

Ms Sarah Smith
Department of Environment, Parks and Water Security
Floor 1, Arnhemica House, 16 Parap Street, Parap
Darwin NT 0801

Dear Ms Smith

Re: Draft Environmental Impact Statement Australia-Asia PowerLink Project

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

Flora and Fauna Division

The Flora and Fauna Division reviewed the draft EIS and have provided comments in the attached table found at Appendix 1.

It is recommended that the Northern Territory Environment Protection Authority (NT EPA) request further information, additional monitoring, and further assessment of impacts to threatened species and significant and sensitive vegetation as described in the table.

Parks Division

The high recreational value for hunters in Shoal Bay needs to be observed.

The overhead power lines in Black Jungle may affect:

- Rainforest and associated threatened flora species such as *Ptychosperma macarthurii*
- Large areas of modelled habitat for *Typhonium praetermissum*;
- Drainage lines, which have the potential to support *Stylidium ensatum*; and
- Undefined Aboriginal cultural values and Sacred Sites.

Rangelands Division
Weed Management Branch

Comment	EMP section / topic	Comment
1	Significant omission	<p>The Australian Government listed ecosystem degradation, habitat loss and species decline due to invasion of northern Australia by introduced gamba grass (<i>Andropogon gayanus</i>), para grass (<i>Urochloa mutica</i>), olive hymenachne (<i>Hymenachne amplexicaulis</i>), mission grass (<i>Pennisetum polystachion</i>) and annual mission grass (<i>Pennisetum pedicellatum</i>)' as a key threatening process (KTP) under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). This initiated the development of the Threat abatement plan (TAP) to reduce the impacts on northern Australia's biodiversity by the five listed grasses (TAP).</p> <p>All five species do or are likely to occur adjacent, upstream or within the OHTL and or Murrumujuk footprint.</p>
2	Weed Management plan	<p>This report states "The purpose of this report is to identify and describe the relevant threatened species, significant vegetation types and threatening processes to such a degree as to be able to identify the need for any further surveys and to inform an impact assessment". As such, section 2.2 Significant Vegetation - The 5 grasses listed as a key threatening process should be discussed as they pose a direct threat to all listed vegetation types in this section.</p> <p>As noted by the proponent in other sections, the EPBC Act allows for the listing of threatened ecological communities and that a significant threat to these communities is the key threatening process of the 5 listed grasses. DEPWS advises that the 5 listed grasses are also a threat to threatened ecological communities.... This should be noted.</p>
3	Weed Management plan	<p>Split declaration: WMP does not have a clear definition of what a split weed declaration is and what it means for the plan. This is for Mimosa, Rubber bush and Gamba grass.</p>
4	Buffer area	<p>The plan covers a 120m buffer from the corridor centre along the railway line. However it does not recognise any weeds outside this buffer area that may have an impact on the corridor (disturbed soils and vegetation). Weeds that occur on adjacent parcels or upstream of the subject area should be addressed. This includes prickly acacia on Murrnji Stn, Siam weed in the Top End areas at a minimum.</p>
5	Buffel grass	<p>Buffel grass (<i>Cenchrus ciliaris</i>) is not declared in the NT but is of concern to some stakeholders in the Tennant Creek region. Addressing this species in the WMP is recommended as it is in the Tennant Creek Regional Weed Strategy 2021 -2026. The proponent should be aware of the fire risk to infrastructure from the introduction or spread of buffel grass in southern sections of the project. Buffel grass can be spread inadvertently and effective weed hygiene practices will be required to prevent further spread.</p>

6	Section 10 Reporting and Responses	Outside of the annual Weed Management Report, upon request from the NT Weed Management Branch all reports and or records pertaining to any specific weed related actions or incidents within the project areas should be made available within 5 business days.
7	Solar Precinct / overhead transmission line	The solar precinct and overhead transmission line within the Tennant Creek region occupies areas which are relatively weed free. It is important that the proponent implements strict weed hygiene practices during all stages and areas of development and operation. To maintain weed free areas and prevent weed spread. Weed hygiene declarations should be considered for all vehicles entering the development area as well as activities that may increase the introduction of new weeds.
8		Lake Woods is recognised as wetland of international significance due to its wildlife aggregations and wetland values. To help protect these values Consolidated Pastoral Company who currently have the pastoral lease in which Lake Woods occupies, has an agreement with the Northern Territory Government to implement a Conservation Management Plan. The proponent should be aware that Consolidated Pastoral Company was awarded over \$1 million through the Commonwealth Government's Biodiversity Fund in 2011. Funding was allocated to control parkinsonia around Lake Woods and Longreach Waterhole. The weed control work is ongoing and there has been a significant reduction in parkinsonia since the implementation of the control program. It is important that new weeds are not introduced or existing weeds spread within the lake system. Implementation of regular monitoring of tracks and roads that intersect creeks within the Lake Woods catchment should be implemented to ensure weeds do not establish and spread within the lake.

Water Resources Division

The Powell Creek Solar Precinct is located in the Daly Roper Beetaloo Water Control District, the Darwin Converter site and Cable Transition facilities are located in the Darwin Rural Water Control District, and the overhead transmission line traverses from the Solar Precinct to the Darwin Converter site predominantly through the Daly Roper Beetaloo Water Control District, before terminating in the Darwin Rural Water Control District.

Comment	EMP section / topic	Comment
1	Groundwater	Groundwater Assessment has limited comments regarding improvements to this draft EIS. From a groundwater resources perspective, the proponent has shown adequate understanding of the existing environment and potential impacts to groundwater systems across the project extent.
2	Chapter 6 page 6-14 Section 6.3.2.3 Groundwater Systems	Pine Creek Oregon (typo), should read Pine Creek Orogen. Please ensure Orogen is spelled correctly throughout the draft EIS.
3	Groundwater	The proponent states that additional hydrogeological investigations will be undertaken prior to drilling and

		<p>installation of water supply bores at the Powell Creek Station Solar Precinct as well as the Darwin Converter Site.</p> <p>These additional hydrogeological investigations should include groundwater modelling to demonstrate that groundwater extraction for water supply will have no deleterious impact on groundwater levels at nearby receptors (e.g. stock bores and nearby springs). These additional investigations should be provided to the Minister / Department for assessment and review.</p>
4	Groundwater	<p>It is also noted that the draft EIS does not include a proposed groundwater monitoring program for the Solar Precinct and the Darwin Converter Site.</p> <p>However, it is anticipated that the Surface and Groundwater Management Plan completed as part of the Construction Environmental Management Plan will include a groundwater monitoring program outlined for the construction and operational stages of the project.</p>
5	Licensing	<p>Detail is included regarding the requirements for the extraction of water in accordance with a licence as per the requirements of the <i>Water Act 1992</i>.</p> <p>Impacts to surface water flows and interference with a waterway from the installation of the overhead power line is mitigated within the EIS through the use of existing service corridors and placement of overhead power poles away from a waterway.</p>
6	Surface Water	No issues of concern requiring comment have been identified.

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

5 July 2022

Submission on the Draft EIS

NT EPA Draft EIS – Australia-Asia PowerLink Project

Government authority: Flora and Fauna Division DEPWS

Section of Draft EIS	Theme or issue	Comment
Chapter 9 & Chapter 10	Marine: Physical Environment	Information on the existing environment should incorporate geomorphic and predicted mud, sand and gravel layers and data layers and interpretation of sediment chemistry characteristics (Nicholas et al 2019) available as part of the Darwin Harbour – Bynoe harbour habitat mapping program (data package - Siwabessy et. al. 2020).
Chapter 9, P9-5 & 9-13	Marine: Turbidity – Light attenuation	<p>Modelling the relationship between turbidity, measured as NTU, and light attenuation through the water column requires more detailed information of components of total suspended solids (TSS), including particulate inorganic matter (PIM), particulate organic matter (POM) and the colour of dissolved organic matter (CDOM). These relationships are site specific and cannot be reliably transferred from other regions, especially not using Cardno (2013) derived relationships which were based on inner Darwin Harbour environments that are dominated by mangrove habitats.</p> <p>Until this relationship is established, the proponent cannot reliably place impacts to benthic primary producer habitats from elevated TSS and changes to light availability at the seafloor into context and set triggers for mitigation actions.</p> <p>The Flora and Fauna Division recommends that further data is sought and water quality monitoring is undertaken if necessary to establish: (a) the relationship between turbidity and light attenuation, and (b) the natural variability between seasons, so that appropriate TSS triggers for benthic primary producer habitats can be developed.</p>
Chapter 9, Table 9-1, Figure 9-2	Marine: Geomorphology	<p>Table 9-1 and Figure 9-2 seem to be incomplete. Geomorphic features from the Darwin Harbour – Bynoe Harbour habitat mapping project are not displayed in Figure 9-2 See Nichols et al (2019).</p> <p>Further, it is unclear how the proportion of each geomorphic feature intersecting the cable corridor is calculated in Table 9-1. Is this based solely on what was mapped by Geoscience Australia or the whole corridor area?</p>

		The Flora and Fauna Division recommends including geomorphic features from the Darwin Harbour – Bynoe Harbour habitat mapping project, and undertaking additional analysis of bathymetric data for which no geomorphic data are available, so that Table 9-1 will be more representative of features present.
Chapter 9, Table 9-2	Marine: Sediments	<p>It is unclear why Table 9-2 states that Shoal Bay is unsurveyed and sediments are “<i>Thought to be sandy with scattered rocks and mud</i>”, even though in the first paragraph of section 9.3.2.4 states that it was extensively surveyed as part of the Darwin Harbour – Bynoe Harbour habitat mapping project.</p> <p>Information on the existing environment should incorporate predicted mud, sand and gravel layers (Nicholas et al 2019) available as part of the Darwin Harbour – Bynoe Harbour habitat mapping program (data package - Siwabessy et. al. 2020).</p>
Chapter 10, P10-12	Marine: Threatened and/or migratory species	<p>The Draft EIS states: “<i>Threatened and/or migratory species which may occur, or which utilise benthic habitat, within the area of influence include turtles (Loggerhead, Flatback and Olive-Ridley), Dugongs, Sea snakes, elasmobranchs, Estuarine Crocodiles, Pygmy Blue Whale, and Whale Shark</i>”</p> <p>Although Appendix T (Marine Ecology Report) notes that Hawksbill turtles are likely present within the zone of influence, the draft EIS seems to have omitted that they may occur in Shoal Bay. The Flora and Fauna Division recommends that the Hawksbill turtle is incorporated into the risk assessment for nearshore waters.</p>
Chapter 10, P10-26	Marine: Benthic habitats	<p>The Flora and Fauna Division supports Sun Cable’s commitment to undertake additional benthic surveys for either the southern or northern cable route to verify predicted modelling outputs and characterise the benthic physical environment.</p> <p>Besides characterising the benthic environment solely within the cable corridor, the proponent should map/characterise sensitive receptors within the zone of influence, in particular for benthic primary producer habitats (corals, macro-algae and seagrass, or a mixture of these communities). This will inform site selection for WQ monitoring sites to monitor TSS / SSC and light availability at the seafloor (see Factor Marine Environmental Quality) during and post cable laying activities within NT waters.</p>
Chapter 10, P10-27	Marine: TSS, SSC risk assessment	<p>Turbidity will increase for about a month during cable laying activities in nearshore waters.</p> <p>To mitigate this impact, the Flora and Fauna Division recommends that, if possible, cable laying is confined to the late Wet, when nearshore waters generally have elevated total suspended sediments and seagrass habitats remain dormant until light availability at the seafloor improves at the start of the Dry and triggers seagrass regeneration (see factor Marine Ecosystems).</p>

<p>Chapter 10, P10-32</p>	<p>Marine: Benthic habitats Risk assessment</p>	<p>The draft EIS concluded that the residual impact to benthic habitats from direct disturbance or loss of benthic habitat is minor.</p> <p>The Flora and Fauna Division considers lumping benthic habitat into a single category is not appropriate.</p> <p>The potential impacts of cable laying on benthic species depend on biological processes including feeding mechanism, mobility, life history characteristics, stage of development and environmental conditions. These drivers are different for each community group (corals, macro-algae, seagrass and filter feeder communities).</p> <p>As such, the Flora and Fauna Division recommends that the draft EIS reviews impacts to each of the individual community types in terms of their tolerance to changing environmental conditions, the duration of these changes and mitigation options, such as timing of project activities to minimise their vulnerability to cable laying.</p> <p>The draft EIS briefly refers to WAMSI (2019) on page 10-32. However, it should apply the recommendations provided in various reports presented on the WAMSI Dredging Science Node¹ in more detail, so there is a clearer understanding of site specific impacts and changes of environmental conditions specific to the individual sensitive receptors.</p> <p>The Flora and Fauna Division agrees with the conclusion in the draft EIS that the Dry season period is important for maintaining health of benthic primary producer habitats. Therefore the Flora and Fauna Division recommends that, if possible, cable laying is restricted to the late Wet when monsoonal activity is at its greatest, where WQ is at its poorest, and when seagrass/macro-algal habitats remain dormant until light availability at the seafloor improves at the start of the Dry and triggers regeneration. Further, early Wet (September – December) is also considered unfavourable for cable laying as anecdotal evidence points towards this being a coral reproductive period, and elevated TSS up to 3.2 mg/L may cause decline of coral health through bleaching and tissue damage².</p> <p>Further, using time series plots and accompanying assessment in conjunction with sensitive receptors is not meaningful. Figures 10-7 and 10-8 seem to suggest that elevated TSS will not impact on sensitive receptors. However, it only can show the relationship between elevated TSS and WQO at a chosen site. The draft EIS cannot state with any confidence that a sensitive receptor is actually present at a chosen site, because it is based on predicted models. The use of the predictive benthic habitat map should be used carefully as there are known errors in the predictive benthic habitat model. For example, it is unlikely that coral exist at HC3 and HC4, as this location</p>
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¹ <https://wamsi.org.au/research/programs/dredging/>

² Tittle, LJ and Donahue M 2022. Effects of sediment exposure on corals: a systematic review of experimental studies. Environmental Evidence (2022) 11:4. <https://doi.org/10.1186/s13750-022-00256-0>

		<p>consists of large sand waves devoid of any benthos (DEPWS, towed video benthic habitat database). However, the substrate type (i.e. sand) does explain why elevated TSS are lower than other plots in Figure 10-7.</p> <p>For the draft EIS to relate modelled TSS concentrations to sensitive receptors, the Flora and Fauna Division recommends that further benthic habitat mapping is undertaken where sensitive receptors are likely to occur, followed by WQ sampling/monitoring at sites with known sensitive receptors. This will help establish the tolerance to TSS and setting of appropriate triggers for adaptive management.</p>
Chapter 10, P10-34	Marine: Land based lighting impact on fauna	<p>Given the topography on Gunn Point peninsula is relatively flat, light pollution from Sun Cable's infrastructure may impact on migratory and threatened species.</p> <p>The Flora and Fauna Division recommends that infrastructure design follows National Light Pollution Guidelines³</p>
Appendix R, Section 5.0	Marine: 'Plume' modelling	<p>Plume modelling undertaken and outputs in the draft EIS are acceptable, given the underlying data and assumptions, and modelling approach. However, the Western Australian Marine Institute – Dredging Science Program recommends that hydrodynamic model and associated plume / sediment transport modelling is undertaken in 3D, rather than 2D⁴.</p> <p>Once the proponent has decided on the cable laying path and undertaken benthic and geotechnical surveys for the preferred path in Shoal Bay, the Flora and Fauna Division recommends that they revisits plume modelling and sediment transport modelling for the Shoal Bay cable laying campaign and consider using 3D modelling techniques in conjunction with the below mentioned long-term monitoring data.</p>
Appendix S, Part 4.0	Marine: Water quality (WQ)	<p>The draft EIS has not collected site-specific baseline WQ data.</p> <p>To mitigate this information gap, the draft EIS has used INPEX monitoring data from Lee Point, Lee Point Site 02. However, there is no explanation why this site was chosen above the INPEX monitoring site SPO 01 (Cardno, 2015, report L384-AW-REP-10204), which is located between the two proposed cable routes and is more likely to be representative of WQ within the cable corridors in Shoal Bay. However, if the southern route is chosen as the cable corridor, then Lee Point sites together with SPO 01 are adequate to inform risk assessment.</p> <p>The proposed monitoring program is unlikely to be suitable for setting triggers (e.g. for coral communities at Gunn Point). As such, the Flora and Fauna Division recommends further WQ monitoring at selected areas where receptors occur. These monitoring sites should preferably be established before cable laying takes place, so that</p>

³ National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020

⁴ [Dredging Science Program – Western Australian Marine Science Institution \(wamsi.org.au\)](http://wamsi.org.au)

		site specific triggers can be determined and an appropriate reactive monitoring program can be designed. If the monitoring program is implemented, then the design of the monitoring program should include establishing turbidity / light attenuation relationships (see above), as light condition will be the main driver for health of benthic primary producer habitat.
Appendix S, P29	Marine: Water quality	The use of report cards should be used carefully. The DEPWS monitoring data unpinning the report cards is collected for surveillance or ambient purposes and the data is somewhat skewed for dry season and neap tidal conditions to mitigate the confounding influence of tide and season. The report cards applicability for spring tide and/or wet season is constrained.
Chapter 2 – section 2.4.3.2	Terrestrial: Access road	It is unclear why there is a need for two different access routes if the bitumen access road is an all-weather road. The Flora and Fauna Division recommends removing one of the roads if feasible.
Chapter 2	Terrestrial: Vegetation clearing	Is there additional clearing required for construction camps, borrow pits and the concrete batching plant beyond the facilities and OHTL footprints? If so, this may require additional assessment.
Chapter 5	Terrestrial: Fauna impacts	<p>In general, there is a lack of justification for the assessment of impacts on threatened fauna species. References are out of context or no evidence is provided for the statements being made. Potential impacts should be assessed against the EPBC significant impact criteria.</p> <p>There are several components for which there is a need for trenching, yet the impacts of trenching on fauna are not assessed. The Flora and Fauna Division recommends that the impact of trenching on fauna is assessed and management of risks are clearly defined.</p>
Chapter 5 – section 5.4	Terrestrial: Fauna impacts	<p>Impacts stated in the ToR that are not covered in the draft EIS assessment include:</p> <ul style="list-style-type: none"> - direct disturbance of fauna and fauna habitat as a result of clearing; - indirect impacts to fauna habitat due to changes to water quality, introduction or spread of weed or pathogens or pest species, fragmentation and edge effects; - indirect impacts to fauna as a result of reduced habitat availability; - direct impacts to fauna as a result of collision with overhead transmission lines; - direct impacts to fauna as a result of collision with vehicles or equipment, including solar panels; and - changes to fauna behaviours as a result of noise or lighting from proposal areas, including potential glare from solar panels or the ‘lake effect’ (solar farm mistaken for a water body).

		The Flora and Fauna Division recommends that all impacts are assessed consistent with the ToR.
Chapter 5 – section 5.4.1.2, section 5.4.3.2	Terrestrial: Waterbirds	<p>Section 5.4.1.2 states that because the usual extent of Lake Woods is over 10 km away, it is not considered to be within the area of influence. The ToR states that the ‘lake effect’ should be assessed as a potential impact. Waterbirds undertake regional movements between waterbodies within the NT and movements to waterbodies in other states, and move through the area during trans-continental migrations. The distance to Lake Woods is small in comparison to these movements and there is a high likelihood that waterbirds would regularly fly over the solar array. Therefore, it is suggested that Lake Woods is incorporated into the Area of Influence.</p> <p>Section 5.4.3.2 states that very few birds regularly migrate within Australia, as patterns are more ‘boom and bust’. This does not fully characterise the dynamics of birds in the region of interest. As well as having high inter-annual variability (‘boom and bust’), there is a seasonal component to surface water availability, and waterbird occurrence and abundance. The different reasons for movements of waterbirds in Australia to those in North America, where cited studies were undertaken, do not justify there being a lower risk to Australian species from solar arrays.</p> <p>The Flora and Fauna Division recommends that Lake Woods is incorporated into the Area of Influence, particularly in the context of waterbird movement to and from the lake over the solar array.</p>
Chapter 5 – section 5.4.2.4, section 5.4.3.1	Terrestrial: Pest animals	Food waste is addressed as a potential cause of an increase in pest animals. Additional water sources can also increase the activity of pest animals, both predators and herbivores, and should be addressed in the draft EIS.
Chapter 5 – section 5.4.2.6	Terrestrial: Direct fauna mortality	It is not clear whether night driving will be required for the project. Night driving increases the risk of vehicle strike to the Greater Bilby and should be assessed/mitigated in parts of the development where this species occurs. Ideally, driving will be constrained to daylight hours.
Chapter 5 – section 5.4.2.8	Terrestrial: Noise and lighting	It is stated that noise will meet residential criteria ~600 m from the works, but then states that the impacts of noise and lighting on fauna will likely be limited to a few hundred metres from the source. It is also stated that the Darwin Converter Site and Cable Transition Facilities footprints do not contain sensitive receptors to noise or lighting, and that desert landscapes are less likely to contain species that are sensitive to noise or lighting. These statements should be supported by literature and/or reference to project ecological studies.
Chapter 5 – section 5.4.3.2	Terrestrial: Bird collisions with transmission wires	The assessment is focused on the OHTL utilities corridor. There is no assessment of if/how the powerline may impact birds that are moving across the landscape to or from Lake Woods that may be susceptible to powerline collision. Given the proximity of Lake Woods to the powerline, and the numbers of waterbirds that it can support in flood, this risk of collision should be included in the assessment and the risk potentially reduced through mitigation.

Chapter 5 – section 5.4.3.2	Terrestrial: Bat collisions with transmission wires	No reference to literature has been provided to support the statement that bats are too small and agile to have a negative interaction with powerlines. This statement forms the basis of the conclusions regarding this issue throughout the chapter. Bat collisions with barbed wire fences indicate that linear structures can lead to collisions. The Flora and Fauna Division recommends that the assessment of potential for bat impact with powerlines is evidence-based.
Chapter 5 – section 5.5 Appendix P Appendix O	Terrestrial: Threatened species	<p>No individual assessment is provided for the following threatened fauna species listed in the ToR:</p> <p>Painted Honeyeater, Princess Parrot, Night Parrot, Brush-tailed Mulgara, White-throated Grasswren, Masked Owl (northern mainland), Red Goshawk, Partridge Pigeon (eastern), Crested Shrike-tit (northern), Nabarlek (Top End), Northern Quoll, Arnhem Leaf-nosed Bat, Black-footed Tree-rat (Kimberley and mainland Northern Territory), Northern Brush-tailed Phascogale, Water Mouse, Fawn Antechinus, Arnhem Land Gorges Skink, and Plains Death Adder.</p> <p>Of particular note are the Black-footed Tree-rat (Kimberley and mainland Northern Territory), Fawn Antechinus and Masked Owl (northern mainland), which Stokeld et al. (2020; https://www.ntlis.nt.gov.au/mpds/get_file?file_id=8602) classify as high value species for the Gunn Point area.</p> <p>The Flora and Fauna Division recommends that individual impact assessments are described for all threatened fauna with a medium-high likelihood of occurrence within the project footprint.</p>
Chapter 5 – section 5.5.2, section 5.5.3, section 5.5.4.8, Table 5-10 Appendix O	Terrestrial: Threatened species	<p>No Greater Bilby sign was recorded during surveys of the Solar Precinct. However, there are known records of the species from the railway corridor in and close to the Solar Precinct footprint from 2008. An assessment based on one survey in the proposal footprint found that the Solar Precinct is unlikely to contain core habitat or support persistent/regular occurrence of the species, and that habitat suitability is 'marginal'. Based on the unpredictable movement ecology of bilbies and the proximity of the withheld records, the Flora and Fauna Division suggests that this species needs additional assessment. Given the previous records of Greater Bilbies at the Solar Precinct, the Flora and Fauna Division recommends that follow-up surveys of the Solar Precinct footprint and suitable habitat along the proposed access roads are undertaken immediately prior to construction. The Flora and Fauna Division also recommends that the surveys incorporate a broader area around the Solar Precinct for context.</p> <p>The EIS states that habitat suitability at the Solar Precinct is marginal, because of a lack of palaeodrainage habitats which are considered more persistently suitable for Greater Bilbies, based on findings by Southgate et al. (2018). However, Southgate et al. (2007) provide evidence of Greater Bilbies using a diversity of habitats including sand plain substrate in the northern part of the study area (Newcastle Waters) and in the south where they were more restricted to laterite/rock or drainage/calcrete. The statement used to justify the lack of habitat suitability at the Solar Precinct does not account for the differences in habitat use across the species distribution. A Greater Bilby</p>

		<p>population in this location is at the edge of the species range, and is considered an important population regardless of the perceived habitat suitability.</p> <p>The proposed access roads also pass through potential Greater Bilby habitat, and the potential for vehicle collision should be assessed.</p> <p>If Greater Bilbies are detected in any of the proposed project footprints the Flora and Fauna Division recommends that any burrows within the clearing footprint are avoided with a 20 m buffer until no longer occupied. Subsequent clearing in the surrounding area should give consideration to allowing Greater Bilbies to safely vacate the development area (e.g. delaying clearing until burrow verified as not in use). The Flora and Fauna Division also recommends that night driving is avoided in areas with confirmed Greater Bilby activity and night works are avoided in all potential bilby habitat.</p>
Chapter 5 – section 5.5.3, section 5.5.4.7	Terrestrial: Threatened species	<p>A juvenile Gouldian Finch was recorded south of Lake Woods during SREBA surveys in 2021, suggesting this species inhabits and may breed in the area. There is potential breeding habitat (<i>Eucalyptus leucophloia</i> woodland) in the Ashburton Range, along with permanent springs and pastoral dams that Gouldian Finches use as water sources. This suggests that the Gouldian Finch may be present along the proposed access roads to the Solar Precinct, and this species should be assessed in relation to impacts from this component of the project.</p> <p>The Gouldian Finch has been recorded in more locations in the vicinity of the OHTL during the GBA and SREBA projects (2020-2022). As such, the distribution of foraging and breeding habitat extends further south through the Sturt Plateau bioregion and past the southern edge of Lake Woods. There are also recent records from the coastal Top End. Proposed access roads at the Solar Precinct traverse potential Gouldian Finch breeding habitat (<i>Eucalyptus leucophloia</i> woodlands in the Ashburton Range). Gouldian Finch habitat is also present along the OHTL north of Pine Creek to Gunn Point. As Gouldian Finches are Endangered under the EPBC Act, any population is considered an important population under the EPBC Significant Impact Guidelines. Therefore the map of habitat provided in Figure 5-17 displays only part of the habitat requiring assessment for this project. The Flora and Fauna Division recommends that the assessment of significant impact for Gouldian Finches is undertaken to incorporate all potential Gouldian Finch habitat.</p> <p>The Flora and Fauna Division recommends that the cumulative impacts of habitat removal is assessed within a 20 km buffer of the project footprint.</p>
Chapter 5 – section 5.5.4.1	Terrestrial: Threatened species	<p>It is stated that Red Goshawk nests are conspicuous. However, Red Goshawk nests can be confused with the nests of other large raptors if observers are unfamiliar with the differences. The Flora and Fauna Division recommends that any active raptor nests are avoided if possible. If avoidance is not an option, further steps should be taken to confirm the identity of any active raptor nest.</p>

Chapter 5 – section 5.5.4.3	Terrestrial: Threatened species	It is unclear as to why Merten’s and Mitchell’s Water Monitors are assessed here but Yellow-spotted Monitor is not. The Yellow-spotted monitor occurs along the entirety of the OHTL. The Flora and Fauna Division recommends that Yellow-spotted Monitors are also assessed.
Chapter 5 – section 5.5.4.6	Terrestrial: Threatened species	<p>As discussed in a previous comment, the assessment that ghost bats will not be impacted by collision with powerlines is not well justified. Ghost Bats are much larger than other Microchiroptera and less able to avoid collision. While further justification is required for all bat species assessed, it is worth particular attention for the Ghost Bat. See recent review paper on Ghost bats (Cramer et al. 2022 – https://doi.org/10.1071/AM21042) that discusses the collision of Ghost Bats with barbed wire fences.</p> <p>The Kohoonir Adit colony (400 m from the proposed OHTL route) is the largest known Ghost bat colony globally. If the project has significant impacts on this colony, the species is likely to be significantly impacted. Potential impacts from the OHTL include electrocution, collision and changes to flight patterns, predator and prey dynamics and foraging behaviour (although it is noted that the structure of the OHTL is planned to be such that electrocution should not be possible). Surveys undertaken by the Flora and Fauna Division around this colony have indicated that activity of ghost bats remains high at least 1 km from the adit. The large numbers of this species and their high activity around the roost increases the risk that the OHTL poses. There is sufficient information about the species in relation to this roost that further field surveys are not required. However, a more thorough assessment of impact, and appropriate and justified mitigation measures should be provided. The standard practice for mitigating impacts of collision with linear structures such as powerlines and fences is the use of a visual cue, such as white bunting.</p> <p>The potential impacts to the Ghost bat colony from construction activities should also be thoroughly assessed.</p>
Chapter 5 – Table 5-15	Terrestrial: Threatened species	<p>The assessment of the potential for the proposal to lead to a long-term decrease in the size of an important population of the Howard River Toadlet only considers the impact of clearing within the footprint, not potential impacts from changed surface flow on habitat suitability.</p> <p>The mitigation measures covered under the criterion ‘modify, destroy, remove, isolate or decrease the availability of quality of habitat to the extent that the species is likely to decline’ do not specifically relate to Howard River Toadlet habitat. The Flora and Fauna Division recommends that additional information is provided on how much clearing of potential habitat is required and how any changes to surface flow will be mitigated.</p> <p>For this species, Stokeld et al. (2020; https://www.ntlis.nt.gov.au/mpds/get_file?file_id=8602) state that this species is of high value and that outside of the Howard Sand Plains SoCS the disturbance of habitat should be avoided and that suitable habitat be retained and native vegetation buffers ≥ 250 m applied. Field surveys in areas</p>

		with highly suitable habitat should be undertaken at an appropriate time if there is uncertainty in the occurrence of the species.
Chapter 5 – section 5.5.5.4	Terrestrial: Migratory species	<p>The assessment of significant impacts to migratory species is not in line with the EPBC Significant Impact Guidelines. The migratory species that are also listed as threatened are not assessed in line with their threatened status under the EPBC Significant Impact Guidelines.</p> <p>The Flora and Fauna Division recommend that species are assessed consistent with the EPBC Significant Impact Guidelines.</p>
Chapter 2 Section 2.4.3.3 Section 2.4.3.4 Section 2.4.3.5 Section 2.4.3.6	Terrestrial: impacts of various construction on biodiversity	<p>The documentation provided is not adequate to assess the potential impacts to biodiversity from ancillary construction activities, landfills, dangerous goods/hazardous chemicals storages and additional infrastructure associated with project (i.e. location of hardstands, laydowns, warehousing, storage areas, additional compounds, weather stations etc. as outlined in Section 2.4.3.6 – Other ancillary facilities).</p> <p>These activities and construction potentially has a high likelihood of impacting surrounding biodiversity and the impact should be assessed prior to construction.</p> <p>The Flora and Fauna Division recommends that further information is provided in the Supplementary EIS regarding the location, extent and impact of the ancillary construction activities, landfills, dangerous goods/hazardous chemicals storages and additional infrastructure associated with the proposal. The potential impact on biodiversity along with avoidance and mitigation measures should be assessed for these activities.</p>
Chapter 2 Section 2.5.2.1	Terrestrial: route options and threatened flora	<p>The Department acknowledges that the routes of the OHTL corridor through Katherine, Pine Creek and Adelaide River are yet to be determined due to several constraints and route obstacles.</p> <p>While the Katherine and Pine Creek potential route deviations are within the 10km buffer of the OHTL corridor, the Adelaide River route deviation options are well over the 10km buffer (approx. 15km from the proposed OHTL corridor route in some places).</p> <p>It is unclear from the mapping and the documentation provided in Chapter 5 whether the potential impact of these route deviations have been considered in the EIS. The route deviations for Adelaide River intersect the following biodiversity values (at least):</p> <ul style="list-style-type: none"> • <i>Cycas armstrongii</i> records • <i>Stylidium ensatum</i> potential habitat • <i>Helicteres macrothrix</i> potential habitat

		<p>The route deviations for Pine Creek intersect the following biodiversity values (at least):</p> <ul style="list-style-type: none"> • <i>Acacia praetermissa</i> record • <i>Stylidium ensatum</i> potential habitat <p>The Flora and Fauna Division recommends that further information is provided in the Supplementary EIS regarding the impact of the route deviation options. The impact on biodiversity along with avoidance and mitigation measures should be assessed for these options.</p>
Chapter 5 Section 5.3.3.2	Terrestrial: sensitive and significant vegetation	<p>Clearance of sensitive and significant vegetation in the NT requires consideration of the NT Land Clearing Guidelines. The Flora and Fauna Division notes the occurrence of highly significant sandsheet heath (SSH) on the Howard Springs Sandplains.</p> <p>The Flora and Fauna Division recommends that information is provided on the types and extent of sensitive and significant vegetation proposed to be removed through the proposed development activities. The potential impacts on significant vegetation and proposed mitigation actions should also be outlined.</p>
Chapter 5 Table 5-7	Terrestrial: threatened flora	<p>There are inconsistencies in this table with respect to other chapters or appendices of this EIS.</p> <p>For example: the 'Value Rating' for Darwin Converter Site suggests that there are no threatened species within the impact footprint.</p> <p>Section 5.3.3 of Appendix P-3 indicates that <i>Typhonium praetermissum</i> is present within the Darwin Converter Site footprint.</p> <p>Additionally, the potential habitat for the threatened species <i>Stylidium ensatum</i>, <i>Ptychosperma macarthurii</i>, <i>Cycas armstrongii</i>, <i>Helicteres macrothrix</i> and <i>Typhonium praetermissum</i> have not been mentioned in any of the relevant locations.</p> <p>The Flora and Fauna Division recommends reviewing all topics of the EIA result table including residual impact ratings for all impacts on threatened flora species.</p>
Chapter 5	Terrestrial: hydrological changes	<p>The potential impact of hydrological changes on vegetation communities and threatened species due to construction has not been assessed.</p> <p>The Flora and Fauna Division recommends including an assessment of the impact of hydrological changes on groundwater-dependent ecosystems and threatened species.</p>

Chapter 5 Section 5.5.4.9	Terrestrial: threatened flora	<p>There is highly suitable habitat for <i>Stylidium ensatum</i> present within the OHTL corridor. The Department acknowledges the proponent's recommendation to undertake surveys for <i>Stylidium ensatum</i>. Appropriate survey times for <i>Stylidium ensatum</i> are during the mid-late Dry season when the plant is flowering/fruitleting.</p> <p>Further evidence is required to support the statement: 'it is unlikely that minor additional gaps in habitat will cause fragmentation into more populations'.</p> <p>The Flora and Fauna Division recommends that, following surveys, avoidance and minimisation measures should be implemented for this species. The mitigation measures outlined in Table 5-11 should consider avoidance where possible.</p>
Chapter 5 & Appendix P-3	Terrestrial: threatened flora	<p>For <i>Helicteres macrothrix</i> the Flora and Fauna Division recommends:</p> <ul style="list-style-type: none"> • Further substantiation is provided in the impact assessment for <i>Helicteres macrothrix</i> regarding impact of destruction/removal of plants/loss of habitat for criteria 'Fragment the existing population into two or more populations'. • Targeted surveys for <i>Helicteres macrothrix</i> in the utilities corridor where there is modelled potentially suitable habitat.
Chapter 5 Section 5.5.4.10 & Section 5.5.5.3	Terrestrial: threatened flora	<p>For <i>Typhonium praetermissum</i> the Flora and Fauna Division recommends:</p> <ul style="list-style-type: none"> • Targeted surveys at the appropriate time of year to optimise detection to assess and contextualise the potential significant impacts on the <i>Typhonium praetermissum</i> at the subpopulation and species level. • Include the results of targeted survey in the supplementary EIS and assessment of significant impact on the population and species. • Provide information on whether the design of the OHTL footprint will be altered to avoid impacts on plants (or the proportion of individual plants) within the footprint. • Clarify proposed actions to mitigate impacts and minimise loss of plants within the footprint. • Clarify whether the project design will be modified to avoid the loss of <i>Typhonium</i> plants (75 individuals) and proposed mitigation actions if the plants are impacted. • Include and clarify the level of uncertainty in assessment of low risk of fragmentation.
Chapter 5	Terrestrial: threatened flora	<p>For <i>Cycas armstrongii</i> the Flora and Fauna Division recommends:</p>

Section 5.5.4.12		<ul style="list-style-type: none"> Targeted surveys to identify the extent of high density stands (>400 mature stems per hectare) within the project footprint and to assess the impact of removal on the broader population. Mature stems are considered all of those greater or equal to 50 cm in height. Any proposed removal of plants should refer to the translocation guidelines for this species.
Chapter 5 Section 5.5.4.13	Terrestrial: threatened flora	<p>For Darwin palm <i>Ptychosperma macarthuri</i> the Flora and Fauna Division recommends:</p> <ul style="list-style-type: none"> Further substantiation is required on the impact assessment regarding impact of destruction/removal of plants/loss of habitat for criteria 'Fragment the existing population into two or more populations'. Targeted surveys are undertaken.
Chapter 5 Section 5.5.4.15	Terrestrial: threatened flora	<p>For <i>Utricularia dunstaniae</i> 'General fieldwork' rather than targeted surveys is not suitable to detect this small and highly seasonal species which responds directly to wet season rainfall.</p> <p>The Flora and Fauna Division recommends the following for <i>Utricularia dunstaniae</i>:</p> <ul style="list-style-type: none"> Provide further substantiation is required on the impact assessment regarding impact of destruction/removal of plants/loss of habitat for criteria 'Fragment the existing population into two or more populations'. Undertake targeted surveys for <i>Utricularia dunstaniae</i> in the appropriate flowering season (i.e. January-May).
Chapter 5 Section 5.5.4.16	Terrestrial: threatened flora	<p>For <i>Cleome insolata</i> 'General fieldwork' rather than targeted surveys is not suitable to detect this species.</p> <p>The Flora and Fauna Division recommends targeted surveys for <i>Cleome insolata</i> in the appropriate fruiting/seeding season (i.e. March-April).</p>
Chapter 5 Table 5-21	Terrestrial: significant vegetation	<p>The 'Avoidance' section of this table for 'Loss of vegetation and habitat' impact states that 'no significant vegetation types is contained within the Solar Precinct' followed by 'Micro-siting of transmission towers to avoid significant vegetation where possible'. It is unclear whether there is or is not significant vegetation within the Solar Precinct.</p> <p>The Flora and Fauna Division seeks clarification on whether there is significant vegetation within the Solar Precinct or not.</p>

Chapter 5 Table 5-21	Terrestrial: vegetation clearing outside of approved boundary	<p>The 'Monitoring' section of this table for 'Loss of vegetation and habitat' impact states 'visual inspections during clearing is within approved boundaries. Results recorded, along with any photographs'.</p> <p>The Flora and Fauna Division recommends the area to be cleared for the Solar Precinct is clearly flagged and marked on-ground so that it is clear to contractors where to clear and avoid clearing beyond approved boundaries.</p>
Chapter 5 Table 5-21	Terrestrial: threatened species habitat	<p>The 'Avoidance' section of this table for 'Threatened species (restricted range)' impact states that 're-routing the access track to avoid local occurrences (if present)'.</p> <p>The Flora and Fauna Division recommends that any areas known to support threatened flora species are clearly flagged and signposted as 'No-Go Zones' for contractors to avoid.</p>
Chapter 5 Section 5.8	Terrestrial: threatened flora	The Flora and Fauna Division recommends that the potential for cumulative impacts on the <i>Typhonium praetermissum</i> sub-population and species population be clearly outlined.
Appendix P-3	Terrestrial: threatened flora	<p>Records and potential habitat for <i>Acacia praetermissa</i> are found within the Pine Creek route deviation options.</p> <p>The Flora and Fauna Division recommends reassessing the impact of the proposal on <i>Acacia praetermissa</i> in the Supplementary EIS following route option decisions.</p>
Appendix P-3	Terrestrial: threatened flora	<p>Records of <i>Typhonium taylorii</i> are found within 7km of the project footprint and potential habitat is likely to exist in the Howard Sand Plains.</p> <p>The Flora and Fauna Division recommends reassessing the likelihood of <i>Typhonium taylorii</i> presence in the Utilities corridor.</p>