that there is no explicit requirement to consider the effects of pump extraction on migrating fauna in the catchment. It is recommended that the following is included in the draft ToR to ensure these fauna are also assessed: Identify seasonal and inter-annual variability, in timing and relationship to flow, of key ecological processes including the upstream migration of juvenile cherabin *Macrobrachium spinipes* and other migrating species.
Draft ToR 3.6 Aquatic Ecosystems Avoidance, mitigation and management		It is recommended that this section include consideration of possible design or operation of pump infrastructure so that it avoids disrupting the migration of key species past the extraction point. One of the key species that should be considered is *Macrobrachium spinipes* which is an abundant and important prey item for aquatic predators in the Top End.
Draft ToR 3.6 Aquatic Ecosystems	Environmental values	The draft ToR requires the proponent to provide the: "*Condition of habitat as per the Northern Territory Australian River Assessment Scheme Sampling and Processing Manual*". The Flora and Fauna Division notes that Australian River Assessment Scheme (AUSRIVAS) is limited to freshwater streams and rivers and offers little scope for providing an assessment of habitat availability or quality. It is recommended that this requirement is deleted.
		The draft ToR require the proponent to provide: "*Descriptive and spatial information for listed aquatic threatened species, threatening processes, estimates of population size or abundance and distribution*". There appears to be some uncertainty around the scale and scope of this requirement, for example at what scale should the population size or abundance be provided (i.e. Project area/ Adelaide River/Globally)? To further clarify the scope/scale of the requirement, it is recommended that the dot point be amended to: Review current information on the ecology, distribution and conservation status of listed threatened species occurring within the proposal area, or with the potential to be impacted by the proposal. Review current information on the national and global significance of local populations of these threatened listed species.
		The draft ToR require the proponent to provide an "*Assessment of the importance of habitats for threatened and listed species, and other aquatic values (i.e. fish and macroinvertebrates) in a Territory, national and international context*"

		It is recommended that this dot point is amended to the following so that the draft EIS is focused on the relevant biodiversity values likely to be impacted by the proposal: Identify ecological assets of the Adelaide River and floodplain and assess pathways of impact of the proposal on these assets**.**
		The draft ToR require the proponent to provide the "*Identification and assessment of the importance of key indicator species….*" It is unclear what these particular species "indicate". For example, species might be of interest because they have high conservation value (e.g. threatened elasmobranchs) or may be the focus of future research to address particular issues (e.g. disruption of migration (Cherabin), or altered salinity regime (nurseryfish etc.)), or are weeds that adversely modify habitat. Rather than using the term "indicator" perhaps "focal" species would be a better term. Suggested wording: Identify species, species-groups, or assemblages which may be suitable for on-going monitoring of the Adelaide River system to provide assurance that ecological structure and function has not been impaired.
		The draft ToR require the Proponent to undertake *"Additional targeted surveys including the use of eDNA…"*. It should be noted that using the current methods eDNA produces a large number of unassigned taxa, which require further interpretation. This interpretation would potentially require the sourcing of local reference DNA data, and improved knowledge of the probability of detection for a range of target species.
		The draft ToR refer to "*Biosecurity management and control in relation to weeds and feral animals"* but it is unclear what this specifically refers to. A later section mentions existing invasive and pest species present at the site. It is recommended that the draft EIS include information around how biosecurity will be maintained in the reservoir. For example, will the general public have access to the site? This is important for understanding the risk of new exotic species that may be introduced into the reservoir and the broader Adelaide River catchment.
Draft ToR 3.4 Hydrological Processes	Potential significant impacts and risks	The Adelaide River floodplain is identified on the Directory of Important Wetlands of Australia, with mapped sites within and immediately adjacent to the area of impact. The directory identifies a range of biological and ecological values associated with the site. It is recommended that the draft EIS include an assessment against the criteria and identify/quantify how those values will be impacted through the construction, inundation and operation of the reservoir. In particular, the assessment should quantify any change to the seasonal inundation of the floodplain habitat downstream noting that these areas are nesting habitat for species such as the Magpie Goose.
Draft ToR	References	The draft ToR refer to: DENR 2020. Land clearing guidelines. Department of Environment and Natural Resources: https://nt.gov.au/property/land-clearing

		It is recommended that this is updated to: Northern Territory Planning Scheme Land Clearing Guidelines. Department of Lands, Planning and Environment, Northern Territory Government, Darwin: https://nt.gov.au/__data/assets/pdf_file/0007/236815/land-clearing-guidelines.pdf

Attachment 2

Submission on the Proponent Initiated Environmental Impact Statement Referral (PIER)

Department of Logistics and Infrastructure (DLI) - Adelaide River Off-stream Water Storage (AROWS)

This submission is made under regulation 53 of the Environment Protection Regulations 2020

Government authority: Department of Lands, Planning and Environment – **Water Resources Division**

Summary: A Water Allocation Plan (the Water Plan) is underway for the Adelaide River Catchment which will guide water management in the area. The Water Plan is proposed for mid-2026. The project will be subject to a number of licensing and permit requirements under the *Water Act 1992*. Findings of the EIS will inform assessments under the *Water Act 1992* and subsequent conditions as appropriate.

From a technical perspective the Water Resources Division recommends that the proponent be required to assess coastal processes factor through the EIS. While evidence from water modelling indicates that impacts to river flows will be negligible at the coast, a sufficient evidence base to confirm that flow is a suitable proxy for other impacts to coastal processes, marine environmental quality, and marine ecosystems has not been cited. Other recommendations have been made with respect to assessment of water quality impacts as detailed below.

Section of Referral	Theme or issue	Comment
N/A	Regulation under the Water Act	A Water Allocation Plan is under development for the Adelaide River Catchment (the Water Plan). Once declared the Water Plan will share water between competing uses, identify values of the resource and provide guidance to decision makers including the Controller of Water Resources. The Water Plan will provide catchment scale management arrangements, some arrangements may be tailored to align to resource characteristics for a particular area or zone. The Water Plan will not identify specific controls appropriate for the AROWS project. The Water Plan is proposed to be declared in mid-2026. As identified below, the AROWS project will require a water extraction licence. Assessment of a water licence application will take into account measures in the plan, recommendations of the NT EPA and site-specific information. If granted, a water licence may specify the volume of water which may be taken and impose conditions on take (for example directing timing and rates of take), and conditions to monitor take (for example including metering and water monitoring).

Referral Report *Environment Protection Act 2019*- Table 4-2 Page 66 Hydrology Impact -*Modelling Limitations* -Assessment *Extraction Rules and Scenarios* -*Recommendations*	Management of Impact on Water	The AROWS referral report has been reviewed by Water Regulation. The report adequately addresses the potential environmental impacts from a Water Regulation perspective. Water Regulation have commented on licensing and permit requirements under the *Water Act 1992* that will be required for this project and how they incorporate assessment of the impacts that the development will have on the environment and other water users. The proponents have acknowledged the licensing and permit requirements for the project in Table 4-2 of the document. A surface water extraction licence under section 45 of the *Water Act 1992* will be required. The Controller of Water Resources (Controller) will determine whether to grant a licence in response to an application under this section and must take in to account relevant factors in the decision. The relevant factors are listed under section 90 of the *Water Act 1992*. A groundwater extraction licence may be required under section 60 of the *Water Act 1992* in order to extract water from a bore for project construction supply purposes. The same factors under section 90 of the *Water Act 1992* must be considered by the Controller. A 'permit to interfere with a waterway' may be required under section 41 of the *Water Act 1992* for the AROWS project. A number of mapped order 1 and 2 streams intersect the project area. The Controller must consider the factors under section 90 of the *Water Act 1992* when determining whether to issue a permit. The Proponent advised that modelling used for the submission of the Proponent-initiated EIS referral is currently being updated and will be replaced in the EIS phase. The Proponent acknowledged a list of modelling requirements to include in the EIS phase such as defining ecological flow thresholds to correlate hydrological changes with ecological impacts. From a water licensing perspective, the presentation of how simulated hydrological changes might translate to impacts on the environment and other water users will be required so that specific licensing conditions can be recommended to manage the impacts.
Referral Report *Environment Protection Act 2019* Section 5.4.2.5 Page 135	Groundwater mounding	Hydrogeological modelling to be conducted as part of the EIS, especially in construction impacts. The findings thus far appear reasonable. Emphasis should be placed on implementation of a groundwater monitoring program (water level) that encompasses sites where mounding is anticipated beyond the basin boundaries.

Table E-1 & Section 5.1.3 Pg. 73	Factors and objectives screened out of the assessment	With respect to Coastal processes, marine environmental quality, and marine ecosystems, the referral report states: *"Due to the large tidal regimen of the Darwin region (which can exceed 8m during spring tides), water flows vary significantly across the tidal range making mangrove environments tolerant to a range of fresh and saltwater interfaces. The variable bathymetry of the mouth of the Adelaide River also influences the local tidal curves, with mixed level highs and lows that can differ day to day and across seasons. Within a highly variable tidal environment, minor changes in water levels from upstream river flows during the peak of wet season flows are unlikely to have a notable impact on the coastal environment, particularly because freshwater influx from the Adelaide River catchment is a very small portion of the overall coastal water volume."* Proponent's modelling has been used as a line of evidence screen out impact on 'Coastal Processes'. Clarification and a referenced evidence base is needed to support the Proponent's claim that tidally induced flow velocities will negate impact of upstream extraction at the mouth. 'Marine environmental quality' and 'Marine ecosystems' themes were not discussed, nor was justification for dismissing these aspects provided. No studies or surveys of the marine receiving ecology were cited. The Water Resources Division recommends that coastal processes, marine environmental quality and marine ecosystems should be included in the scope of the Environmental Impact Assessment. (from: *guide-ntepa-environmental-factors-objectives*.pdf and *referring-a-proposal-to-the-nt-epa*.pdf)
Section 5.2.4 Pg. 85	Acid Sulfate Soils (PASS/AASS)	We agree that comprehensive assessments need to take place to characterise the presence and potential impact of Potential Acid Sulfate Soil (PASS)/Acid Sulfate Soils (ASS). In addition to potential impacts noted for soils and water bodies, PASS/ASS could have detrimental effects on groundwater systems if triggered by the Project.
Section 5.5.1.2 Pg. 145	Groundwater Quality	"*Further, it is noted that DLPE are in the process of undertaking a groundwater assessment study across the Adelaide River Catchment as part of the water allocation planning process. Findings from this study may be included in discussions on the catchment context within the EIS.*" The focus of scientific studies to support the Adelaide River Catchment Water Allocation Plan (WAP) is surface water. It is not anticipated that there will be comprehensive groundwater quality assessments undertaken by DLPE through the planning process. Figure 5.25 shows that groundwater along the Adelaide River has TDS >1000 mg/L and is 'not fit for human consumption'. If the river is the mechanism for delivery of saline water to the aquifers along the river channel during dry season, impact of increasing saline intrusion needs to be assessed in conjunction with impacts from the basin storage raised in Section 5.5.2.6. Increased channel salinity or greater upstream travel has potential to impact riverbank vegetation and in-stream ecosystems.

Section 5.5.2 Table 5-15 Pg. 148	Potential impacts on inland water environmental quality	This table excludes potential impacts to groundwater quality as a result of changing the freshwater-saltwater interface in the river.
Section 4.3 Table 4-3 Page 69	Environment Classification	5th row of Table 4-3 describes the baseline environmental condition as "*slightly to moderately disturbed*". The source of this classification is not cited.
Section 5	Operations	Use of chlorine or fluoride dosing on site in operations phase not mentioned or assessed. Risk of any other chemical spills during operation were not assessed.

Attachment 3

Submission on the Proponent Initiated Environmental Impact Statement Referral (PIER)

Department of Logistics and Infrastructure (DLI) - Adelaide River Off-stream Water Storage (AROWS)

This submission is made under regulation 53 of the *Environment Protection Regulations 2020*

Government authority: Department of Lands, Planning and Environment – **Mining Division**

Summary: Consideration of economic and social impacts of the proposal to mining not adequately demonstrated

Section of Referral	Theme or issue	Comment
Consultation & ToR Section 3.8 Community and Economy – Potential Impacts and Risks	Economic and Social Impacts and Risks and Stakeholder Identification and Engagement and consultation (knowledge gap)	The proposed infrastructure reserve corridor extending from the AROWS catchment infrastructure area to the Strauss Water Treatment Plant intersects the following: • a granted Extractive Mineral Permit (Mineral Title – EMP30881) held by Yebna Sands Pty Ltd for the potential future expansion of the Acacia Quarry (Deemed Mining Licence 0549-02); and • the existing access roads for the operating Acacia Quarry (occurring on EMP28311). As such the AROWS proposal has the potential to impact both the existing operation of the Acacia Quarry and its potential future expansion; however, the proposal does not demonstrate that the Proponent has consulted with the Mining Operator in relation to potential economic or social impacts. The Mining Division recommends that Section 3.8 of the draft ToR be revised to require specific consideration of potential impacts to mining operations and stakeholder engagement with mining operators.

ToR Section 3.8 Community and Economy – Environmental Values	Economic and Social Impacts (knowledge gap)	The AROWS proposal has resulted in the General Reservation of Land (RL32761) to *"…protect the future off-stream water storage area from potential impacts from mineral exploration and mining activities…"* (Northern Territory Government Gazette No. G33, 18 August 2021). This has resulted in the preclusion of the grant of mineral titles to industry and any potential mining activity from occurring within a 588km^2 area in a region that is in close proximity to the Darwin area and Stuart Highway. While the area is small in relation to the total size of the Territory, it should be noted that areas in relatively close proximity to logistical hubs and major roads generally have a higher mining development potential, due to generally lower development and operating costs. The Mining Division recommends that Section 3.8 of the draft ToR be revised to specifically require that the social and economic profile effects of the proposal be identified and described.

Attachment 4

Submission on the Proponent Initiated Environmental Impact Statement Referral (PIER)

Department of Logistics and Infrastructure (DLI) - Adelaide River Off-stream Water Storage (AROWS)

This submission is made under regulation 53 of the Environment Protection Regulations 2020

Government authority: Department of Lands, Planning and Environment – **Heritage Branch**

Summary: Heritage Branch advises that the Terms of Reference and the Referral Report are generally satisfactory under the *Heritage Act 2011*, but additional archaeological survey work may need to be undertaken, and that greater consideration of the water treatment plant (and pipeline) location is necessary.

Section of Referral	Theme or issue	Comment
Archaeological Survey Report – Not submitted as part of EIS	Continuing assessment of the potential risk of impact to undiscovered Aboriginal archaeological places and objects.	• The Heritage Branch acknowledges that the Proponent has commissioned a systematic archaeological survey of the project footprint in 2020 (referenced, but not submitted as part of this EIS referral). The engaged consultant did not identify any Aboriginal archaeological places and objects during the survey and recommended no further work was necessary to meet obligations under the *Heritage Act 2011*. • The Heritage Branch notes that survey coverage was relatively low intensity (averaging 200m between transects) and the consultant acknowledges ground surface visibility was relatively low in large portions of the AROWS project area. • The Heritage Branch has concerns that there may remain a risk to undiscovered Aboriginal archaeological places and objects within the surveyed project area. The Heritage Branch will undertake in-house fieldwork to assess the methodology, conclusions and recommendations of the survey to determine if additional work needs to be undertaken, and to what standards.
Referral Report Section 5.9.2.1	Current extent of surveys may be insufficient to manage risk to heritage places and objects (including Aboriginal	• The Heritage Branch has concerns that the archaeological assessment has not covered the total disturbance footprint as highlighted in the EIS submission. We acknowledge that this footprint is still under refinement, and that the proponent has committed in the EIS to additional surveys to cover the total project area (Section 5.9.2.1). • The Heritage Branch understands that the proposed Strauss Water Treatment Plant is outside of the scope of this project. However, we have concerns for direct impacts to unrecorded wartime-era historical sites within the proposed site, as well as both direct and indirect impacts to the declared heritage place **'WWII Noonamah Railway Siding and Store Depot'**. The railway siding, camp and stores depot combine to form what is the only example of such a precinct in the Territory and is a significant element of the Territory's wartime heritage. Use of the land immediately adjacent may be unsuitable for a water treatment plant and construction of a pipeline within 50m of the heritage place before such an assessment is undertaken is problematic. We strongly recommend an assessment of the site suitability and its risk to nearby declared heritage places and unrecorded archaeological or historical places is undertaken, as the results of this

	archaeological places and objects)	may have a considerable impact on the proposed treatment plant and pipe alignment. Please contact the Heritage Branch for further information on 08 8999 5039. • The Heritage Branch acknowledges the commitment to further stakeholder consultation in Sections 5.9.1.2 and 5.9.1.4. • The Heritage Branch advises that a template unexpected finds protocol and ancestral remains protocol can be provided to the proponent on request. These protocols will guide the proponent through their obligations under the relevant Acts (Section 5.9.2.4). • The Heritage Branch advises that all proposed heritage mitigation negotiated with Traditional Owners and Custodians must comply with the *Heritage Act 2011* (Section 5.9.3.2). The Branch can provide feedback for proposed mitigation strategies on request. • The Heritage Branch acknowledges the proponent commitment to future works in Section 5.9.4, including additional surveys and the development of a Cultural Heritage Management Plan. This is the most effective way to manage heritage for a project of this nature.
Draft ToR	Satisfactory	• The Heritage Branch are satisfied with the proponent draft ToR in relation to the *Heritage Act 2011*. No changes are proposed at this time.