



Terrestrial Ecology Assessment

GEMCO Excess Water Disposal

GEMCO

24 January 2025

→ **The Power of Commitment**

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Cover Photo: Savannah Glider (*Petaurus ariel*), photographed during GHD fauna surveys, August 2024.

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Executive summary

Groote Eylandt Mining Company Pty Ltd (GEMCO) is currently conducting a feasibility study to progress a preferred excess water disposal option for its mining operations on Groote Eylandt. The water would be transferred to the GEMCO port facility via a 12 km dual pipeline located along the Rowell Highway predominately within the Western Leases. South32 Group Operations Pty Ltd (South32) has engaged GHD Pty Ltd (GHD) to undertake a terrestrial ecology desktop assessment and field survey in support of the feasibility study for the proposed Excess Water Disposal project (the Project) on the western side of Groote Eylandt.

Initially, GHD conducted a desktop assessment, to provide an appreciation of the terrestrial environmental values of the Construction footprint. The desktop assessment incorporated a review of the relevant government databases and mapping layers. An assessment was conducted to attribute a 'likelihood of occurrence' to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) and the *Territory Parks and Wildlife Act 1976* (TPWC Act) listed threatened species and communities that have been previously recorded or were predicted to occur within the desktop search extent.

To ground truth the results of the desktop assessment, field surveys were undertaken, including:

- Habitat and vegetation survey: Field survey was undertaken by 4Elements Consulting field ecologists over three consecutive days, 23 – 25 April 2024, throughout the 4Elements survey area. This survey aimed at assessing the potential for conservation significant species of flora, fauna and vegetation communities. Incidental observations of common species were recorded where observed.
- Fauna specific survey: GHD deployed two ecologists to conduct fauna specific field surveys from 13 – 19 August 2024. Surveys incorporated camera trapping, spotlighting and call playback, point count bird surveys and general meander searches of the entirety of the construction footprint. All fauna species detected were recorded.

Results of the field surveys indicated:

- A total of 76 native flora species from 40 families, with all tree and shrub species identified.
 - No threatened flora species were identified.
- During field surveys, 19 individual quaternary level assessments indicated a total of 19 National Vegetation Information System (NVIS) Level 4 vegetation communities distributed across the 4 Elements survey area.
 - Many of the vegetation communities were heavily impacted by extreme weather events (i.e. recent ex-Tropical Cyclone Megan in March 2024), with numerous trees down and areas impacted by flooding.
- During field surveys, a total of 75 fauna species were recorded.
 - This was comprised 55 birds and 11 mammals (including one exotic mammal (feral cat)) and nine reptiles.
 - One Territory and/or Commonwealth listed threatened fauna species was observed within the Construction footprint during the field investigation, the northern quoll (*Dasyurus hallucatus*).
- No Territory or Commonwealth listed Threatened Ecological Communities were recorded.
- The majority of site level assessments indicated at least moderate levels of disturbance by regular and repeated fire and anthropogenic activities within the existing road/electricity easement which would act to remove ground cover vegetation, leaf litter and coarse woody debris.

Based on field survey observations, the Construction footprint is characterised by natural (e.g. fire, stormwater and flooding) and anthropogenically (e.g. clearing, infrastructure) modified vegetation. Many vegetation communities were lacking in or contained a highly modified forb and/or graminoid layer, indicating a reduced overall value for ecological features.

Flora

Based on the results of the field surveys and identification of potential habitat, both *Eleocharis retroflexa* (listed as 'vulnerable' under the EPBC Act) and *Utricularia singeriana* (listed as 'vulnerable' under NT TPWC Act) have been assessed as "may occur" within the Construction footprint, specifically within source code 55 vegetation mapping community. Source code 55 makes up approximately 2.3% of the 4Elements survey area.

Fauna

Despite the generally modified condition of fauna habitats within the Construction footprint, one matter of national environmental significance (MNES) species (northern quoll) was confirmed present, and it is likely two others are also present (northern masked owl and Mertens' water monitor). Based on the availability and condition of the habitats identified during field surveys, six threatened fauna species were assessed as 'may occur' within the Construction footprint in some capacity (i.e. foraging, dispersal, nesting, roosting, etc). These species were common greenshank, sharp-tailed sandpiper, Alaskan bar-tailed godwit, northern brushtail possum, ghost bat and northern blue-tongue skink.

The following impacts to fauna may occur during the construction phase:

- **Fauna injury and mortality:** Construction work within the Construction footprint has the potential to cause direct wildlife injury and mortality if animals are struck by machinery or injured during the clearing process.
- **Habitat removal:** Clearing of vegetation has the potential to remove habitat for fauna species resulting in displacement of individuals and potential increased pressure on adjacent habitat.
- **Disruption of fauna behaviour:** Construction activities may result in a temporary, localised disturbance to fauna behaviour in local habitats through construction-related noise and vibration (and lighting, if required).
- **Spread of weeds:** Vegetation clearing and soil disturbance during construction has the potential to degrade local habitats through facilitating the introduction and spread of established introduced species.
- **Proliferation of pest fauna:** Construction activities have the potential to attract localised concentrations of exotic fauna by increasing the availability of food and water through inappropriate waste disposal and water management. Exotic fauna species can adversely impact native wildlife by increasing levels of predation and competition.
- **Waterway degradation:** Vegetation clearing, and earthworks may expose sediment to erosive forces, which could degrade through overland flow and discharge to the downstream drainage features through mobilisation of pollutants, increased turbidity and/or sediment deposition. Additionally, development of pipeline infrastructure may influence the course of overland flow which may alter surface hydrology and watercourse structure.
- **Restriction of movement:** Given the presence of several threatened and common terrestrial fauna species, the construction of pipeline infrastructure has the potential to restrict movement across the landscape. Mitigation measures as described in Section 6.3 are critical to reducing the potential impacts of the proposed above-ground infrastructure restricting the movement of terrestrial fauna across the landscape.

Significant impact assessments (SIA) were conducted to determine the significance of any potential impacts to identified MNES. The results of the SIA indicated low likelihood of a significant residual impact to any MNES provided the identified avoidance and mitigation measures are adopted as outlined in Section 6.3.

Similarly, provided the identified avoidance and mitigation measures are adopted, there is a low likelihood of significant residual impact to conservation significant species listed under the TPWC Act.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.5 and the assumptions and qualifications contained throughout the report.

Contents

1.	Introduction	1
1.1	Purpose of this report	1
1.2	Structure of the report	1
1.3	Definitions	1
1.4	Abbreviations	2
1.5	Scope and limitations	3
1.6	Assumptions	4
2.	Background	5
2.1	Project background	5
2.2	Project location	5
2.3	Project activities within the terrestrial footprint	6
2.3.1	Construction	6
2.3.2	Maintenance and Monitoring	7
3.	Legislation	10
4.	Methods	12
4.1	Desktop assessment	12
4.1.1	Publicly available databases	12
4.1.2	Knowledge review	12
4.2	Likelihood of Occurrence Assessment	13
4.3	Field Survey Effort	16
4.3.1	4Elements survey area	16
4.3.2	Flora	16
4.3.3	General Fauna Habitat Searches	17
4.4	Impact assessment methods	18
5.	Results	20
5.1	Desktop Assessment	20
5.1.1	Flora	20
5.1.2	Fauna	20
5.1.3	Biosecurity matters	21
5.1.4	Remaining MNES	22
5.2	Field Survey	22
5.2.1	Flora	22
5.2.2	Vegetation Communities	22
5.2.3	Fauna	27
5.2.4	Habitat Condition	30
5.3	Likelihood of Occurrence	31
6.	Discussion	33
6.1	Likelihood of occurrence	33
6.1.1	Flora	33
6.1.2	Vegetation	34
6.1.3	Fauna	34
6.2	Potential impacts	37
6.2.1	Fauna movement and connectivity, design considerations to facilitate fauna passage	37
6.3	Management and Mitigation Measures	39

6.4	Significant Impact Assessment	42
6.4.1	EPBC Act threatened flora	42
6.4.2	EPBC Act threatened fauna	44
6.4.3	EPBC Act migratory species	58
7.	Conclusion	62
8.	References	64

Table index

Table 1	Definitions	1
Table 2	List of abbreviations used in this report	2
Table 3	Summary of clearing requirements	6
Table 4	Key legislation, policies, and guidelines relevant to terrestrial (inclusive of freshwater) ecosystems	10
Table 5	Desktop assessment information sources	12
Table 6	Ecological assessments reviewed.	13
Table 7	Likelihood of occurrence framework	13
Table 8	WoNS and NT declared weeds within 5 km of the Construction footprint.	21
Table 9	Historical records of introduced fauna located within 5 km of the Construction footprint	21
Table 10	Summary of the invasive flora species recorded during the field survey	22
Table 11	Summary of the mapped vegetation communities across the 4Elements survey area according to site number	23
Table 12	Summary of the additional communities recorded within the 4Elements survey area	24
Table 13	Summary of the mapped vegetation communities across the 4Elements survey area	24
Table 14	Table summarising 4Elements Consulting fauna observations during April 2024 field surveys	28
Table 15	Summary of the type and severity of disturbance observed at each site. Severity – 0: nil; 3: severe.	31
Table 16	Summary of LOO results - 'confirmed present', 'likely to occur' and 'may occur' species).	32
Table 17	Summary of significant impact likelihood	42
Table 18	SIA for EPBC Act Vulnerable threatened flora	42
Table 19	SIA for EPBC Act Vulnerable threatened shorebirds	44
Table 20	SIA for EPBC Act Endangered threatened shorebirds	46
Table 21	SIA for the northern masked owl	48
Table 22	SIA for the northern quoll	49
Table 23	SIA for the ghost bat	51
Table 24	SIA for the northern brushtail possum	52
Table 25	SIA for Mertens' water monitor	54
Table 26	SIA for the northern blue-tongue skink	57
Table 27	SIA for migratory marine species	59
Table 28	SIA for migratory terrestrial species	60
Table 29	SIA for wetland migratory species	61
Table 30	Summary of significant residual impact assessments.	63
Table 31	Fauna species recorded during the field surveys.	93

Figure index

Figure 1	Project area	8
Figure 2	Pipeline crossings	9
Figure 3	Terrestrial flora ecology survey effort map	14
Figure 4	Terrestrial fauna ecology survey effort map	15
Figure 5	Site no. 168 indicating the lack of tussock grasses throughout the area	23
Figure 6	Site no. 175 indicating the lack of tussock grasses throughout the area	23
Figure 7	Site no. 184 showing the significant number of fallen trees	23
Figure 8	Site no. 186 - watercourse present within site	23
Figure 9	Vegetation communities from the 4Elements Survey	26
Figure 10	Northern quolls recorded on cameras GR7 and M22 during four nights of field survey between 14 – 18 August 2024.	27
Figure 11	Agile wallaby (<i>Macropus agilis</i>) recorded on camera M22 and savannah glider (<i>Petaurus ariel</i>) photographed during spotlight surveys.	28
Figure 12	Fauna records	29
Figure 13	Pictures illustrating limited structural complexity and lack of mature vegetation over much of the survey area	30
Figure 14	Actively flowing drainage lines inundated with water from ex-tropical cyclone Megan in March 2024.	30
Figure 15	Largely dry drainage lines leading to culverts under Rowell Highway observed during August 2024 surveys	31
Figure 16	Two of the 41 existing culverts under Rowell Highway immediately adjacent to the proposed pipeline alignment.	38
Figure 17	Proposed pipeline crossings and field verified culverts	41

Appendices

Appendix A	Desktop assessment results
Appendix B	Post survey likelihood of occurrence assessment
Appendix C	Field Survey Flora List
Appendix D	Field Survey Fauna List

1. Introduction

1.1 Purpose of this report

This report has been prepared to assess and describe the ecological values of the area associated with a proposed excess water disposal and associated infrastructure project on Groote Eylandt and provide supporting information for referral to the Northern Territory (NT) Environmental Protection Agency (EPA). This report presents the findings of a comprehensive desktop assessment for Matters of National Environmental Significance (MNES) and field surveys conducted by 4Elements Consulting and GHD.

A separate report has been prepared to address the ecological assessments of the marine environment for the GEMCO excess water disposal project (the Project). A self-assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was also completed to understand the potential impacts on nationally significant animals, plants, habitats, and places in Australian territories.

1.2 Structure of the report

The report is structured as follows:

- Section 2: A brief background to the project
- Section 3: An overview of relevant legislation
- Section 4: An overview of the assessment methods
- Section 5: A description of the assessment results
- Section 6: Identification of potential ecological impacts together with recommended mitigation measures
- Section 7: Conclusion.

1.3 Definitions

The definitions in Table 1 have been used throughout this report.

Table 1 Definitions

Term	Definition
Project	All aspects of the GEMCO Excess Water Disposal Project (excluding internal movement of water) including construction and operation.
Construction footprint	Area directly impacted by the construction of the Project including both onshore and offshore areas totalling 25.17 hectares (ha). This has been calculated as 1.84 ha in the marine environment and 23.33 ha in the terrestrial environment, noting only terrestrial (inclusive of freshwater) aspects are considered within this report.
Study area	Construction footprint plus 5-kilometre (km) buffer, used during desktop investigations to assess the likelihood of occurrence of conservation listed species.
Terrestrial environment	The terrestrial environment is defined as all habitats above the high tide mark. Aspects within the marine environment are considered within the separate Marine Ecology Assessment Report.
4Elements survey area	Total extent of the area investigated as part of the April 2024 field survey. The 4Elements survey area covers a total of 153.5 ha, extending from the marine tidal zone to the north, south to approximately 500 metres (m) north of the mine.
Threatened species	Species that are listed as critically endangered, endangered, vulnerable or migratory under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act), and species that are listed as critically endangered, endangered, vulnerable, near threatened or special least concern pursuant to the <i>Territory Parks and Wildlife Conservation Act 1976</i> (TPWC Act).

1.4 Abbreviations

See Table 2 for abbreviations used in this report.

Table 2 List of abbreviations used in this report

Abbreviation	Definitions
ALA	Atlas of Living Australia
AOO	Area of Occupancy
CE	Critically Endangered
CEMP	Construction Environmental Management Plan
CNV	clearing native vegetation
CWD	coarse woody debris
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DD	Data deficient
DEPWS	Department of Environment, Parks and Water Security
DIWA	Directory of Important Wetlands of Australia
E	Endangered
EMS	Ecological Management Services
EPA	Environmental Protection Agency
EP Act	<i>Environment Protection Act 2019</i>
EP Regulations	<i>Environment Protection Regulations 2020</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
ESCP	Erosion and Sediment Control Plan
EVNT	Endangered, Vulnerable and Near Threatened
Fisheries Act	Fisheries Act 1988
FS	Feasibility stage
GEMCO	Groote Eylandt Mining Company Pty Ltd
GHD	GHD Pty Ltd
GL	gigalitres
GPS	Global Positioning System
ha	hectares
HAT	Highest Astronomical Tide
HDPE	High Density Polyethylene
km	kilometre
LOO	Likelihood of Occurrence
m	metre
Mig	Migration
MMP	Mining Management Plan
MNES	Matters of National Environmental Significance
mtpa	million tonnes per annum
NH2	Quarry pit name
NL	Not Listed
NR Maps	Natural Resource Maps

Abbreviation	Definitions
NT	Northern Territory
nt	Near Threatened
NVIS	National Vegetation Information System
pa	per annum
Planning Act	<i>Planning Act 2020</i>
Planning Scheme	<i>Planning Scheme 2020</i>
PMST	Protected Matters Search Tool
QBEIS	Queensland Biodiversity and Ecology Information System
Qld	Queensland
SER	Supplementary Environment Report
SIA	Significant Impact Assessment
South32	South32 Group Operations Pty Ltd
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Community
the Port	GEMCO's Milner Bay Port Facility
the Project	Excess Water Disposal project
TPWC Act	Territory Parks and Wildlife Conservation Act 1976
V	Vulnerable
WM Act	Weeds Management Act 2001
WoNS	Weeds of National Significance

1.5 Scope and limitations

This report has been prepared by GHD for GEMCO and may only be used and relied on by GEMCO for the purpose agreed between GHD and GEMCO as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than GEMCO arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

This information presented in this report is based on the following:

Information and assessment contained within this report pertaining to vegetation, native vegetation and threatened flora is based on survey and advice provided by 4Elements Consulting.

The Protected Matters Search Tool (PMST) is a predictive tool that produces lists of threatened species, communities, and other MNES that have the potential to occur within a defined search area, or for which there may be potentially suitable habitat within the defined search area. It considers previous records and habitat modelling; however, it does not confirm the presence/absence of threatened species and communities.

The NT Government Department of Environment, Parks and Water Security (DEPWS) – Natural Resource Maps flora and fauna atlas database (NR Maps) is based on information recorded from previous surveys. Using the database, results of surveys in a defined geographical area can be searched to produce lists of species known to occur or known to have occurred in the case of extinct species. The accuracy of this is limited by the quality and quantity of data recorded from the desktop search extent. This does not necessarily reflect the survey effort, type or timing.

For example, targeted surveys may have been undertaken, ineffective survey techniques may not yield accurate results, a large survey effort may yield few results, and the data include incidental observations that were not part of a formal survey. Therefore, the database results (particularly the quantity of records) cannot be used as a definitive estimate of survey effort in a given area.

Least concern species have not been mapped, hence distribution and density of non-threatened species locations across the Construction footprint have not been assessed. The known records of threatened species records in the Construction footprint (both from NR Maps and field investigation) have been assessed and informed the desktop assessment and field surveys. NR Maps was utilised for nomenclature of mammals, reptiles and frogs.

Species listed as near threatened (nt), or data deficient (DD) under the TPWC Act that are not listed elsewhere (e.g. EPBC Act listed species) are not included in this assessment.

Marine turtle species were all considered as part of the Marine Ecology Assessment Report (GHD 2024), and as such have not been considered further as part of this report. NT EP Act Pre-referral Screening Tool Answer Checklist and associated significant impact assessments are presented in the report titled “Environmental Referral Report – GEMCO Excess Water Disposal Project”.

Field survey effort has been conducted following relevant EPBC/NT survey guidelines.

1.6 Assumptions

This report has been prepared with respect to the following assumptions:

- Site details established through Commonwealth and NT desktop assessments are correct and reflect current site conditions at the time the searches were conducted.
- Previous studies used to inform the preparation of this document are accurate and reflect the site conditions at that time.
- Approvals and permits associated with construction related activities for the Project will be the responsibility of GEMCO to obtain.

2. Background

2.1 Project background

Groote Eylandt Mining Company Pty Ltd (GEMCO) operates an open cut, strip-mining operation, on Groote Eylandt, in the Gulf of Carpentaria in Northern Territory (NT). The existing operation mines manganese ore by open-cut methods before processing the ore at an on-site facility. Manganese is then transported by road train to GEMCO's Milner Bay Port Facility (the Port) (Figure 1).

To access the manganese ore, existing vegetation is cleared, and topsoil and overburden is removed, forming mine pits (quarries). As mining intersects aquifers and due to rainfall and runoff in some areas, water naturally collects within the quarries. The water is extracted, and a portion is typically used during operations, with surplus water transferred between quarries and released to bushland in accordance with the existing Mining Management Plan (MMP).

Deeper mining has resulted in greater groundwater intrusion within the quarries while progression of mining towards the coast has resulted in an increase in salinity within quarry water in some areas. Mine models indicate dewatering volumes could reach up to 100 gigalitres (GL) per annum (pa) in the near future. To address this increase in quantity and salinity a marine outfall project, also referred to as the Excess Water Disposal project (the Project) is being evaluated to allow the discharge of up to 80 GL pa of water from the quarries.

GEMCO is currently undertaking the detailed design of the Project, which will include pipeline and pumping infrastructure from an existing northern quarry (nominally NH2 for this assessment) to a discharge point at the Port. The pipeline is planned to traverse adjacent to the Rowell Highway (road train haul route; Figure 1) for approximately 12 km and utilise areas of existing or historical disturbance as far as practical. The pipeline is proposed to be placed on the ground for the majority of the extent.

Approximately 1.7 km of pipeline crossings (~14% of total alignment) have been incorporated into the design along the pipeline alignment, consisting of a mixture of buried, elevated or earthen ramped pipeline segments. A mixture of buried and elevated pipeline treatments will be applied through watercourses and drainage lines, this is to be finalised during the detailed design. A referral under the *Environment Protection Act 2019* (NT) (EP Act) has been prepared to assess the potential impacts of the Project.

2.2 Project location

Groote Eylandt is part of the Northern Territory (NT) and is located in the Gulf of Carpentaria, 650 km southeast of Darwin and 50 km off the Arnhem land coast. Groote Eylandt is Australia's third largest island, with a land area of 2,326 km². The island is part of the Groote Archipelago that comprises itself and Bickerton Island. Groote Eylandt is home to the Anindilyakwa communities of Umbakumba, Milyakburra and Angurugu. Groote Eylandt has a population of approximately 1,500 people, with the total population of the Groote Archipelago being approximately 2,800.

Groote Eylandt is largely undeveloped, and much of the island is still used for traditional Aboriginal practices such as hunting and gathering. The main townships within the Groote Eylandt Archipelago include the mining township of Alyangula, the two Aboriginal settlements of Angurugu and Umbakumba on Groote Eylandt and the Aboriginal settlement of Milyakburra on Bickerton Island.

The proposed location of the Construction footprint is on the western side of Groote Eylandt at/adjacent to the GEMCO Port Facility, the Rowell Highway and GEMCO's Western Leases (Figure 1). The proposed pipeline is situated in largely disturbed habitats adjacent to the Rowell Highway, where roadside verge roadworks and channel works have resulted in historic ground disturbance, some with relatively recent regrowth.

2.3 Project activities within the terrestrial footprint

A separate report has been prepared to address the marine components of the Project (GHD 2024), and as such, this report focuses on the Project construction and operation within the terrestrial (inclusive of freshwater) environment.

2.3.1 Construction

Construction of the Project is proposed to commence in March 2026 and conclude in December 2026.

2.3.1.1 Materials and equipment transport

Groote Eylandt has two primary public roads; the Rowell Highway and the Angurugu-Umbakumba Road.

Both roads are well-maintained, two-lane thoroughfares, facilitating travel between Alyangula, the GEMCO mining operations and the airport, as well as between Angurugu and Umbakumba. There are frequent existing barge services connecting Darwin to the Port at Milner Bay.

Material required for the Project construction will be transported to Groote Eylandt by sea. Transport of materials to the island will be concentrated during the early stages of the Project's construction but will occur throughout the Project's construction schedule until it becomes operational. Furthermore, specialised construction equipment not currently used and present on the island will be transported to the island and will include heavy machinery and equipment. The contractor engaged to complete will provide more detailed information on the material and machinery specifications at a later stage of development. Materials once on the island will be transported via the existing road network to and around the construction footprint.

2.3.1.2 Earthworks

Construction activities include:

- Minor earthworks
- Vegetation clearing (refer Table 3)
- Installation of pumping and ancillary infrastructure
- Installation of outfall structure
- Reshaping and rehabilitating areas along the Rowell Highway
- Sediment and erosion controls at pipeline crossing points and laydown areas.

Clearing will occur to facilitate construction and operation of the Project. A breakdown of vegetation clearing requirements are outlined in Table 3.

Due to the predominantly east west drainage topography and the north to south perpendicular alignment, the pipeline will cross several creek crossings (Malkala Creek and Ndunga Creek). Rowell Highway drainage culverts will also require crossings that will either be buried or supported by pipe cradles/supports to allow existing drains to continue to operate. In addition to the creek and drainage crossings, and a major public road crossing, it is anticipated that several small recreational access road crossings, fauna and flood mitigation crossings will also be required.

Other pumping and ancillary pumping equipment laydowns and lifting hardstands are required for pumps, diesel generators and fuel storage within the mining operational area at NH2. A laydown area will also be present near the Port on previously disturbed land.

Table 3 Summary of clearing requirements

Clearing Description	Area (ha)
Disturbance off lease with no vegetation clearing required	1.57
Disturbance on lease with no vegetation clearing required	11.32
Vegetation clearing on lease	9.9
Vegetation clearing off lease	0.54

2.3.1.3 Hardstand construction

The construction areas will be contained within the existing lease boundaries with the exception of the ocean outfall construction works (assessed in the Marine Ecology Assessment Report) and portions of works along the Rowell Highway. All spoil generated in the marine environment will be stored within the existing Port dredge stockpile area (Figure 1).

2.3.1.4 Pipeline assembly

DN1000 HDPE pipes will be welded together in approximately 12 m sections along the length of the pipeline alignment. Construction will occur along the alignment within the lease boundaries as far as reasonably practical. Laydown areas for pipe will be on the mine lease and within the special purpose lease at the Port. The pipeline will be predominantly placed at ground level with a total of approximately 1.7 km of pipeline crossings positional along the alignment to facilitate passage and surface water flows, Crossings will be a mixture of buried, elevated and earthen ramped segments. A summary of crossing locations is provided on Figure 2.


2.3.2 Maintenance and Monitoring

The pipeline will require regular maintenance and monitoring. The system infrastructure will be maintained through a combination of preventative and on-condition maintenance strategies. The preventative maintenance plans for mechanical and electrical components will be managed through the GEMCO asset management system, while the on-condition assessment of piping will be conducted periodically to assess wear rates and system compliance.

Monitoring and maintenance activities would include:

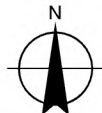
- Pipeline infrastructure monitoring and repair
- Drainage infrastructure and temporary (project construction duration) and permanent erosion sediment and control monitoring
- Access crossings (fauna, pedestrian and vehicle) monitoring and repair
- Weed management of project disturbance areas monitoring and treatment



Legend
 Project area

Rowell Highway

Paper Size ISO A4
 0 250 500 750 1,000
 Metres



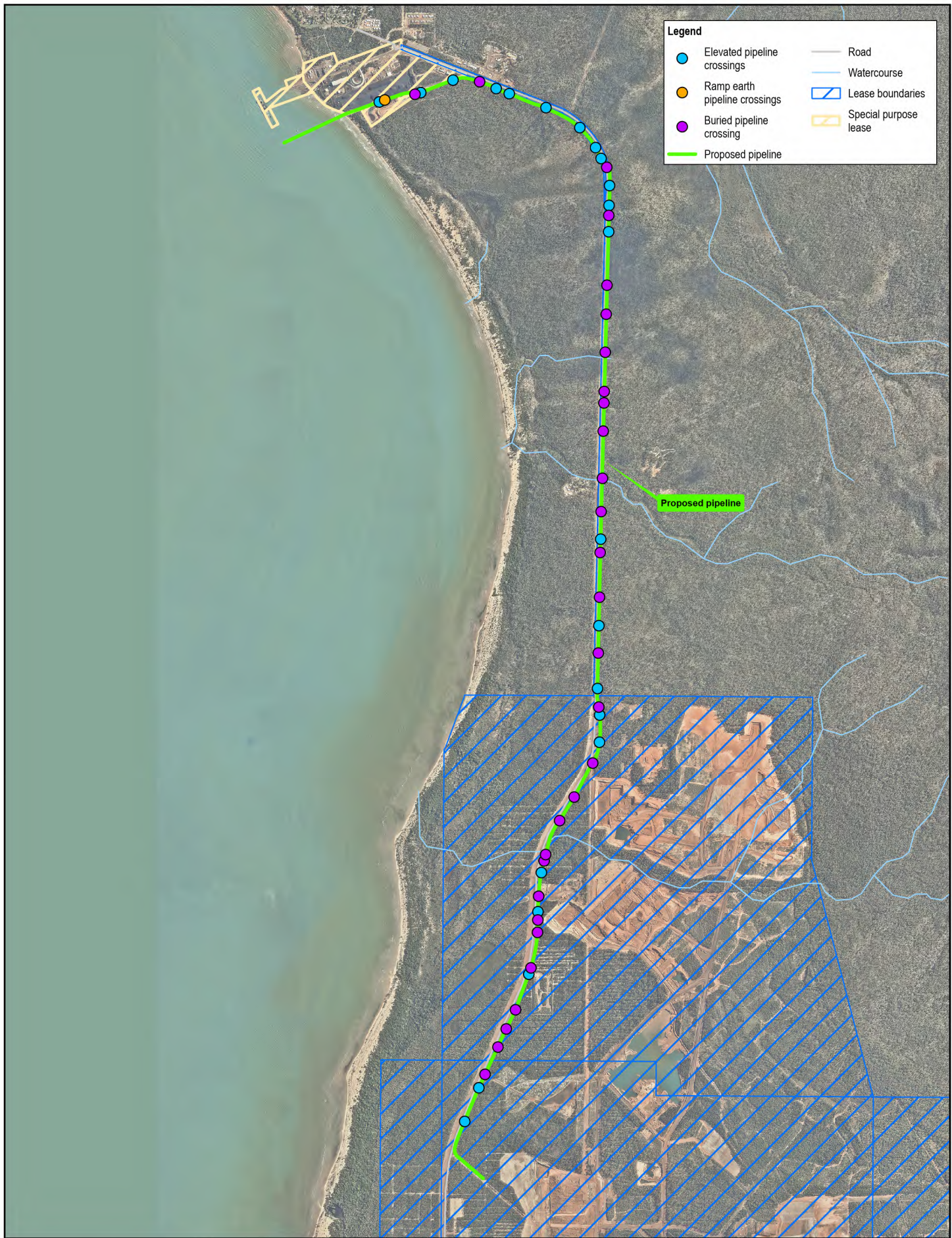
Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 53

South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project

Project No. **12624084**
 Revision No. **0**
 Date **10/12/2024**

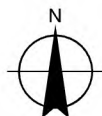
Project area

FIGURE 1



Paper Size ISO A4
 0 250 500 750 1,000
 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
 GEMCO Excess Water Disposal Project

Project No. 12624084
 Revision No. A
 Date 10/12/2024

Pipeline crossings

FIGURE 2

3. Legislation

The Project is subject to both Commonwealth and NT legislation and regulatory requirements. A summary of terrestrial (inclusive of freshwater) ecosystem relevant legal, policy and guideline frameworks and their context to the Project is provided in Table 4.

Table 4 Key legislation, policies, and guidelines relevant to terrestrial (inclusive of freshwater) ecosystems

Legislation	Descriptions
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)	The Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) provides a framework for protection of the Australian environment, including its biodiversity, and its natural and culturally significant places. The EPBC Act focuses Australian Government interests on the protection of MNES, nationally significant animals, plants, habitats, or places, with the states and territories having responsibility for matters of state and local significance. Relevant to terrestrial and aquatic ecosystems and the assessment within this report are the following protected MNES: <ul style="list-style-type: none"> – Listed threatened species – Listed migratory species (protected under international agreement)
<i>Biosecurity Act 2015</i> (Cth)	Key piece of legislation in Australia that manages biosecurity threats to plant and animal habitats and human health.
<i>Environment Protection Act 2019</i> (NT) <i>Environment Protection Regulations 2020</i> (NT) (EP Regulations)	The process for environmental impact assessment is legislated under the NT <i>Environment Protection Act 2019</i> (EP Act) and <i>Environment Protection Regulations 2020</i> (EP Regulations). Proposals that have the potential to have a significant impact on the environment require referral to the NT EPA in accordance with the EP Act and the EP Regulations.
<i>Territory Park and Wildlife Conservation Act 1976</i> (NT) (TPWC Act)	The <i>Territory Park and Wildlife Conservation Act 1976</i> (TPWC Act) aims to establish NT parks and reserves and protect and conserve NT wildlife that is listed as threatened, including essential habitat. Relevant to terrestrial and freshwater ecosystems and the assessment within this report are the following protected wildlife under the TPWC Act: <ul style="list-style-type: none"> – Listed threatened species
<i>Water Act 1992</i> (NT)	Provides for the investigation, allocation, use, control, protection, management, and administration of water resources, such as interference with a waterway which includes changes to the bed or bank stability of a waterway including by vegetation removal.
<i>Fisheries Act 1988</i> (NT)	The NT <i>Fisheries Act 1988</i> (Fisheries Act) is purposed primarily to manage the aquatic resources of the NT including an acknowledgement of the rights and interests of Aboriginal people and resources. A permit will be required for activities that cause shock, sound, or other vibration under water (including freshwater habitats relevant to this report), which includes construction activities in freshwater creeks where water is present. Creek disturbance works (excavations) are expected to occur during the drier months and not cause impact when water is present.
<i>Planning Act 1999</i> (NT)	Provides for land use planning and land use control in the NT. Under the NT <i>Planning Act 2020</i> (Planning Act), permits may be required for land use or building development requiring consent under the Planning Act.
<i>Planning Scheme 2020</i> (NT)	The NT <i>Planning Scheme 2020</i> (Planning Scheme) is the Northern Territory's 'rule book' for land use planning and development. The Planning Scheme does the following: <ul style="list-style-type: none"> – Describes how land use may change to meet future needs – Identifies factors and risks that could affect land use (e.g. flooding) – Sets controls that allow, prohibit, or put conditions on land use – Provides guidance to help consent authorities make decisions – States the level of flexibility allowed for decisions about development applications.

Additional published resources sourced from government departments and technical organisations have been used to support the understanding of the existing environment and associated assessment of potential impacts, as summarised below.

Guidelines and policies relating to impact assessments:

- Approved conservation advice and recovery plans for threatened species (as provided by DCCEEW).
- NT EPA Environmental impact assessment “General technical guidance: Environmental factors and objectives (2022)”.
- NT technical guidance on environmental impact assessment requirements and expectations (NT EPA, 2024).
- EPBC Act - Matters of National Environment Significance: Significant Impact Guidelines (DoE, 2013).

The targeted surveys utilised a component of the mammal survey methods and requirements outlined in the ‘*NT EPA Guidelines for Assessment of the Impacts on Terrestrial Biodiversity (2013)*’.

Methods were also based on:

- DEWHA (2011) Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act.
- Gillespie et al (2015). A guide for the use of remote cameras for wildlife survey in northern Australia. Darwin: Charles Darwin University.
- DEWHA (2010) Survey guidelines for Australia's threatened reptiles. Guidelines for detecting reptiles listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*.
- Ward (2009) Survey protocol for the northern hopping-mouse (*Notomys aquilo*).

4. Methods

4.1 Desktop assessment

4.1.1 Publicly available databases

GHD conducted a desktop assessment and database search on the 5 September 2024, to inform the terrestrial environmental values of the Construction footprint. The desktop assessment incorporated a review of the relevant government databases and mapping layers. Publicly available information, databases and mapping utilised during the desktop assessments is summarised in Table 6 and detailed in Appendix A.

Table 5 Desktop assessment information sources

Desktop search	Purpose
Commonwealth	
Protected Matters Search Tool (PMST)	DCCEEW PMST search was conducted on 25 October 2024 to identify MNES protected under the EPBC Act that have the potential to occur within the Construction footprint, with a 5 km search radius applied.
Species Profile and Threats Database (SPRAT)	The DCCEEW SPRAT profiles were assessed to determine habitat requirements and ecology of potentially occurring conservation significant species.
Directory of Important Wetlands of Australia (DIWA)	The DIWA database was searched to understand if any nationally important wetlands are present within the Construction footprint.
Northern Territory	
Department of Environment, Parks and Water Security (DEPWS) Natural Resource Maps (NR Maps)	NR Maps was used to identify spatial information on land tenure, planning, geology, soils, water, flora and fauna, weeds, and other environmental values.
Northern Territory (NT) Government Threatened Flora and Fauna Database	The NT Government Threatened Flora and Fauna profiles were assessed to determine habitat requirements and ecology of potentially occurring conservation significant species.
Public	
Atlas of Living Australia (ALA) Database	The ALA database was searched to retrieve historical records of conservation significant flora and fauna species assessed as likely to occur within and near the Construction footprint.
eBird Australia	eBird Australia is a collaborative project managed by the Centre for Biodiversity and Conservation Science. The database was searched for relevant records of threatened avian species.
iNaturalist Australia	A public database for the sharing of biodiversity observations globally. The database was accessed to search for relevant threatened reptile records.

4.1.2 Knowledge review

A number of ecological assessments have been undertaken within or nearby the Construction footprint, which were reviewed as part of this assessment and now form part of the desktop analysis for the current assessment, as outlined in Table 6.

Table 6 Ecological assessments reviewed.

Year	Author	Report title
2022	Ecological Management Services Pty Ltd	Ecological Assessment of the Ndunga Creek Catchment, Groote Eylandt
2022	Ecotone Flora and Fauna Consultants	Threatened Fauna Species and Weed Assessment Pre-Clearance Surveys, GEMCO - FY23 Mine Path Stage 2
2022	Ecotone Flora and Fauna Consultants	Ecological Memo - Threatened Species and Weed Assessment
2022	Ecological Management Services Pty Ltd	Threatened Fauna Species Pre-Clearance Surveys 2022 FY22 Mine Plan and CY22 Grade Control
2021	Ecological Management Services Pty Ltd	Threatened Fauna Species Pre-Clearance Surveys 2021 Western Leases Haul Road Development
2021	Cumberland Ecology	GEMCO Western Leases and Surrounds - Vegetation Mapping Report
2012	URS Australia Pty Ltd	Flora and Fauna Surveys of Western Groote Eylandt

4.2 Likelihood of Occurrence Assessment

A Likelihood of Occurrence (LOO) assessment was conducted for all conservation significant species that were identified in the desktop assessment and/or during field surveys. The likelihood of occurrence assessment was based on a review of species distributions and habitat requirements, historical records for the region, the results of habitat assessments and flora surveys conducted within the 4Elements survey area (Figure 3) and targeted fauna survey completed in the construction footprint (Figure 4), using the decision framework in Table 7.

Based on the compilation of pre-field desktop results and post-field data analysis a ‘likelihood rating’ was attributed to all conservation significant and migratory species (Appendix B). A total of 32 conservation significant species were assessed and 34 migratory species were assessed.

Table 7 Likelihood of occurrence framework

Likelihood	Decision framework
Confirmed present	Species has been recorded within the Construction footprint during field surveys
Likely to occur (High likelihood)	There are recent (within 10 years) and nearby (within 10 km) historical records of the species AND suitable high-quality habitat present within the Construction footprint
May occur (Moderate – Low likelihood)	There are older (10 - 20 years) and more regional (10 – 30 km) historical records of the species AND suitable low to moderate quality habitat present within the Construction footprint
	There are no nearby or regional historical records of the species and the species was not detected in field surveys BUT suitable moderate or high-quality habitat is present within the Construction footprint AND the species has life history characteristics that warrant increased conservatism in likelihood assessment (i.e. cryptic species or species with temporal or spatial dynamism such as transient, wide-ranging species or species that are dormant for extended periods)
	The species is unlikely to occur in the Construction footprint but has a reasonable likelihood of occurring immediately adjacent and should be included in impact assessment due to the potential for indirect impacts on the species
Unlikely to occur (Very low likelihood)	The species has been historically recorded locally or regionally, however no suitable habitat occurs within the Construction footprint, and the species has limited mobility or temporal dynamism, allowing increased confidence that it is unlikely to occur within the Construction footprint even on a transient basis
	The species has NOT been recorded locally or regionally AND only small areas of very low-quality habitat are present in the Construction footprint AND the species is readily detected wherever present.
Highly unlikely to occur (Negligible likelihood)	The species has NOT been historically recorded in the region AND no suitable habitat is present AND the Construction footprint is generally outside the species current known range.
	The species has well-known and highly specific habitat requirements that are not present in the Construction footprint AND the species has low mobility. This is reserved for species where there is very high confidence that the species will not occur



- Legend**
- Survey point
 - Survey line
 - Watercourse
 - Terrestrial survey footprint
 - Component A
 - Component B
 - Component C
 - Component D

Paper Size ISO A3
 0 100 200 300 400
 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
 GEMCO Excess Water Disposal Project

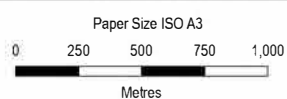
Project No. 12624084
 Revision No. 0
 Date 30/01/2025

**Terrestrial flora ecology
 survey effort map**

Figure 3



- Legend**
- Bird survey locations
 - Camera locations
 - General tracks
 - Spotlight survey transects
 - Proposed pipeline



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
 GEMCO Excess Water Disposal Project

Project No. 12624084
 Revision No. 0
 Date 10/12/2024

**Terrestrial fauna ecology
 survey effort**

FIGURE 4

4.3 Field Survey Effort

Two field survey events for the Project have been conducted to date.

- Habitat and vegetation survey: Field survey was undertaken by 4Elements Consulting field ecologists over three consecutive days, 23 - 25 April 2024. This survey aimed at assessing the potential for conservation significant species of flora, fauna and vegetation communities. Incidental observations of common species were recorded where observed.
- Fauna specific survey: GHD deployed two ecologists to conduct fauna specific field surveys from 13 – 19 August 2024. Surveys incorporated camera trapping, spotlighting and call playback, point count bird surveys and general meander searches of the entire construction footprint. All fauna species detected were recorded.

4.3.1 4Elements survey area

For the purposes of this report, the 4Elements survey area refers to the total extent of the area investigated as part of the 4Elements Consulting April 2024 field survey. The area covers a total of 153.5 ha, extending from the marine tidal zone to the north, down to approximately 500 m north of the mine (Figure 3). For the majority of the 4Elements survey area, the extent is approximately 200 m across, extending 100 m either side of the central road (Rowell Highway). The exception to this is the northern extent, whereby it expands to meet the coastal interface to approximately 450 m across. It should be noted the actual impact/footprint area of the Project will be considerably smaller at approximately 24.88 ha (terrestrial (inclusive of freshwater)), with the majority of the alignment being ~12-15 m width. Given the relatively flat terrain of the 4Elements survey area, all portions were accessed by field staff on foot. Some areas presented with standing water as a result of ex-tropical cyclone Megan in March of 2024.

4.3.2 Flora

Flora field surveys were undertaken by 4Elements Consulting and included the following objectives:

- Establishing the accuracy of the National Vegetation Information System (NVIS) and Groote Eylandt vegetation survey mapping of vegetation communities, the associated description of these communities, and their landscape context, particularly in relation to the proposed alignment of the construction footprint.
- The identification of novel and important vegetation communities that could have the potential to be important wildlife refuges such as fire-proof niches, wetlands, and unique vegetation types.
- The compilation of a floristic checklist of vascular plants found within the 4Elements survey area, with specific emphasis placed on the floristic composition of representative vegetation communities affected by the predicted construction footprint.
- The ground-truthing of vegetation patterns depicted on aerial imagery, to inform the compilation of site-scale vegetation mapping.
- Record opportunistic observations of weeds while traversing the 4Elements survey area, targeting priority listed weeds under relevant legislation.
- Prepare vouchered flora specimens for any endangered, vulnerable, or near-threatened species for submission to the Northern Territory Herbarium.

4.3.2.1 Vegetation Verification

Delineation of vegetation community distributions across the 4Elements survey area was conducted by 4Elements Consulting using quaternary level assessments, or rapid assessments, adapted from the QBEIS methodology v7.0 (Neldner et al. 2023).

These assessments are designed to capture vegetation community information quickly by targeting soils, landforms and key species within each vegetation structural layer. This information is generally sufficient to determine the identity of a mapped unit. This then allows the confirmation or alteration of polygon boundaries when mapping vegetation communities across the construction footprint. A total of 20 rapid assessments were undertaken throughout the 4Elements survey area (Figure 3).

4.3.2.2 Threatened Flora Searches

Desktop analysis determined the potential occurrences of threatened flora, listed under the EPBC Act and the NT TPWC Act, within the 4Elements survey area. Searches were undertaken by 4Elements Consulting in habitats relating to known ecological requirements during all site traverses undertaken in the survey period.

Within suitable habitat types, random meander searches were also conducted, focusing on target species preferential habitat (Figure 3). Seasonal detectability was a key consideration during threatened flora searches and influenced the survey period being undertaken in the late wet season (NT Government, 2023).

4.3.3 General Fauna Habitat Searches

The NT government website provides survey guidelines when conducting field surveys for the assessment of biodiversity. The respective guidelines do not provide a prescriptive method for the assessment of general fauna habitat. As such, to assess the level of disturbance and habitat characteristics, 4Elements Consulting applied the use of the 'Terrestrial Vertebrate Fauna Survey Guidelines for Queensland' (Eyre *et al.* 2022). Additionally, throughout the entire 4Elements survey area notes on general fauna habitat condition were recorded as below:

Presence/absence of suitable habitat for Endangered, Vulnerable and Near Threatened (EVNT) species.

- Condition and disturbance history of habitat.
- Location of site within known distribution of the species.
- Connectivity with habitat where species is known to occur.
- Structural and floristic characteristics of the vegetation.
- Presence of water in any form e.g., rivers, dams, creeks, drainage lines, soaks.
- Size and abundance of hollows and coarse woody debris (CWD).
- Presence of sandbanks, shallow wading areas, rock walls, saltmarsh, roost areas, etc.
- Fauna

GHD deployed two ecologists to conduct fauna specific field surveys from 13 – 19 August 2024. Surveys incorporated camera trapping, spotlighting and call playback, point count bird surveys and general meander searches of the entire alignment. Methods are discussed in detail below, however, these surveys were designed to assess habitat suitability and presence/absence of the following threatened species:

- Northern quoll (*Dasyurus hallucatus*) NT: critically endangered, EPBC: endangered.
- Northern hopping-mouse (*Notomys aquilo*) NT: vulnerable, EPBC: vulnerable.
- Mertens' water monitor (*Varanus mertensi*) NT: vulnerable, EPBC: endangered.
- Masked owl (northern) (*Tyto novaehollandiae kimberli*) NT: vulnerable, EPBC: vulnerable.

Timing for fauna surveys occurred within the dry season (August 2024), which is suitable timing for a range of fauna species as breeding and activity commences at this time, therefore increasing detectability.

The targeted survey utilised a component of the mammal survey methods and requirements outlined in the *NT EPA Guidelines for Assessment of the Impacts on Terrestrial Biodiversity (2013)*.

Methods were also based on:

- DEWHA (2011) Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act.
- Gillespie *et al.* (2015). A guide for the use of remote cameras for wildlife survey in northern Australia. Darwin: Charles Darwin University.
- DEWHA (2010) Survey guidelines for Australia's threatened reptiles. Guidelines for detecting reptiles listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*.
- Ward (2009). Survey protocol for the northern hopping-mouse (*Notomys aquilo*).
- EPBC Act referral guideline for the endangered northern quoll (*Dasyurus hallucatus*), EPBC Act Policy Statement (Commonwealth of Australia 2016).

The survey broadly involved establishing transects of remote cameras in suitable habitat for northern quoll and northern hopping-mouse, night and day searches, and standardised transects for northern hopping-mouse as per Ward (2009). For northern hopping-mouse the Ward (2009) approach was adapted to encompass the entire

pipeline route rather than selecting representative transects within a much larger area of potential habitat that more typically would be searched.

Survey effort at locations involved:

- Targeted nocturnal transect searches for northern quoll and northern hopping-mouse utilising thermal imaging equipment and spotlights (two nights achieved).
- Systematic transects along waterways and wetlands for Mertens' water monitor.
- Twenty *in situ* fauna cameras established targeting northern quoll, northern hopping-mouse and Mertens' water monitor for a minimum of four nights.
- Survey transect of the entire alignment for northern hopping-mouse.
- Habitat assessment was undertaken at survey locations and a more general evaluation of habitat was undertaken throughout the Construction footprint and adjacent surrounds, with a particular emphasis on potential habitats for threatened species.
- Incidental observations of all fauna were also recorded.

4.3.3.1 Camera trapping

A total of 20 motion detection, heat activated cameras were installed at points approximately 600-1,020 m along the construction footprint (Figure 4). Four Reconyx HF2X Hyperfire 2 cameras were deployed, and the remaining 16 cameras used were Swift Enduro 4G. All cameras were set to take three photos per trigger event with a 5-10 second delay between trigger events. All cameras were set to normal sensitivity. A bait station was secured in front of each camera using a star picket and cable ties.

Surrounding leafy vegetation and debris was removed to reduce the likelihood of false triggers and battery depletion. To attract the widest suite of vertebrate fauna, a bait of oats, peanut butter, sardines, macadamia oil and walnuts was used in each bait station.

4.3.3.2 Spotlighting and call playback

Spotlighting transects were conducted over two nights on 15 and 16 August 2024. Two transects were traversed using a hand-held personal spotlight to detect fauna with two ecologists spaced sufficiently as to not interfere with spotlight beams. Survey effort on 15 August consisted of one transect in the southern portion of the alignment beginning at 19:25 hours and concluding at approximately 21:00 hours. The transect was 2.62 km in length. Survey effort on 16 August consisted of one transect in the northern portion of the alignment beginning at 19:14 hours and concluding at approximately 21:00 hours. The transect length was 2.28 km. Before each transect, masked owl calls were broadcast followed by a 5-minute active listening period to detect any responses from any owl individuals.

4.3.3.3 Point count bird surveys

A total of eight 20-minute point count bird surveys were conducted over the survey period. Surveys involved recording all bird species identified through calls and/or sightings within a 20-minute period at various points along the alignment. Bird species were also recorded incidentally along the length of the entire alignment.

4.3.3.4 General meander traverse

The entirety of the construction footprint was traversed on foot by two ecologists over the survey period. Ecologists noted general habitat condition, any evidence of threatened species (tracks, scats, diggings, spoil heaps etc), potential throughfare locations in the form of drainage culverts and pipes and recorded all incidental species observed. Active searches for reptiles and amphibians were conducted where suitable ground layer microhabitats were observed. Any potential threatened flora was also recorded.

4.4 Impact assessment methods

The impact assessment undertaken for the Project comprised a number of steps:

- Potential impact pathways related to the Project were identified and examined in detail. Reference was made to the Project activities, as well as the existing environmental values as described in Section 5. Including consideration of impacts from flooding and overland flow in the Red Earth Engineering Hydrology and Hydraulic Modelling Report, which states, "*by incorporating appropriate and regular flow paths, such as raised*

or buried pipeline segments, the project is expected to have minimal impacts on the hydrological regime, causing only minor redirections of overland flows”.

- Appropriate, achievable avoidance and mitigation measures were identified for each potential impact pathway, as relevant to each sensitive receptor, as described in Section 6.3.
- The potential for residual impact was assessed in Section 6.4. Residual impact is defined as the potential impact remaining following the application of identified avoidance and mitigation measures. For conservation significant species/matters protected under the EPBC or TPWC Act, the potential for significant impact was assessed using the EPBC Significant Impact Guidelines 1.1 (DoE 2013).
- A conclusion was formed based on the outcomes of the residual impact assessment.

5. Results

5.1 Desktop Assessment

5.1.1 Flora

5.1.1.1 Threatened ecological communities

The PMST database did not identify any threatened ecological communities (TECs) with the potential to occur within 5 km of the Construction footprint.

5.1.1.2 Sensitive / significant vegetation

A search of the NR Maps flora atlas database did not identify any vegetation communities that correspond to sensitive / significant vegetation.

5.1.1.3 Threatened flora species

A search of the relevant Commonwealth and NT threatened species databases (PMST and NR Maps) did not identify any conservation significant flora species with the potential to occur within 5 km of the Construction footprint. Furthermore, no threatened flora species were identified during previous field surveys conducted in 2021 by Cumberland Ecology within the GEMCO Western Leases and surrounds.

5.1.2 Fauna

5.1.2.1 Threatened fauna species

The PMST report and NR Maps search identified a total of 44 conservation significant fauna species that have the potential to occur within the desktop search extent (Appendix A). A buffer of 5 km was used to determine search extents for both databases. These threatened species comprise:

- Eighteen bird species
- Nine mammals
- Ten reptiles
- Seven sharks

Exclusively marine species (i.e., sharks and whales) are not assessed in this report resulting in consideration of 30 species. For further information on exclusively marine species, refer to the GEMCO Excess Water Disposal – Marine Ecology Assessment Report (GHD, 2024).

5.1.2.2 Migratory Fauna

The PMST report and the NR Maps database identified 71 species listed as Migratory under the EPBC Act, that have the potential to occur within the desktop search extent (Appendix A). A buffer of 5 km was used to determine search extents for both databases. These species include:

- Fifty birds
- Six mammals
- Seven reptiles
- Eight sharks.

Exclusively marine species are not assessed in this report, resulting in assessment of 33 terrestrial species. Species that were both migratory and threatened were assessed under threatened species section. For more information on marine species, refer to Marine Ecology Assessment Report (GHD, 2024).

5.1.3 Biosecurity matters

5.1.3.1 Introduced flora

A search of the NT weeds database was undertaken to identify declared weeds listed under the NT *Weeds Management Act 2001* and/or those known as Weeds of National Significance (WoNS). The search identified 469 records of introduced plants from 18 species within the desktop search extent. Of these, three species are classified as WoNS, and all 18 species are declared Class A (to be eradicated) or Class B weeds (growth and spread to be prevented) under the *Weeds Management Act 2001*.

Table 8 WoNS and NT declared weeds within 5 km of the Construction footprint.

Species name	Common name	Number of recorded occurrences	WoNS	NT declared weed class
<i>Alternanthera pungens</i>	Khaki weed	1		B
<i>Andropogon gayanus</i>	Gamba grass	2	✓	A
<i>Azadirachta indica</i>	Neem	11		B
<i>Cryptostegia madagascariensis</i>	Ornamental rubber vine	7		A
<i>Cenchrus echinatus</i>	Mossman River grass	12		B
<i>Cenchrus polystachios</i>	Mission grass	1		B
<i>Hyptis suaveolens</i>	Hyptis	34		B
<i>Jatropha gossypifolia</i>	Bellyache bush	2	✓	B
<i>Lantana camara</i>	Lantana	2	✓	B
<i>Senna alata</i>	Candle bush	21		B
<i>Senna occidentalis</i>	Coffee senna	22		B
<i>Sida acuta</i>	Spiny head sida	9		B
<i>Sida cordifolia</i>	Flannel weed sida	7		B
<i>Sida rhombifolia</i>	Common sida	2		B
<i>Stachytarpheta</i> sp.	Snake weed	32		B
<i>Themeda quadrivalvis</i>	Grader grass	3		B
<i>Tribulus cistoides</i>	Caltrop - cistoides	8		B
<i>Tribulus terrestris</i>	Caltrop - terrestris	3		B

5.1.3.2 Introduced fauna

A desktop search of the NR Maps introduced fauna species database was undertaken to identify historical records of introduced fauna species listed under the Commonwealth *Biosecurity Act 2015*. The NR Maps database identified 13 records of introduced fauna species within the desktop search extent, comprising four species which are listed below in Table 9 (NR Maps, 2023).

Table 9 Historical records of introduced fauna located within 5 km of the Construction footprint

Scientific name	Common name	Number of recorded occurrences
<i>Hemidactylus frenatus</i>	Asian house gecko	7
<i>Rhinella marina</i>	Cane toad	1
<i>Passer montanus</i>	Eurasian tree sparrow	4
<i>Felis catus</i>	Feral cat	3

5.1.4 Remaining MNES

No World Heritage Properties, National Heritage Places, Wetlands of International Importance (RAMSAR) were recorded within the study area.

5.2 Field Survey

5.2.1 Flora

The field survey within the 4Elements survey area recorded a total of 76 native flora species from 40 families, with all tree and shrub species being identified (see Appendix C for a full list of observed flora). A number of sedges and annual forbs were not identified to species level due to a lack of reproductive material, however, this did not inhibit general vegetative descriptions.

Based on the results of the field survey, no NT and/or Commonwealth listed threatened flora species were detected during the vegetation survey within the 4Elements survey area. However, two threatened flora species are considered as 'may occur' within source code 55 vegetation mapping (Quaternary plot 188) along the western side of the Rowell Highway. These species were *Eleocharis retroflexa* and *Utricularia singeriana*.

5.2.1.1 Invasive flora

For the purpose of this report, weeds are defined as all invasive flora species, including those 'declared' and categorised as invasive under the NT *Weeds Management Act 2001* (WM Act). A total of eight invasive flora species were recorded during the field survey. A list of all weed species recorded within the 4Elements survey area is outlined in the Table 10 below.

Table 10 Summary of the invasive flora species recorded during the field survey

Common Name	Genus Species
Mission Grass	<i>Cenchrus polystachios</i>
Couch Grass	<i>Cynodon dactylon</i>
Crabgrass	<i>Digitaria bicornis</i>
Jungle Rice	<i>Echinochloa colona</i>
Hyptis	<i>Hyptis suaveolens</i>
White convolvulus creeper	<i>Merremia dissecta</i>
Rats tail Grass	<i>Sporobolus</i> sp.
Snakeweed	<i>Stachytarpheta cayennensis</i>

No Weeds of National Significance (WoNS) were recorded within the 4Elements survey area.

A notable characteristic of the construction footprint was that all weeds were located along the Rowell Highway fringes and did not penetrate into adjacent remnant vegetation. The only exception was in the Port area where extensive anthropogenic disturbance has occurred, hence weeds were present both within disturbed areas and penetrated into surrounding stands of native vegetation.

5.2.2 Vegetation Communities

During field surveys, 19 individual quaternary level assessments indicated a total of 12 NVIS vegetation communities distributed across the 4Elements survey area (Figure 3, Table 11). Many of the vegetation communities were heavily impacted by extreme weather events (i.e. ex-Tropical Cyclone Megan during March 2024), with numerous trees down and areas impacted by flooding. Grass cover was <1% over the area and a low thick, regenerating shrub layer was a common occurrence through many areas (Figure 5 to Figure 8). The results of the quaternary level assessments are outlined in the Table 11.



Figure 5 Site no. 168 indicating the lack of tussock grasses throughout the area



Figure 6 Site no. 175 indicating the lack of tussock grasses throughout the area



Figure 7 Site no. 184 showing the significant number of fallen trees



Figure 8 Site no. 186 - watercourse present within site

Table 11 Summary of the mapped vegetation communities across the 4Elements survey area according to site number

Site No.	Source Code	NVIS Level 4 Vegetation Community
168	32	<i>Acacia</i> spp., <i>Melaleuca dealbata</i> , <i>M. viridiflora</i> , <i>Corymbia polycarpa</i> , <i>Asteromyrtus symphyocarpa</i> low woodland on quaternary sandplains
169	84	<i>Lepironia</i> or <i>Dapsilanthus ramosus</i> sedgeland fringing permanent waterbodies
170	10	<i>Eucalyptus tetradonta</i> , <i>E. miniata</i> open forest to woodland with low shrub or tussock grass understorey
172	11	<i>Eucalyptus tetradonta</i> , <i>E. miniata</i> , <i>Callitris intratropicalis</i> open forest with mixed shrub/tussock grass understorey
173	41	<i>Callitris intratropicalis</i> , <i>Eucalyptus tetradonta</i> , <i>E. kombolgiensis</i> open woodland with hummock grassland understorey
174	11	<i>Eucalyptus tetradonta</i> , <i>E. miniata</i> , <i>Callitris intratropicalis</i> open forest with mixed shrub/tussock grass understorey
175	15	<i>Callitris intratropicalis</i> mid open forest\ <i>Acacia lamprocarpa</i> low open woodland\ <i>Triodia microstachya</i> mid-sparse hummock grassland
176	11	<i>Eucalyptus tetradonta</i> , <i>E. miniata</i> , <i>Callitris intratropicalis</i> open forest with mixed shrub/tussock grass understorey
177	41	<i>Callitris intratropicalis</i> , <i>Eucalyptus tetradonta</i> , <i>E. kombolgiensis</i> open woodland with hummock grassland understorey

Site No.	Source Code	NVIS Level 4 Vegetation Community
178	41	<i>Callitris intratropica</i> , <i>Eucalyptus tetrodonta</i> , <i>E. kombolgiensis</i> open woodland with hummock grassland understorey
179	42	<i>Corymbia polycarpa</i> mid woodland\ <i>Grevillea pteridifolia</i> low open woodland\ <i>Cyperus haspan</i> mid open sedgeland
180	41	<i>Callitris intratropica</i> , <i>Eucalyptus tetrodonta</i> , <i>E. kombolgiensis</i> open woodland with hummock grassland understorey
181	201	<i>Melaleuca viridiflora</i> , <i>Eucalyptus polycarpa</i> , <i>Grevillea pteridifolia</i> open woodland with <i>Asteromytrus symphyocarpa</i> and <i>Vetiveria elongata</i> tussock grassland
182	26	<i>Melaleuca leucadendra</i> mid woodland\ <i>Grevillea pteridifolia</i> low open woodland\ <i>Eriachne trisetata</i> mid tussock grassland
184	40	<i>Eucalyptus tetrodonta</i> mid woodland\ <i>Pandanus spiralis</i> low open woodland\ <i>Heteropogon triticeus</i> mid open tussock grassland
185	40	<i>Eucalyptus tetrodonta</i> mid woodland\ <i>Pandanus spiralis</i> low open woodland\ <i>Heteropogon triticeus</i> mid open tussock grassland
186	42	<i>Corymbia polycarpa</i> mid woodland\ <i>Grevillea pteridifolia</i> low open woodland\ <i>Cyperus haspan</i> mid open sedgeland
187	17	<i>Melaleuca viridiflora</i> or <i>M. cajuputi</i> or <i>M. leucadendra</i> or <i>M. ferruginea</i> , <i>Eucalyptus polycarpa</i> , <i>E. bigalerita</i> open forest with <i>Pandanus spiralis</i> and mixed tussock grassland understorey
188	55	<i>Melaleuca viridiflora</i> mid woodland\ <i>Grevillea pteridifolia</i> tall open shrubland\ <i>Dapsilanthus spathaceus</i> mid sedgeland

When mapping the extent of the vegetation communities across the 4Elements survey area, a further five Level 4 vegetation communities were recorded. These communities are outlined in the Table 12.

Table 12 Summary of the additional communities recorded within the 4Elements survey area

Source Code	NVIS Level 4 Vegetation Community
43	<i>Melaleuca viridiflora</i> low open woodland\ <i>Melaleuca viridiflora</i> mid open shrubland\ <i>Chrysopogon elongatus</i> mid tussock grassland
92	<i>Brachychiton paradoxus</i> low isolated trees\ <i>Chrysopogon elongatus</i> tall tussock grassland
100	Saline tidal flats
202	Cleared
n/a	Ocean

Based on the above, a total of 17 NVIS Level 4 vegetation communities were mapped across the 4Elements survey area which included a mix of modified / cleared areas and remnant native vegetation (Table 13). The most dominant community was recorded as '202 – Cleared' covering 46.79 ha, followed by '41 - *Callitris intratropica*, *Eucalyptus tetrodonta*, *E. kombolgiensis* open woodland with hummock grassland understorey' covering 34.26 ha and '10 - *Eucalyptus tetrodonta*, *E. miniata* open forest to woodland with low shrub or tussock grass understorey' covering 24.67 ha.

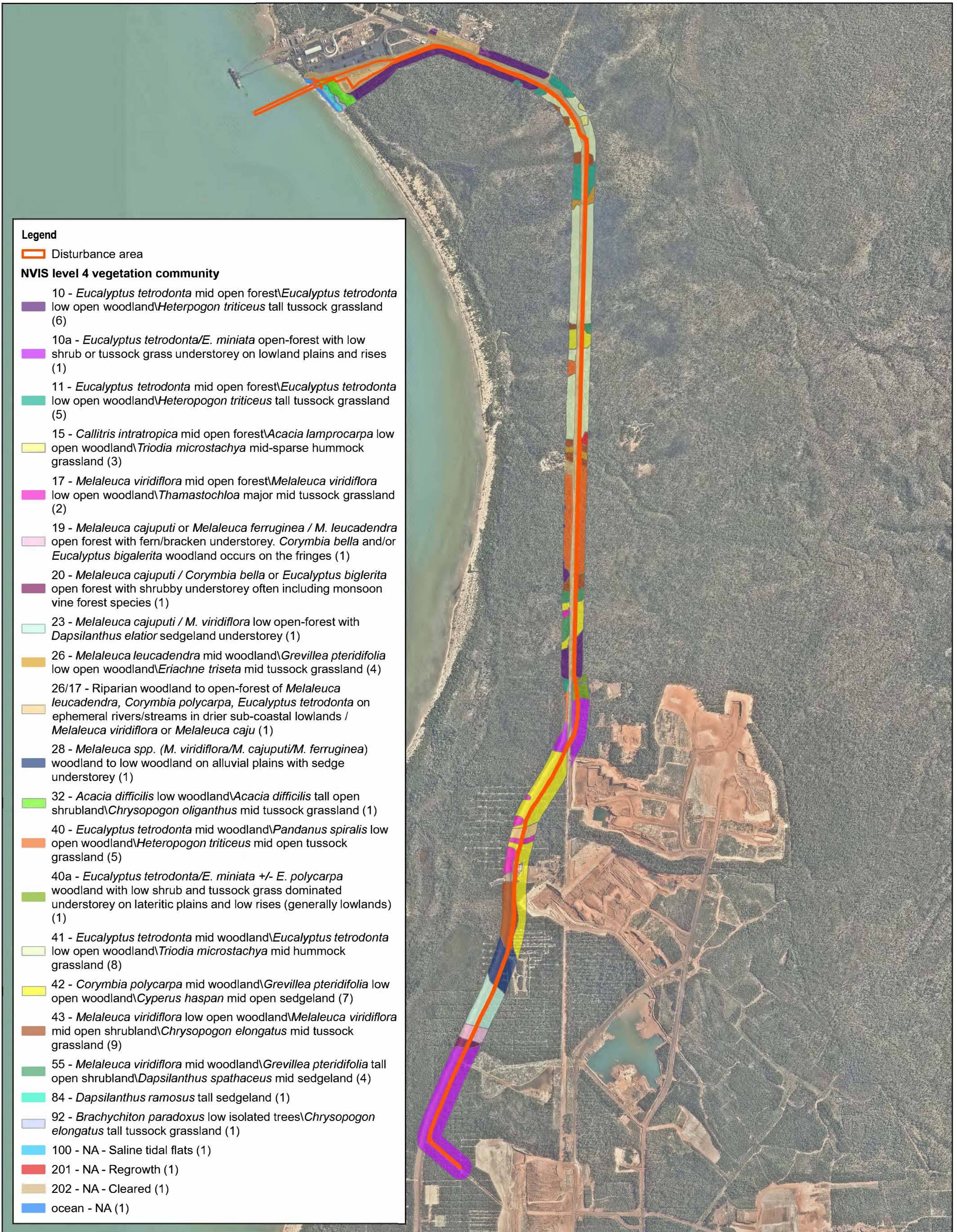
Several of the communities (e.g. 10, 11, 15, 41) all contain somewhat similar vegetation composition and/or structure and may be slight variations on the same community. For the purpose of this report, GHD has based the mapping on the spatial information provided by 4Elements Consulting.

Table 14 and Figure 9 provides an overview of all the vegetation communities mapped during the field survey across the 4Elements survey area and the full extent of each.

Table 13 Summary of the mapped vegetation communities across the 4Elements survey area

Source Code	NVIS Level 4 Vegetation Community	Area (ha)
10	<i>Eucalyptus tetrodonta</i> mid open forest\ <i>Eucalyptus tetrodonta</i> low open woodland\ <i>Heteropogon triticeus</i> tall tussock grassland	24.67
11	<i>Eucalyptus tetrodonta</i> mid open forest\ <i>Eucalyptus tetrodonta</i> low open woodland\ <i>Heteropogon triticeus</i> tall tussock grassland	6.94

Source Code	NVIS Level 4 Vegetation Community	Area (ha)
15	<i>Callitris intratropica</i> mid open forest\ <i>Acacia lamprocarpa</i> low open woodland\ <i>Triodia microstachya</i> mid-sparse hummock grassland	1.3
17	<i>Melaleuca viridiflora</i> mid open forest\ <i>Melaleuca viridiflora</i> low open woodland\ <i>Thamastochloa major</i> mid tussock grassland	0.41
26	<i>Melaleuca leucadendra</i> mid woodland\ <i>Grevillea pteridifolia</i> low open woodland\ <i>Eriachne trisetata</i> mid tussock grassland	2.09
32	<i>Acacia difficilis</i> low woodland\ <i>Acacia difficilis</i> tall open shrubland\ <i>Chrysopogon oliganthus</i> mid tussock grassland	3.2
40	<i>Eucalyptus tetradonta</i> mid woodland\ <i>Pandanus spiralis</i> low open woodland\ <i>Heteropogon triticeus</i> mid open tussock grassland	14.5
41	<i>Eucalyptus tetradonta</i> mid woodland\ <i>Eucalyptus tetradonta</i> low open woodland\ <i>Triodia microstachya</i> mid hummock grassland	34.26
42	<i>Corymbia polycarpa</i> mid woodland\ <i>Grevillea pteridifolia</i> low open woodland\ <i>Cyperus haspan</i> mid open sedgeland	5.57
43	<i>Melaleuca viridiflora</i> low open woodland\ <i>Melaleuca viridiflora</i> mid open shrubland\ <i>Chrysopogon elongatus</i> mid tussock grassland	5.99
55	<i>Melaleuca viridiflora</i> mid woodland\ <i>Grevillea pteridifolia</i> tall open shrubland\ <i>Dapsilanthus spathaceus</i> mid sedgeland	3.52
84	<i>Dapsilanthus ramosus</i> tall sedgeland	0.58
92	<i>Brachychiton paradoxus</i> low isolated trees\ <i>Chrysopogon elongatus</i> tall tussock grassland	0.45
100	NA – saline tidal flats	1.13
201	NA - regrowth	0.68
202	NA - cleared	46.79
ocean	NA	1.17
Grand Total		153.25

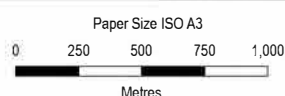


Legend

Disturbance area

NVIS level 4 vegetation community

- 10 - *Eucalyptus tetradonta* mid open forest*Eucalyptus tetradonta* low open woodland*Heteropogon triticeus* tall tussock grassland (6)
- 10a - *Eucalyptus tetradonta*/*E. miniata* open-forest with low shrub or tussock grass understorey on lowland plains and rises (1)
- 11 - *Eucalyptus tetradonta* mid open forest*Eucalyptus tetradonta* low open woodland*Heteropogon triticeus* tall tussock grassland (5)
- 15 - *Callitris intratropica* mid open forest*Acacia lamprocarpa* low open woodland*Triodia microstachya* mid-sparse hummock grassland (3)
- 17 - *Melaleuca viridiflora* mid open forest*Melaleuca viridiflora* low open woodland*Themastochloa* major mid tussock grassland (2)
- 19 - *Melaleuca cajuputi* or *Melaleuca ferruginea* / *M. leucadendra* open forest with fern/bracken understorey. *Corymbia bella* and/or *Eucalyptus bigalerita* woodland occurs on the fringes (1)
- 20 - *Melaleuca cajuputi* / *Corymbia bella* or *Eucalyptus biglerita* open forest with shrubby understorey often including monsoon vine forest species (1)
- 23 - *Melaleuca cajuputi* / *M. viridiflora* low open-forest with *Dapsilanthus elatior* sedgeland understorey (1)
- 26 - *Melaleuca leucadendra* mid woodland*Grevillea pteridifolia* low open woodland*Eriachne trisetata* mid tussock grassland (4)
- 26/17 - Riparian woodland to open-forest of *Melaleuca leucadendra*, *Corymbia polycarpa*, *Eucalyptus tetradonta* on ephemeral rivers/streams in drier sub-coastal lowlands / *Melaleuca viridiflora* or *Melaleuca caju* (1)
- 28 - *Melaleuca* spp. (*M. viridiflora*/*M. cajuputi*/*M. ferruginea*) woodland to low woodland on alluvial plains with sedge understorey (1)
- 32 - *Acacia difficilis* low woodland*Acacia difficilis* tall open shrubland*Chrysopogon oliganthus* mid tussock grassland (1)
- 40 - *Eucalyptus tetradonta* mid woodland*Pandanus spiralis* low open woodland*Heteropogon triticeus* mid open tussock grassland (5)
- 40a - *Eucalyptus tetradonta*/*E. miniata* +/- *E. polycarpa* woodland with low shrub and tussock grass dominated understorey on lateritic plains and low rises (generally lowlands) (1)
- 41 - *Eucalyptus tetradonta* mid woodland*Eucalyptus tetradonta* low open woodland*Triodia microstachya* mid hummock grassland (8)
- 42 - *Corymbia polycarpa* mid woodland*Grevillea pteridifolia* low open woodland*Cyperus haspan* mid open sedgeland (7)
- 43 - *Melaleuca viridiflora* low open woodland*Melaleuca viridiflora* mid open shrubland*Chrysopogon elongatus* mid tussock grassland (9)
- 55 - *Melaleuca viridiflora* mid woodland*Grevillea pteridifolia* tall open shrubland*Dapsilanthus spathaceus* mid sedgeland (4)
- 84 - *Dapsilanthus ramosus* tall sedgeland (1)
- 92 - *Brachychiton paradoxus* low isolated trees*Chrysopogon elongatus* tall tussock grassland (1)
- 100 - NA - Saline tidal flats (1)
- 201 - NA - Regrowth (1)
- 202 - NA - Cleared (1)
- ocean - NA (1)



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project

Project No. 12624084
Revision No. 0
Date 10/12/2024

**Vegetation communities
across the 4Elements survey area**

FIGURE 9

5.2.3 Fauna

During GHD field surveys, a total of 74 fauna species were recorded (Table 31 and Figure 12). This list comprised 54 bird species, 11 mammals and nine reptiles. Notably, no frogs were detected. Of the 74 species, one, the northern quoll (*Dasyurus hallucatus*) is a listed threatened species. Northern quoll is listed as critically endangered under the TPWC Act and endangered under the EPBC Act 1999.

A minimum of six northern quoll individuals were recorded during four survey nights (Figure 10). Quolls were detected on cameras GR7, M22, M30, M33, M37 and M39. Northern quoll prints were detected at two locations; approximately 2.5 km north of the southern extent of the project and approximately 660 m south of Bartalumba Bay Road in the northern portion of the alignment, totalling eight records of the species (Figure 10). The habitat of the Northern Quoll typically includes rocky areas for denning, surrounded by vegetated regions used for foraging and dispersal. These rocky habitats are often high-relief, rugged, and dissected, but can also consist of or fields or caves in lower-lying areas. (DCCEEW, 2023). No denning habitat suitable for northern quoll was recorded in the Construction footprint.

Searches for northern hopping-mouse habitat and spoil heaps did not result in the identification of potential habitat, nor was any evidence of burrows recorded. Recent surveys have verified the inland occurring northern hopping-mouse's preference for sandy areas around weathered sandstone, with 95% of recorded burrows within 500 m of sandstone or quartzite edges and a median distance of 136 m (GEMCO 2022; Barden and Diете 2022). A 500 m buffer from sandstone margins encompasses most records from Groote Eylandt, including studies by Barden (2019-2023), Heiniger (2020b), Diете (2017), GEMCO Southern Mammals Small Mammal Study, Eastern Leases Environmental Impact Assessment (Cumberland Ecology 2015), and Coffey Environments (2010).

Few burrows recorded beyond 500 m were near riparian corridors or in sand on river flood terraces. Some burrows over 500 m away were found in a broad valley between sandstone areas in the Eastern Lease North area. The sole mainland record, held by the Museum and Art Gallery of the Northern Territory, also fits this pattern (Dixon 2019). Within the project area, potential habitat for the species was observed to be heavily modified (i.e. fire) and generally unsuitable for this species based on known habitat requirements. Notably, the geology which is associated with northern hopping-mouse burrows is not present in the vicinity of the Construction footprint.

Two listed migratory marine species were recorded, common tern (*Sterna hirundo*) and eastern osprey (*Pandion haliaetus*). The common tern was recorded flying just offshore above the outfall area and the eastern osprey recorded flying above the port area. Other common species recorded are listed in Table 31 including agile wallaby and savannah glider (Figure 11).



Figure 10 Northern quolls recorded on cameras GR7 and M22 during four nights of field survey between 14 – 18 August 2024.



Figure 11 Agile wallaby (*Macropus agilis*) recorded on camera M22 and savannah glider (*Petaurus ariel*) photographed during spotlight surveys.

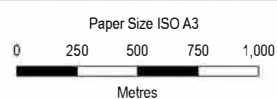
The 4Elements Consulting field surveys detected a total of eight fauna species during the April survey event. These are summarised in Table 14. The black-necked stork brings total fauna species recorded during the two field surveys to 75.

Table 14 Table summarising 4Elements Consulting fauna observations during April 2024 field surveys

Species Name	Common Name
<i>Cacatua sanguinea</i>	Little corella
<i>Lichmera indistincta</i>	Brown honeyeater
<i>Corvus orru</i>	Torresian crow
<i>Philemon argenticeps</i>	Silver-crowned friarbird
<i>Trichoglossus rubritorquis</i>	Red-collared lorikeet
<i>Aprosmictus erythropterus</i>	Red-winged parrot
<i>Ephippiorhynchus asiaticus</i>	Black-necked stork
<i>Canis lupus dingo</i>	Dingo



- Legend**
- GHD Northern Quoll observations
 - Hollow-bearing tree
 - Culvert/drainage
 - Pipeline



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
 GEMCO Excess Water Disposal Project

Project No. 12624084
 Revision No. 0
 Date 10/12/2024

Field observations

FIGURE 12

5.2.4 Habitat Condition

Throughout the construction footprint and the broader 4Elements survey area, ecologists noted a lack of general habitat features including stones, boulders or other rock crevices (i.e. caves), however, several of the sites did contain fallen logs (>10 cm) and other coarse litter, likely the result of storm related debris (Figure 13). The field survey noted a lack of hollow bearing trees and/or stags within the construction footprint with those habitat features described as rare.

The majority of sampled sites during the 4Elements Consulting field surveys in April 2024 indicated at least minor to moderate levels of disturbance by regular and repeated fire which would act to remove ground cover vegetation, leaf litter and coarse woody debris. The removal of the ground cover vegetation limits the refuge habitat for many small terrestrial fauna species. Almost half of the 4Elements Consulting survey sites (7 of 19) indicated minor to severe storm disturbance including downed trees and heavy debris (Table 15). Clearing of vegetation and the presence of invasive flora species were also noted across some of the sites within the 4Elements survey area.



Figure 13 Pictures illustrating limited structural complexity and lack of mature vegetation over much of the survey area

It should be noted that during the 4Elements Consulting surveys, most ephemeral drainage lines and creeks had water present due to the passage of ex-tropical cyclone Megan in March 2024 (Figure 14). This level of water is not characteristic of the landscape year-round as evidenced by field surveys conducted GHD in August 2024 where most drainage lines were dry or held small pools of standing water (Figure 15).



Figure 14 Actively flowing drainage lines inundated with water from ex-tropical cyclone Megan in March 2024.



Figure 15 Largely dry drainage lines leading to culverts under Rowell Highway observed during August 2024 surveys

Table 15 Summary of the type and severity of disturbance observed at each site. Severity – 0: nil; 3: severe.

Disturbance Type	Site Number																			
	168	169	170	172	173	174	175	176	177	178	179	180	181	182	184	185	186	187	188	
Wildfire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prescribed Burn	1	0	2	2	1	2	2	1	2	1	2	0	1	1	2	2	1	1	1	1
Logging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Treatment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grazing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clearing	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weeds	1	2	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Erosion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Storm	0	0	0	0	0	0	1	2	3	1	2	0	0	0	3	1	0	0	0	0

5.3 Likelihood of Occurrence

With consideration of both the desktop assessment review of database records and subsequent field survey effort, the species identified during desktop assessment analysis were assessed against the criteria outlined in Section 4.2 of this report and is presented in Appendix B.

Of the 30 identified conservation significant fauna species, one was confirmed present, two were considered ‘likely to occur’, six were classified as ‘may occur’, 16 were considered ‘unlikely to occur’ and five were considered ‘highly unlikely to occur’. A total of two flora species were classified as ‘may occur’ from field survey observations of habitat species classified as ‘confirmed present’, ‘likely to occur’ or ‘may occur’ are summarised in Table 16.

A total of 34 migratory species were assessed against the criteria outlined in Section 4.2 of this report and is presented in Appendix B. Of the 34 assessed species, two were confirmed present through field surveys, zero were ‘likely’, 17 were classified as ‘may occur’, nine were considered unlikely to occur and six were considered highly unlikely to occur. Species classified as ‘confirmed present’ or ‘may occur’ are summarised in Table 16.

Table 16 Summary of LOO results - 'confirmed present', 'likely to occur' and 'may occur' species).

Species name	Common name	Conservation status		Likelihood of occurrence
		EPBC Act	TPWC Act	
Flora				
<i>Eleocharis retroflexa</i>	Curved spikerush	V	NL	May occur
<i>Utricularia singeriana</i>	Singer's bladderwort	NL	V	May occur
Birds				
<i>Tyto novaehollandiae kimberli</i>	Masked owl (northern)	V	V	Likely to occur
<i>Tringa nebularia</i>	Common greenshank	E, Mig	NL	May occur
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V, Mig	NL	May occur
<i>Limosa lapponica baueri</i>	Alaskan bar-tailed godwit	V	V	May occur
Mammals				
<i>Dasyurus hallucatus</i>	Northern quoll	E	CE	Confirmed present
<i>Trichosurus vulpecula arnhemensis</i>	Northern brushtail possum	V	NL	May occur
<i>Macroderma gigas</i>	Ghost bat	V	NL	May occur
Reptiles				
<i>Varanus mertensi</i>	Mertens' water monitor	E	V	Likely to occur
<i>Tiliqua scincoides intermedia</i>	Northern blue-tongue skink	CE	NL	May occur
Marine migratory				
<i>Pandion haliaetus</i>	Eastern Osprey	Mig	NL	Confirmed present
<i>Sterna hirundo</i>	Common tern	Mig	NL	Confirmed present
<i>Sterna sumatrana</i>	Black-naped tern	Mig	NL	May occur
<i>Hydroprogne caspia</i>	Caspian tern	Mig	NL	May occur
<i>Tringa brevipes</i>	Grey-tailed tattler	Mig	NL	May occur
<i>Sternula albifrons</i>	Little tern	Mig	NL	May occur
<i>Pluvialis fulva</i>	Pacific golden plover	Mig	NL	May occur
<i>Calidris ruficollis</i>	Red-necked stint	Mig	NL	May occur
<i>Chlidonias leucopterus</i>	White-winged black tern	Mig	NL	May occur
<i>Sterna dougallii</i>	Roseate tern	Mig	NL	May occur
Terrestrial migratory				
<i>Apus pacificus</i>	Fork-tailed swift	Mig	NL	May occur
<i>Cuculus optatus</i>	Oriental cuckoo	Mig	NL	May occur
<i>Hirundo rustica</i>	Barn swallow	Mig	NL	May occur
<i>Cecropis daurica</i>	Red-rumped swallow	Mig	NL	May occur
<i>Motacilla cinerea</i>	Grey wagtail	Mig	NL	May occur
Wetland migratory				
<i>Gallinago megala</i>	Swinhoe's snipe	Mig	NL	May occur
<i>Glareola maldivarum</i>	Oriental pratincole	Mig,	NL	May occur
<i>Acrocephalus orientalis</i>	Oriental reed-warbler	Mig	NL	May occur
<i>Charadrius veredus</i>	Oriental plover	Mig	NL	May occur
EPBC Act Conservation status – CE: Critically endangered, E: Endangered, V: Vulnerable, Mig: Migratory, NL: Not listed TPWC Act Conservation status – CE: Critically endangered, V: Vulnerable, NL: Not listed				

6. Discussion

6.1 Likelihood of occurrence

The likelihood of occurrence for threatened flora and fauna were assessed following field survey effort, using knowledge of habitats present within the Construction footprint to inform the suitability of the area for these species. The results of the likelihood of occurrence for each species are summarised above in Table 16 and detailed in Appendix B.

Based on field survey observations, the Construction footprint is characterised by natural (e.g. fire, stormwater and flooding) and anthropogenically (e.g. clearing, infrastructure) modified vegetation. Many vegetation communities were lacking in or contained a highly modified forb and/or graminoid layer, indicating reduced structural complexity for cover-dependant fauna. Apparent regular burns throughout much of the Construction footprint have removed ground cover vegetation in many areas, limiting the availability of refuge for a range of terrestrial fauna species.

Natural processes may also act to supplement the habitat features adjacent to the Construction footprint (i.e. storm-blown trees act as refuge for terrestrial fauna, enhancing habitat features within the Construction footprint). As such, the quality, availability and density of suitable habitat features within the Construction footprint is expected to be dynamic and fluctuate depending on seasonal variations in weather patterns and climate. Therefore, the assessment of these processes based on static field surveys is somewhat constrained and a precautionary approach has been adopted where necessary.

The relatively narrow (~12-15 m) and linear extent of the Construction footprint and presence of existing road infrastructure immediately adjacent would act to limit the suitability of the vegetation for many local flora and fauna species. Many fauna species are known to occupy or disperse throughout large areas or present as highly mobile individuals (i.e. avian species, quolls). This would influence the likelihood of an individual being present within a vegetation type for a specified purpose (i.e. foraging, breeding, roosting). To combat this, the assessment adopted a precautionary approach when considering the likelihood of a species being present within the Construction footprint.

6.1.1 Flora

Field surveys results indicate that both *Eleocharis retroflexa* and *Utricularia singeriana* have been assessed as “may occur” within the Construction footprint, specifically within source code 55 vegetation mapping community. This community is described as ‘*Melaleuca viridiflora* mid woodland/*Grevillea pteridifolia* tall open shrubland/*Dapsilanthus spathaceus* mid sedgeland’ and makes up ~0.14 ha of the proposed disturbance area.

E. retroflexa is described as a small cryptic annual grass-like sedge known to occur in NT and Queensland in shallow water on the margins of seasonal swamps in association with *Melaleuca viridiflora* and *Eucalyptus phoenicea*. The species is listed as Vulnerable under the EPBC Act. No known threats are listed in the NT, however, fire during the known flowering/fruiting period (April – May) may threaten the species. Additionally, trampling may also impact the species where livestock are present. Being an annual (Kern, 1974), the species may undergo extreme natural fluctuations as it occurs on the edges of swamps and watercourses either in shallow water or dried out areas on fine sand, silt or grey podzolics, laterite or clay loam (Cowie and Kerrigan 2006; Queensland Herbarium 2009).

U. singeriana is a small terrestrial annual carnivorous plant endemic to northern WA and the NT. The species is among the rarest of the Australian endemic *Utricularia* species found in the NT (Cowie 2002) and grows in wet sand and boggy seepage in swamps and near creeks. This species is listed as Vulnerable under the TPWC Act. Individuals are known to flower from March to June (Taylor 1989). The recent collection from Groote Eylandt (Lewis *et al.* 2021) suggests that the distribution may be wider across Arnhem Land and nearby islands (Baleeiro and Jobson 2022).

The 4Elements Consulting survey were conducted during the optimal flowering period for both species, both of which were not observed. Both species are known as annuals, with flowering varying according to conditions and climate. Given the static nature of the field surveys, providing an assessment of the Construction footprint at a fixed point in time, there remains a possibility that either species may be present in low abundance during its flowering period in areas of suitable habitat.

Targeted surveys for *E. retroflexa* and *U. singeriana* within suitable habitat will assist to greatly minimise any risk of impacts to either species. The requirement for targeted surveys should be re-assessed once the design of the pipeline has been finalised to determine if the footprint will disturb suitable habitat for either species. No further species-specific mitigation measures are recommended as part of the proposed works.

6.1.2 Vegetation

Based on the results of field surveys, no NT or Commonwealth TECs were confirmed present within the Construction footprint.

6.1.3 Fauna

According to the findings from the field surveys, despite the overall altered state of fauna habitats within the Construction footprint and considering the availability and condition of these habitats observed during the surveys, various threatened fauna species were evaluated as likely to be present in some form (e.g., foraging, dispersal, nesting, roosting, etc.) within the Construction footprint.

Given the availability of suitable habitat in varying condition, proximity of known records and the habitat preferences/ecology of the species, the following species were considered 'confirmed present' or 'likely to occur' within the Construction footprint:

Birds

- *Tyto novaehollandiae kimberli* - northern masked owl – likely to occur – Vulnerable EPBC Act & TPWC Act

Mammals

- *Dasyurus hallucatus* - northern quoll – confirmed present – Endangered EPBC Act & Critically Endangered TPWC Act

Reptiles

- *Varanus mertensi* - Mertens' water monitor – likely to occur – Endangered EPBC Act & Vulnerable TPWC Act

Given the availability of marginally suitable habitat, scattered known records and the habitat preferences / ecology of the species, the following were assessed as 'may occur' within the Construction footprint:

Birds

- *Tringa nebularia* – common greenshank – Endangered & Migratory EPBC Act
- *Calidris acuminata* – sharp-tailed sandpiper – Vulnerable & Migratory EPBC Act
- *Limosa lapponica baueri* – Alaskan bar-tailed godwit – Vulnerable EPBC Act and TWPC Act

Mammals

- *Trichosurus vulpecula arnhemensis* – northern brushtail possum – Vulnerable EPBC Act
- *Macroderma gigas* – ghost bat – Vulnerable EPBC Act

Reptiles

- *Tiliqua scincoides intermedia* – northern blue-tongue skink – Critically endangered EPBC Act

Many of the species identified during the desktop assessment and discussed in Section 5.1.2.2 are known migratory shorebirds, inhabiting marine, coastal or freshwater habitat. The potential shorebird habitat within the Construction footprint is limited and is considered unlikely to support significant numbers of shorebirds for any given period. The substrate is approximately 90 % sand and 10 % silt, limiting invertebrate species diversity that form shorebird diets (VanDusen *et al*, 2012). Some species such as sharp-tailed sandpiper, Alaskan bar-tailed godwit and common greenshank are more generalist foragers and may occasionally forage in this area to sample foraging potential in a passing nature however it is considered unlikely the species would rely on the area for any significant foraging purposes.

These species may occasionally roost or rest at the area, however, given the proximity to an active port it is considered unlikely, particularly as more suitable roosting habitat occurs further away from the Port. An abundance of similar marine shoreline is available immediately adjacent to the Construction footprint, this would provide habitat of a similar or better condition than that within the Construction footprint.

Given the narrow and generally linear extent of the coastal interface (<150 m across), the likelihood of an individual of those species being present within the Construction footprint is somewhat reduced and may be variable from year to year. For the purposes of assessing the significance of the impact, 'shorebirds' have been assessed as a single group (refer Section 6.4.2.1) and includes those species with a dual listing as 'migratory' under the EPBC Act. A number of mitigation measures are proposed (refer Section 6.3) to limit the risk of impacting on any present individuals.

A number of other threatened fauna species are likely to be present within or adjacent to the Construction footprint (see Table 16 above) for foraging and transitory purposes, with a very low likelihood of nesting and/or roosting due to the lack of suitable habitat features to support those activities. Any disturbance to those activities will only persist for the duration of the construction of the Project. It is assumed that post construction, the foraging opportunities for these species within the Construction footprint will persist. These species are likely to occur in low densities or in short duration(s) within the Construction footprint given the narrow linear extent and lack of abundant suitable habitat.

6.1.3.1 Northern quoll

The confirmed presence of northern quoll, with at least six individuals recorded within the construction footprint in four nights of camera trapping survey, illustrates the species' abundance and use of the Construction footprint. It is worth noting too, that GHD field surveys were conducted at the end of annual mating season (June -August), where male mortality is particularly high after successful mating events (DCCEEW, 2024). This is likely to have resulted in reduced detection rates of the species during field surveys.

Groote Eylandt is considered a refuge for the species because key threatening processes are absent or limited; cane toads and introduced ungulates are absent, feral cats are infrequently detected and the fire regime is limited compared with mainland NT (Heiniger *et al*, 2020).

A 2020 study on the demography and spatial requirements of northern quolls on the island found the average density of northern quolls was 0.33/ha with female median home ranges of 15.7 ha and male home ranges of 128.6 ha. Male ranges increased significantly during breeding season, up to 1616 ha (Heiniger *et al*, 2020). In contrast to this, abundance density on mainland NT has fluctuated over time with historical densities reported at around 0.08 ha *before* recent significant declines. This illustrates the relative high abundance of the species on Groote Eylandt.

The lack of suitable denning resources within the construction footprint suggests the species persists in the Construction footprint in a transient nature for the purpose of foraging, dispersal and courtship.

6.1.3.2 Masked owl (northern)

Although the northern masked owl was not detected during field surveys it is likely the species persists within the broader area for foraging purposes and likely roosts and nests in nearby forest where sufficient cover and available hollow resources exist (outside of the Construction footprint).

The species was detected at Ndunga Creek in surveys conducted by Ecological Management Services (EMS) in 2021 (EMS, 2022). The EMS surveys recorded 68 potential northern masked owl habitat trees within the Ndunga creek survey area. Ndunga creek intersects with the pipeline alignment at the southern end of the Construction footprint, however none of the potential masked owl habitat trees occur within the Construction footprint itself. It should be noted that although a low number of hollow-bearing trees were recorded in the Construction footprint during field surveys, none exhibited hollows of sufficient size for northern masked owl nesting or roosting.

6.1.3.3 Mertens' water monitor

Although the Mertens' water monitor was not detected during field surveys it is 'likely to occur' within the construction footprint given the presence of suitable habitat (i.e. permanent to semi-permanent watercourses) and known records within 100 m. The Construction footprint would provide suitable foraging and sheltering opportunities on the banks of the permanent and ephemeral watercourses for any present individuals.

Given the strong preference for riparian habitat (i.e. species rarely ventures more than 5-10 m from water edge [Wilson & Knowles 1988; Mayes 2006; Smith & Griffiths 2009]), only portions of the Construction footprint are likely to offer suitable habitat for the species. As such, the species is assumed to be in low to moderate densities within and adjacent to the Construction footprint, with fluctuations depending on the availability and abundance of freshwater and riparian habitat.

6.1.3.4 Migratory marine

Given the proximity of known records and the habitat preferences/ecology of the species, the following species were assessed as 'confirmed present' or 'may occur' in the Construction footprint (refer Appendix B):

Migratory marine:

- *Pandion haliaetus* - eastern osprey – confirmed present
- *Sterna hirundo* - common tern – confirmed present
- *Sterna sumatrana* - black-naped tern – may occur
- *Hydroprogne caspia* - caspian tern - may occur
- *Tringa brevipes* - grey-tailed tattler - may occur
- *Sternula albifrons* - little tern - may occur
- *Pluvialis fulva* - pacific golden plover - may occur
- *Calidris ruficollis* - red-necked stint - may occur
- *Chlidonias leucopterus* - white-winged black tern - may occur
- *Sterna dougallii* - roseate tern - may occur

Given the potential for disturbance by the construction and implementation of the Project, specifically the offshore alignment of the pipeline at the ocean outfall, the potential for a significant impact to the above species are assessed in Section 6.4.3.1.

Many of the above species are considered part of the 'shorebird' group and have been categorised as such. Therefore, the assessment of the Project impacts to those species is captured under Section 6.4.2.1 and 6.4.2.2. The remaining fauna are assessed under Section 6.4.3.1.

6.1.3.5 Migratory terrestrial

Given the proximity of known records and the habitat preferences/ecology of the species, the following species were assessed as 'may occur' in the Construction footprint (refer Appendix B):

- *Apus pacificus* - fork-tailed swift
- *Cuculus optatus* - oriental cuckoo
- *Hirundo rustica* - barn swallow
- *Cecropis daurica* - red-rumped swallow
- *Motacilla cinerea* - grey wagtail

6.1.3.6 Migratory Wetland

Given the availability of suitable habitat in varying condition, proximity of known records and the habitat preferences / ecology of the species, the following species were assumed as 'may occur' in the Construction footprint (refer Appendix B):

- *Gallinago megala* - Swinhoe's snipe
- *Glareola maldivarum* - oriental pratincole
- *Acrocephalus orientalis* - oriental reed-warbler
- *Charadrius veredus* - oriental plover

The criteria within the Significant Impact Guidelines 1.1 defines 'important habitat' for a migratory species. The significant impact guideline (DoE 2013) provides guidance towards what may constitute important habitat for the migratory species 'likely to occur' within the Construction footprint.

6.2 Potential impacts

Given the likelihood of occurrence of the species in Section 6.1, the following impacts to ecological values may occur during the construction and / or operations phase of the Project:

- **Fauna injury and mortality:** Construction work within the construction footprint has the potential to cause direct wildlife injury and mortality if animals are struck by machinery or injured during the clearing process.
- **Habitat removal:** Clearing of vegetation has to the potential to remove habitat for fauna species resulting in displacement of individuals and potential increased pressure on adjacent habitat.
- **Disruption of fauna behaviour:** Construction activities may result in a temporary, localised disturbance to fauna behaviour in local habitats through construction-related noise and vibration (and lighting, if required).
- **Spread of weeds:** Vegetation clearing and soil disturbance during construction has the potential to degrade local habitats through facilitating the introduction and spread of established introduced species.
- **Proliferation of pest fauna:** Construction activities have the potential to attract localised concentrations of exotic fauna by increasing the availability of food and water through inappropriate waste disposal and water management. Exotic fauna species can adversely impact native wildlife by increasing levels of predation and competition. In particular, proliferation of feral cats and/or cane toads may have a significant impact on the northern quoll population.
- **Waterway degradation:** Vegetation clearing, and earthworks may expose sediment to erosive forces, which could degrade through overland flow and discharge to the downstream drainage features through mobilisation of pollutants, increased turbidity and/or sediment deposition. Additionally, development of pipeline infrastructure may influence the course of overland flow which may alter surface hydrology and watercourse structure.
- **Restriction of movement/fauna dispersal barriers:** The pipeline infrastructure has the potential to restrict movement across the landscape. The construction of the pipeline in the same corridor as the Rowell Highway may compound the barrier effect on species such as northern quoll and northern brush-tail possum. Mitigation measures as described in Section 6.3 are critical to reducing the potential impacts of the proposed above-ground infrastructure restricting the movement of terrestrial fauna across the landscape.

The impacts outlined above are composed of a mix of direct (i.e. fauna strike) and indirect (i.e. establishment of invasive flora, restriction of movement), and temporary (i.e. possible during the construction phase) and permanent (i.e. remaining in-situ after the completion of construction).

6.2.1 Fauna movement and connectivity, design considerations to facilitate fauna passage

Linear infrastructure, including roads, pipelines, and electrical networks can contribute to fauna habitat fragmentation and an overall reduction in faunal diversity (de Jonge *et al.*, 2022). It should be recognised that the currently proposed pipeline alignment had been selected by the Project team to sit within an already developed and fragmented landscape intersected by the Rowell Highway and mineral lease. To ensure adequate faunal connectivity through the pipeline, attention to crossing points and connectivity structures has been considered in the design of the proposed pipeline.

General recommendations regarding the interval of crossing structures over the extent of any linear infrastructure projects are approximate and can vary depending on the species present and targeted in a particular area. A recent study examining the efficacy of crossing structures on a new highway upgrade in eastern Australia noted crossing structures occurred an average of every 1088 m (Young, *et al.*, 2023), which for that project appeared to be an acceptable interval to facilitate continued movement of fauna across the landscape and subsequent genetic flow.

During field surveys and following the review of hydraulic modelling reports, it was noted that 29 culverts and/or drainage pipes exist along the existing Rowell Highway in close proximity and situated parallel to where the proposed pipeline will be situated (Figure 16). Each of these culverts appear to be large enough to allow for the passage of smaller animals such as the northern quoll, which was confirmed during the August 2024 field survey when quoll and dingo tracks were observed leading into and out of several culverts under the Rowell Highway. As

a comparison, two 1050 cm diameter pipes running 55 m under a major arterial highway in northern NSW demonstrated that a wide variety of fauna will use such pipes/culverts as throughfare through the landscape when available. It is expected that a similar situation could be replicated under the Rowell Highway and proposed pipeline.

In the study mentioned above, a total of 34 vertebrate fauna species were detected making complete crossings of the pipes over three summer monitoring periods, including 16 mammal species, 11 reptile species and seven species of frog (Sandpiper Ecological, 2018). Species similar in size (and larger) to northern quoll were detected such as common brushtail possum (*Trichosurus vulpecula*), long-nosed bandicoot (*Perameles nasuta*) and northern brown bandicoot (*Isodon macrourus*), with the largest species detected using the pipes including swamp wallabies (*Wallabia bicolor*) and eastern grey kangaroos (*Macropus giganteus*).



Figure 16 Two of the 41 existing culverts under Rowell Highway immediately adjacent to the proposed pipeline alignment.

A total of 29 culverts were observed under the Rowell Highway during the fauna survey, immediately adjacent to the proposed pipeline alignment. With the length of the proposed pipeline at approximately 12 km, this results in an average of one culvert every 414 m, suggesting there are sufficient potential opportunities for faunal connectivity for wide ranging species such as northern quoll.

The current pipeline design proposes to install 53 crossings (mix of elevated, buried and eathern-ramp) along the alignment to allow fauna and human crossings and to allow water to move freely over it during storm events. Proposed crossings range from 15 m to > 50 m, totalling a length of approximately 1.7 km (~14%) of the pipeline alignment. Figure 17 demonstrates the alignment of the existing culverts and the proposed pipeline crossings and that 29 of the proposed crossings are aligned with the existing Rowell Highway crossings. This presents an opportunity for pipeline construction to leverage connectivity by aligning fauna passage under or over the pipeline in line with existing culverts under the Rowell Highway. By increasing the number of access points to 53, this represents a crossing an average of every 230 m.

It should be noted that fauna attempting to cross the road/pipeline from east to west (for the majority of the alignment) will effectively be guided to these crossing structures by the pipeline, the pipeline essentially acting as a fauna fence. Conversely, fauna crossing over from west to east not utilising existing culverts for throughfare may cross the existing road and encounter the pipeline as a physical barrier, potentially exposing them to greater risk of road strike, however, it is expected that every 230 m there will be either buried or lifted pipe to assist these animals in escaping the area.

6.3 Management and Mitigation Measures

It is recommended that measures to avoid or mitigate potential flora and fauna impacts are incorporated into a site-specific Construction Environmental Management Plan (CEMP). In particular, the following mitigation measures are recommended:

- GEMCO and any associated contractors are required to ensure the appropriate management of invasive flora (weeds), waste, dust and emissions, erosion and sedimentation, and hazardous materials throughout the Construction footprint and to minimise impacts to adjacent areas.
 - This should be managed through the development and implementation of a CEMP and the implementation of applicable GEMCO standard operating procedures and management plans.
- Prior to the commencement of any activities proposed in relation to the construction of the Project, GEMCO should finalise the Construction footprint including the layout of infrastructure, areas to be cleared, areas to be retained, temporary clearing (i.e. lay down areas, construction pads, site offices, etc), access tracks and any necessary borrow and/or overburden areas. Given that the design phase has largely been completed, the majority of these activities have already been completed.
 - When finalising the Construction footprint (through the detailed design and placement of infrastructure), consideration has been given by GEMCO to minimising the disturbance to native flora and fauna species, as far as practicable by utilising already disturbed areas beside access tracks and the Rowell Highway roadside verge.
- Vegetation clearing should be no wider than is necessary to facilitate the construction of the pipeline and the associated infrastructure, so as to limit the impacts of local flora and fauna.
 - Clearing should be limited as much as possible on the vegetated side of the pipeline alignment, noting there may be clearing requirements for fire safety and construction effort.
 - Where possible, the on-ground layout and alignment of the corridor should be micro-sited to avoid native vegetation (i.e. trees) and suitable fauna habitat features (e.g. rock piles, termite mounds, hollow logs, etc).
- Once the final design has been determined and prior to the commencement of construction, pre-clearance surveys should be conducted by suitably qualified person over the extent of clearing disturbance to limit the potential for impacts to any fauna individual(s). A suitably qualified person should be available as required to salvage and relocate any fauna encountered during construction.
 - This survey should be conducted by a suitably qualified person and target threatened and common fauna species and/or habitat features including hollow bearing trees, burrows, dens, hollow logs, caves, rocky areas i.e. crevices, riparian vegetation, embankments, and any other features which may provide suitable habitat for present fauna.
 - Where pre-clearance surveys identify threatened fauna species, works should cease immediately, and a suitably qualified person should attend site and salvage and translocate the animal/s in question.
- To limit the potential for the introduction and establishment of invasive fauna (i.e. cane toad) on Groote Eylandt, any material(s) or machinery brought to the island to support the construction or maintenance of the proposed pipeline should be carefully inspected as part of a biosecurity assessment (it is understood that this currently occurs with extensive rigor, including inspection by 'sniffer' dogs). Where any invasive fauna species are identified, the individuals should be disposed of and the incident documented.
- To limit the potential for disturbance to any EPBC-listed migratory shorebird species at the outfall location to the northern extent of the Construction footprint (likely only from around November to March and predominantly during the wet season), clearing works within 300 m of the marine environment should involve an inspection by suitably qualified person to ensure no EPBC-listed migratory shorebirds are utilising the area. If EPBC-listed migratory shorebirds are detected during site inspections, works should only proceed once birds have left the Construction footprint.
- Clearing, earthworks, and the use of heavy machinery which may cause disturbance should be minimised within 50 m of all watercourses and associated riparian vegetation.
 - The contractor should clearly demarcate all watercourses and the extent of riparian vegetation (~20 m from watercourse edge) with the intent to limit impacts to freshwater dependent fauna species, including the threatened Mertens' water monitor.

- Construction works within the extent of riparian vegetation (~20 m from watercourse edge) should be planned so as to occur outside of the Mertens' water monitor mating period (i.e. wet season – December - February).
- Minimisation of incursions and access to riparian zones by construction personnel.
- Works to preferentially occur when the watercourse is dry and / or not flowing and erosion and sediment controls implemented.
- If a temporary waterway barrier is required:
 - The dimensions of any temporary barrier shall be limited to the minimum practicable for the site and purpose.
 - The method of draining the water must not cause fish to become trapped or stranded or have detrimental impacts on the wellbeing of fish.
 - If fish salvage is required, an aquatic ecologist shall be consulted.
 - Capture within the CEMP and implement all permit requirements.
- Minimise open excavation time in watercourses to reduce erosion risks and maintain fauna connectivity across the watercourse.

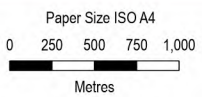
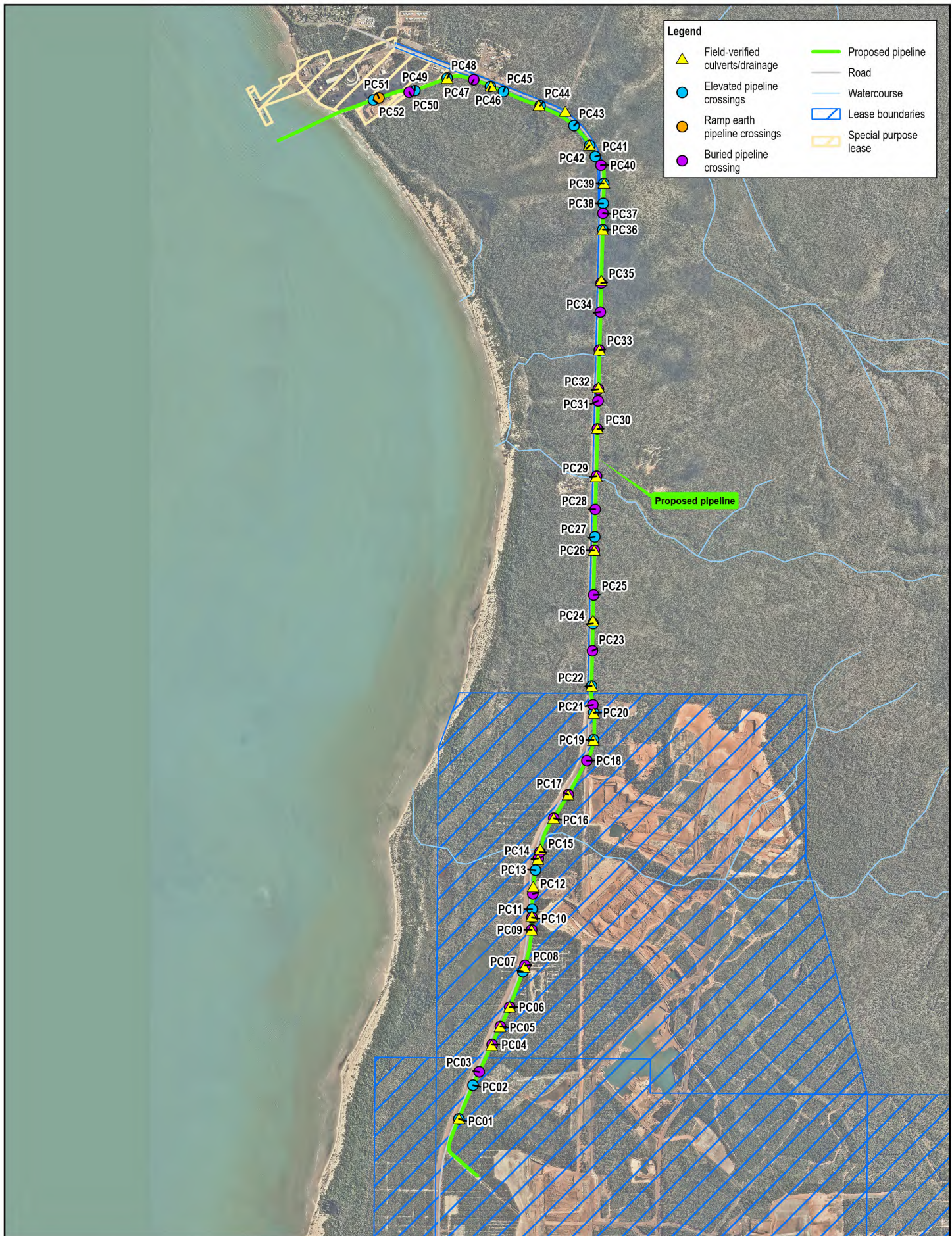
Construction phase management recommendations

Where any trenching is required during the construction phase, the following should be implemented:

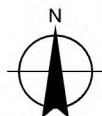
- During construction of onshore pipelines, long stretches of open trenches pose a threat to native fauna that inhabit the adjacent landscapes (O'Brien and Davey 2010). As such, any open-air trench should not be left exposed for longer than 48 hours. In instances where trenching is required, the trench is to be inspected at least once during any 24-hour period (ideally immediately post dawn). If fauna is detected in the trench, advice will be sought from a suitably qualified person with fauna handling experience.

Monitoring

It is desirable that some form of monitoring be undertaken to determine the effectiveness of the fauna passages, whether they be over or under the pipe in addition to potential impacts of the new pipe on fauna crossing the Rowell Highway. A fauna management plan could be prepared that outlines monitoring such as the use of inexpensive fauna cameras to monitor fauna use of the passages and a fauna-vehicle interaction register could also be developed.



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
 GEMCO Excess Water Disposal Project

Project No. 12624084
 Revision No. 0
 Date 10/12/2024

**Proposed pipeline crossings
 and field verified culverts**

FIGURE 17

6.4 Significant Impact Assessment

The MNES species outlined in table 17 below were selected for significant impact assessment as an analysis on their likelihood of occurring at the study area was identified as ‘may occur’, ‘likely to occur’ or ‘confirmed present’. Significant impact assessments in Sections 6.4.1, 6.4.2 and 6.4.3 found, with the application of management and mitigation measures as outlined in Section 6.3, no significant impacts are likely against any MNES as outlined in Table 17. The following sections provide details regarding the significant impact assessments.

Table 17 Summary of significant impact likelihood

Matters	Likelihood of a significant impact
MNES	
<i>Eleocharis retroflexa</i>	Low
Threatened shorebirds	Low
Northern masked owl	Low
Northern quoll	Low
Ghost bat	Low
Northern brushtail possum	Low
Mertens’ water monitor	Low
Northern blue-tongue skink	Low
Migratory marine birds	Low
Migratory terrestrial birds	Low
Migratory wetland birds	Low

6.4.1 EPBC Act threatened flora

A single EPBC listed flora species, *Eleocharis retroflexa*, has been assessed as ‘may occur’ within the Construction footprint. *E. retroflexa* is listed as Vulnerable under the EPBC Act, with the main threats listed as inappropriate fire regimes and grazing and trampling by high densities of feral animals (Woinarski *et al.*, 2007). Significant impact assessment has been completed in Table 18 against the EPBC significant impact guidelines 1.1.

Table 18 SIA for EPBC Act Vulnerable threatened flora

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	<p>No National Recovery Plan for the species is provided, and as such, no important populations have been defined. According to the Conservation Advice, populations appear to be naturally disjunct. However, the low number of recorded populations may be a reflection of lower survey effort or the inconspicuous nature of the plant.</p> <p>There are no data to determine if the species has undergone fluctuations or declines in area of occupancy, extent of occurrence, populations or numbers.</p> <p>Restricted to wetlands, the species is currently known from six populations within Australia (Cowie and Kerrigan, 2006; Queensland Herbarium, 2009):</p> <ul style="list-style-type: none"> – Eubenangee Swamp south of Cairns (national park) – Cairns area: Edmonton and Woree (creek bed and roadside drain, respectively) – Wingate Mountains (2 swamps) (Aboriginal Land Trust) – Nitmiluk National Park (one swamp) <p>The Construction footprint does not intersect with any of the above populations. Based on the above, and the extent of suitable habitat within the Construction footprint, the Project was assessed as a low likelihood to decrease in the size of an important population of a species.</p>	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
2. Reduce the area of occupancy (AOO) of an important population	The species has an indicative extent of occurrence of 150 000 km ² (AVH 2010), however, the AOO is unknown. Based on the extent of suitable habitat within the Construction footprint, the Project was assessed as a low likelihood to reduce the area of occupancy (AOO) of an important population.	Low likelihood of a significant residual impact
3. Fragment an existing important population into two or more populations	No National Recovery Plan for the species is provided, and as such, no important populations have been defined. The corridor for the proposed pipeline is relatively narrow (<20 m) and linear in extent. As such, this will not act to create a significant barrier for any plant communities or flora populations.	Low likelihood of a significant residual impact
4. Adversely affect habitat critical to the survival of a species	No National Recovery Plan for the species is provided, and as such, no critical habitat has been defined. No information for the species on the Register of Critical Habitat is provided. The Commonwealth SIA guidelines refer to habitat critical to the survival of a species or community as areas that are necessary: <ul style="list-style-type: none"> – for activities such as foraging, breeding, roosting, or dispersal – for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) – to maintain genetic diversity and long-term evolutionary development, or – for the reintroduction of populations or recovery of the species or ecological community The species is known from the margins of seasonal swamps and watercourses and impacts to these areas from the project will be minimal. The Construction footprint does not intersect with any known populations of the species and surveys were completed in areas of potential habitat within the project area and the species was not identified.	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of an important population	Factors that could impact on the breeding cycle of flora would include impacts to pollinators, flowering and seeding. The Project will have no impact to these processes.	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Given the relatively minor extent of the vegetation communities which may provide suitable habitat with the Construction footprint (3.52 ha), the Project was considered unlikely to cause the species to decline.	Low likelihood of a significant residual impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The key threats to the species include inappropriate fire regimes and grazing and trampling by high densities of feral animals (Woinarski et al., 2007). The Project is unlikely to amplify either of the above threats within the Construction footprint. Invasive species will be managed through the implementation of mitigation measures (i.e. weed management activities) which will limit the potential for the establishment and proliferation of invasive species. Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk.	Low likelihood of a significant residual impact
8. Introduce disease that may cause the species to decline	According to the Conservation Advice, disease is not known as a threat to the species. Therefore, the Project is unlikely to introduce disease that may cause the species to decline.	Low likelihood of a significant residual impact
9. Interfere substantially with the recovery of the species	No Recovery Actions for the species are provided, however, the Conservation Advice indicates research priorities including monitoring programs, population level assessments, surveys of suitable habitat, seed germination and propagation trials. The Project will not influence any of the above activities and therefore will not interfere with the recovery of the species.	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures it is concluded that the project will result in the low likelihood of a significant residual impact to *Eleocharis retroflexa*.

6.4.2 EPBC Act threatened fauna

6.4.2.1 Threatened shorebirds – Vulnerable

Two threatened shorebird species listed under the EPBC Act as Vulnerable have been assessed as ‘may occur’ within the northern extent of the Construction footprint. Each of these species occur in coastal habitats and have a dual listing as migratory and threatened under the EPBC Act. They have been grouped in Table 19 for assessment of significant impacts against the EPBC significant impact guidelines 1.1 due to the similarity of their habitat requirements and relevance to the project. The species assessed are as follows:

- *Calidris acuminata* - sharp-tailed sandpiper (Vulnerable)
- *Limosa lapponica baueri* – Alaskan bar-tailed godwit (Vulnerable)

Table 19 SIA for EPBC Act Vulnerable threatened shorebirds

Vulnerable species - sharp-tailed sandpiper and Alaskan bar-tailed godwit.		
Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a threatened species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	<p>The results of the surveys indicate the Construction footprint does not constitute a site of high fidelity for any known shorebird populations.</p> <p>The <i>EPBC Act Policy Statement 3.21 - Industry Guidelines for avoiding, assessing and mitigating impacts on EBBC Act listed migratory shorebird species</i> outline definitions of internationally and nationally important habitat for shorebirds.</p> <p>Internationally important habitat refers to areas that hold:</p> <ul style="list-style-type: none"> – 1% of the individuals in a population of one species or subspecies of waterbird or – a total abundance of at least 20,000 waterbirds. <p>Nationally significant important habitat refers to areas that hold:</p> <ul style="list-style-type: none"> – 0.1% of the flyway population of a single species of migratory shorebird or – 2,000 migratory shorebirds or – 15 migratory shorebird species. <p>Based on the above parameters, records at the site and the relatively narrow (<150m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to lead to the long-term decrease of an important population.</p>	Low likelihood of a significant residual impact
2. Reduce the area of occupancy (AOO) of an important population	<p>The results of the surveys indicate the Construction footprint does not constitute a site of high fidelity for any known shorebird populations.</p> <p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to provide important habitat of any migratory or resident shorebird species.</p> <p>Substantial areas of suitable habitat in a similar or better condition persist adjacent to the Construction footprint post construction and throughout the region which would be available to shorebird individuals and populations. This would act to reduce the significance of any suitable habitat within the Construction footprint, which would constitute a very small percentage of the suitable habitat in the area.</p>	Low likelihood of a significant residual impact
3. Fragment an existing important population into two or more populations	<p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to provide important habitat of any migratory or sedentary shorebird species.</p> <p>Given the linear nature of the Construction footprint and the highly mobile nature of the shorebird group, the Project will not fragment access to any suitable habitat.</p>	Low likelihood of a significant residual impact

Vulnerable species - sharp-tailed sandpiper and Alaskan bar-tailed godwit.		
Criteria	Assessment of Significance	Outcome
4. Adversely affect habitat critical to the survival of a species	<p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to provide important habitat of any migratory or resident shorebird species.</p> <p>The impacts are heavily localised in nature and unlikely to result in the disappearance of any EPBC Act threatened shorebirds from an area sufficiently large to register a reduction in the area of occupancy, as measured at the 2 km x 2 km scale recommended under the EPBC Act (EPBC, 2015).</p> <p>Substantial areas of suitable habitat in a similar or better condition persist adjacent to the Construction footprint post construction and throughout the region which would be available to shorebird individuals and populations. This would act to reduce the significance of any suitable habitat within the Construction footprint, which would constitute a very small percentage of the suitable habitat in the area.</p>	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of an important population	<p>Each species is known to breed in the northern hemisphere. While foraging health is important to allow migration back to breeding grounds, the relatively small area of habitat impacted will have no influence on foraging resource availability within the region.</p> <p>Substantial areas of suitable habitat in a similar condition are present adjacent to the Construction footprint and throughout the region, which would remain available to shorebird individuals and populations post-construction.</p> <p>This would act to reduce the significance of any suitable habitat within the Construction footprint, which would constitute a very small percentage of the suitable habitat in the area.</p> <p>Given the above, the Construction footprint does not support a breeding population, and the construction of the pipeline is unlikely to generate a significant impact.</p>	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>The Project will result in the temporary disturbance to <2 ha of suitable habitat for the species. Given the static nature of the Project infrastructure, operational impacts are expected to be negligible, with no substantial restriction of access to habitat or barrier effects.</p>	Low likelihood of a significant residual impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Migratory shorebirds are potentially at risk from predation by foxes and cats. Off-leash dogs are considered threats to many shorebird species (Weston and Stankowich 2013). The construction of linear pipeline infrastructure is not expected to introduce or amplify the presence of the above predators.</p>	Low likelihood of a significant residual impact
8. Introduce disease that may cause the species to decline	<p>Disease is not a known threat to the EPBC Act threatened shorebirds. Hygiene protocols implemented during construction will prevent any unforeseen exposure to threats from disease.</p>	Low likelihood of a significant residual impact
9. Interfere substantially with the recovery of the species	<p>There is no recovery plan for these EPBC Act threatened shorebird species. The Project will have negligible impact in terms of permanent loss of habitat and only a localised, temporary disturbance during construction. The Project will not interfere with the recovery of the species.</p>	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures, it is concluded that the project will result in the low likelihood of a significant residual impact to sharp-tailed sandpiper and Alaskan bar-tailed godwit.

6.4.2.2 Threatened shorebirds – Endangered

One threatened shorebird species listed under the EPBC Act as Endangered has been assessed as ‘may occur’ within the northern extent of the Construction footprint. This species occurs in coastal habitats and has a dual listing as migratory and threatened under the EPBC Act. Significant impact assessment has been completed in Table 20 against the EPBC significant impact guidelines 1.1. The species assessed are as follows:

- *Tringa nebularia* - common greenshank (Endangered)

Table 20 SIA for EPBC Act Endangered threatened shorebirds

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a threatened species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of a population	<p>The results of the surveys indicate the Construction footprint does not constitute a site of high fidelity for any known shorebird populations.</p> <p>The EPBC Act Policy Statement 3.21 - Industry Guidelines for avoiding, assessing and mitigating impacts on EBBC Act listed migratory shorebird species outline definitions of internationally and nationally important habitat for shorebirds.</p> <p>Internationally important habitat refers to areas that hold:</p> <ul style="list-style-type: none"> – 1% of the individuals in a population of one species or subspecies of waterbird or – a total abundance of at least 20,000 waterbirds. <p>Nationally significant important habitat refers to areas that hold:</p> <ul style="list-style-type: none"> – 0.1% of the flyway population of a single species of migratory shorebird or – 2,000 migratory shorebirds or – 15 migratory shorebird species. <p>Based on the above parameters, records at the site, and the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to lead to the long term decrease in the size of the population.</p>	Low likelihood of a significant residual impact
2. Reduce the area of occupancy of the species	<p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to provide important habitat of any migratory or resident shorebird species.</p> <p>Substantial areas of suitable habitat in a similar or better condition persist adjacent to the Construction footprint post construction and throughout the region which would be available to shorebird individuals and populations. This would act to reduce the significance of any suitable habitat within the Construction footprint, which would constitute a very small percentage of the suitable habitat in the area.</p>	Low likelihood of a significant residual impact
3. Fragment an existing population into two or more populations	<p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to provide habitat for any migratory or resident shorebird species.</p> <p>Given the linear nature of the Construction footprint and the highly mobile nature of the shorebird group, the Project will not fragment access to any suitable habitat.</p>	Low likelihood of a significant residual impact
4. Adversely affect habitat critical to the survival of a species	<p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<2 ha), the Construction footprint is unlikely to provide important habitat of any migratory or sedentary shorebird species.</p> <p>The impacts are heavily localised in nature and unlikely to result in the disappearance of any EPBC Act threatened shorebirds from an area sufficiently large to register a reduction in the area of occupancy, as</p>	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
	<p>measured at the 2 km x 2 km scale recommended under the EPBC Act (IUCN, 2014).</p> <p>Substantial areas of suitable habitat in a similar or better condition persist adjacent to the Construction footprint post construction and throughout the region which would be available to shorebird individuals and populations. This would act to reduce the significance of any suitable habitat within the Construction footprint, which would constitute a very small percentage of the suitable habitat in the area.</p>	
5. Disrupt the breeding cycle of a population	<p>Common greenshank breeds in the northern hemisphere. While foraging health is important to allow migration back to breeding grounds, the relatively small area of habitat impacted will have no influence on foraging resource availability within the region.</p> <p>Substantial areas of suitable habitat in a similar condition are present adjacent to the Construction footprint and throughout the region, which would remain available to shorebird individuals and populations post-construction.</p> <p>This would act to reduce the significance of any suitable habitat within the Construction footprint, which would constitute a very small percentage of the suitable habitat in the area.</p> <p>Given the above, the Construction footprint does not support a breeding population, and the construction of the pipeline is unlikely to generate a significant impact.</p>	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>The Project will result in the temporary disturbance to <2 ha of suitable habitat for the species. Given the static nature of the Project infrastructure, operational impacts are expected to be negligible, with no substantial restriction of access to habitat or barrier effects.</p>	Low likelihood of a significant residual impact
7. Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat	<p>Migratory shorebirds are potentially at risk from predation by foxes and cats. Off-leash dogs are considered threats to many shorebird species (Weston and Stankowich 2013). The construction of linear pipeline infrastructure is not expected to introduce or amplify the presence of the above predators.</p>	Low likelihood of a significant residual impact
9. Interfere with the recovery of the species	<p>There is no recovery plan for these EPBC Act endangered and critically endangered shorebird species. The Project will have negligible impact in terms of permanent loss of habitat and only a localised, temporary disturbance during construction. The Project will not interfere with the recovery of the species.</p>	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures, it is concluded that the project will result in the low likelihood of a significant residual impact to common greenshank.

6.4.2.3 Northern masked owl

The northern masked owl is listed as Vulnerable under the EPBC Act. The species occurs throughout northern Australia, from Mackay to the Kimberley region of Western Australia (DCCEEW, 2023). The species inhabits riparian forest, rainforest, open forest, Melaleuca swamps, edges of mangroves and the margins of sugar cane fields (DCCEEW, 2023; Menkhorst et al., 2019).

Key habitat requirements for the species include a large home range, presence of hollow-bearing trees for nesting and the abundance of arboreal and small mammals (Woinarski, 2004).

There are 20 historical records of the species within the desktop search extent (NR Maps, 2024). The closest record of the species is approximately 300 m from the Construction footprint, with the most recent recorded sighting in 2018. The species is known to persist in habitat adjacent to the pipeline alignment.

Significant impact assessment has been completed in Table 21 against the EPBC significant impact guidelines 1.1.

Table 21 SIA for the northern masked owl

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	<p>The northern masked owl is likely present in the vicinity of the Construction footprint, albeit likely for foraging purposes given the field survey did not record evidence of large hollow bearing trees suitable for nesting and/breeding.</p> <p>The overall population of the species is estimated to consist of 3000 breeding individuals. This estimate is considered to be of low reliability (Garnett et al. 2011).</p> <p>Given the narrow and linear nature of the Project and the lack of suitable nesting habitat (large hollow bearing trees) within the Construction footprint, the construction of a pipeline is unlikely to lead to a long-term reduction in the size of the local population.</p> <p>It's very likely that any present masked owl individuals will continue to inhabit the area post-construction for the purpose of foraging.</p>	Low likelihood of a significant residual impact
2. Reduce the area of occupancy (AOO) of an important population	<p>The area of occupancy of the northern masked owl is estimated to be 18,000 km² (Garnett et al. 2011), which is predicted to be declining and this figure is considerably out of date with respect to the current assessment.</p> <p>Despite the above, the total area assessed during the field survey (153.5 ha or 1.53 km² - which is likely considerably larger than the currently undetermined final disturbance footprint) represents an insignificant proportion (~0.0085 %) of the total AOO of the species.</p>	Low likelihood of a significant residual impact
3. Fragment an existing important population into two or more populations	Given the highly mobile nature of the species and the significant home range (~1,000 ha), the Project is unlikely to introduce any permanent novel infrastructure that is likely to fragment any local populations.	Low likelihood of a significant residual impact
4. Adversely affect habitat critical to the survival of a species	As discussed above the Construction footprint represents approximately 0.0085 % of the total AOO of the species, and the field survey did not identify any highly suitable nesting habitat for the species.	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of an important population	The field survey did not identify any suitable nesting habitat for the species. It is highly unlikely the species is nesting within the Project Area and therefore breeding cycles are unlikely to be disturbed.	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>As previously mentioned, the Construction footprint represents approximately 0.0085 % of the total AOO of the species, and the field survey did not identify any highly suitable nesting habitat for the species.</p> <p>The scale of these impacts is considered insufficient to cause the species to decline.</p>	Low likelihood of a significant residual impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Key threats (other than cane toad) listed in the Conservation Advice include grazing by livestock and feral animals, and the invasion of native woodlands by exotic plants, particularly introduced pasture grasses (Woinarski 2004).</p> <p>Invasive species will be managed through the implementation of mitigation measures (i.e. weed management activities) which will limit the potential for the establishment and proliferation of invasive species. Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk.</p> <p>The Project is unlikely to introduce an invasive species that could be harmful to the species habitat.</p>	Low likelihood of a significant residual impact
8. Introduce disease that may cause the species to decline	The Project is unlikely to introduce a disease that may cause the species to decline.	Low likelihood of a significant residual impact
9. Interfere substantially with the recovery of the species	Based on all the information provided above, the Project is unlikely to significantly interfere with the recovery of the species.	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures it is concluded that the project will result in the low likelihood of a significant residual impact to northern masked owl.

6.4.2.4 Northern quoll

The northern quoll is listed as Endangered under the EPBC Act and was once distributed throughout much of northern Australia; however, the species range is now highly fragmented due to habitat clearing and cane toad invasion (DCCEEW, 2023). The species inhabits a variety of habitats, ranging from eucalypt woodlands to rainforests (Hill and Ward, 2010). The species prefers areas that contain rock crevices, hollow logs and termite mounds (DCCEEW, 2023). There are 440 historical records of the species within the desktop search extent (NR Maps, 2023). The species was recorded eight times (including six camera sightings and two sets of tracks) during 4 days of field survey in August 2024. Groote Eylandt is known to support the largest remaining population of northern quolls in the NT with a population density of approximately 0.33/ha compared to approximately 0.08/ha on the mainland (DEPWS, 2019., Heiniger et al, 2020).

Significant impact assessment has been completed in Table 22 against the EPBC significant impact guidelines 1.1.

Table 22 SIA for the northern quoll

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of a population	<p>The northern quoll is common and widespread throughout a broad range of habitats on Groote Eylandt, including rocky areas, forest and woodlands, grassland and coastal shrublands, although it tends to occur at higher densities in rocky areas (Braithwaite and Griffiths 1994, Oakwood 2000, Cameron 2016).</p> <p>Given the narrow and linear nature of the Project and the general lack of highly suitable denning habitat (rocky areas, gorges, gullies or outcrops) within the Construction footprint, the construction of a pipeline is unlikely to lead to a long-term reduction in the size of the local population if adequate connectivity is provided.</p> <p>It's very likely that any present northern quoll individuals will continue to inhabit the area post-construction for dispersal and foraging purposes.</p> <p>The Project may result in fragmentation or barriers to fauna movement across the extent of the Project. Fauna crossings or other design measures will act to limit the impacts of this and allow fauna movement to occur.</p>	Low likelihood of a significant residual impact
2. Reduce the area of occupancy (AOO) of the species	<p>In 2004, the species was considered to have declined to 20 % of its estimated 1990 range, covering a total of 47,812 km². The current area of occupancy of the northern quoll is not provided on the species SPRAT page, although it's assumed to have decreased further from the 2004 estimate.</p> <p>The species is known to have a relatively large but variable home range. Based on the habitat preferences of the species, the Construction footprint is unlikely to provide highly suitable denning habitat or support dense populations. However, the Construction footprint may intersect with an individual(s) home range and foraging extent. As such, the Project is unlikely to remove any significant denning habitat and the species is likely to continue occupying the Construction footprint post construction.</p> <p>The total area assessed during the field survey (153.5 ha or 1.53 km²)- which is likely considerably larger than the currently undetermined final disturbance footprint) would likely represent an insignificant proportion of the total AOO of the species.</p>	Low likelihood of a significant residual impact
3. Fragment an existing population into two or more populations	<p>The pipeline may act as a barrier to fauna movement throughout the landscape, restricting quoll movement. The species is known to be an adept climber, and some individuals may transition across the pipeline; however, juveniles may be separated from adults. Additionally, individuals may be restricted from access to the near coastal zone, foraging areas or any potential denning habitat in the vicinity of the Construction footprint.</p> <p>Given the highly mobile nature of the species and the relatively large home range (<100 ha), any local individuals who are restricted in movement may be impacted by the 12 km of pipeline.</p>	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:		
	Ensuring fauna connectivity at each of the 29 identified sites (Section 6.2.1) will act to mitigate the barrier effect of the pipeline and facilitate movement through the area. It is likely the wide-ranging quoll species will quickly find and utilise these crossing points.	
4. Adversely affect habitat critical to the survival of a species	<p>Critical habitat for the species is segmented to two broad categories: 1) rocky areas, and 2) offshore islands.</p> <p>Groote Eylandt is noted as a significant stronghold for the northern quoll in Australia and listed in the National Recovery Plan as significant habitat (in the form of offshore island where quolls are present) for the species due to reduced threats including cane toads and feral cats.</p> <p>As discussed above, the field survey did not identify any suitable denning habitat (rocky areas, gorges, gullies or outcrops) for the species, limiting the significance of the microhabitats within the Construction footprint. Some aspects of the Construction footprint may provide marginally suitable nesting habitat (e.g. hollow logs) and/or daytime refuge for the species.</p> <p>As such, although the Project is located within an area deemed as significant for the species, the habitat within the Construction footprint is unlikely to consist of significant habitat.</p> <p>The species may temporarily occur throughout the extent of the Construction footprint for transition or foraging purposes, and it is expected this will remain accessible after the completion of construction.</p> <p>Pre-clearance surveys will further minimise the significance of any potential impact resulting from the Project.</p>	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of a population	The field survey did not identify any suitable denning habitat for the species. It was assumed to be highly unlikely that the species was nesting within the Project Area and therefore breeding cycles are unlikely to be disturbed.	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>As previously mentioned, the field survey did not identify any suitable denning habitat for the species.</p> <p>The scale of the assumed impact is considered insufficient to cause the species to decline.</p>	Low likelihood of a significant residual impact
7. Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat	<p>Formerly widespread across northern Australia, this species has suffered widespread declines and local extinctions through poisoning from the westward dispersal of the cane toad (<i>Rhinella marina</i>).</p> <p>Where any materials and/or machinery are required to be transported to the island to support the construction of the pipeline, there is a risk of introducing invasive fauna species which may have a detrimental impact on the northern quoll.</p> <p>Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk.</p> <p>GEMCO has a robust cane toad biosecurity programme which has resulted in no individuals establishing on the island throughout the duration of operations.</p>	Low likelihood of a significant residual impact
8. Introduce disease that may cause the species to decline	The Project is unlikely to introduce a disease that may cause the species to decline.	Low likelihood of a significant residual impact
9. Interfere substantially with the recovery of the species	Based on all the information provided above, the Project is unlikely to significantly interfere with the recovery of the species.	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures it is concluded that the project will result in the low likelihood of a significant residual impact to northern quoll.

6.4.2.5 Ghost bat

The ghost bat is a large, carnivorous bat that perches in vegetation to ambush prey as well as gleaning surfaces while in flight (Bullen 2021). The ghost bat inhabits a highly fragmented distribution, with geographically disjunct colonies occurring in the Pilbara, Kimberley, Northern Territory, the Gulf of Carpentaria and coastal and near coastal eastern Queensland (DCCEEW 2023). This species is known to occur in rainforest areas, vine shrub, open woodlands and arid zone (McKenzie and Hall, 2008), and roosts in caves, rock crevices and old mine shafts (TSSC, 2016b). The species requires multiple roosting sites and move between several caves seasonally or as dictated by weather conditions (TSSC, 2016b).

There are six historical records of the species within the desktop search extent (NR Maps, 2024). The closest record of the species is approximately 1.2 km from the Construction footprint, with the most recent recorded sighting in 2017. Records of this species are sparsely scattered across Groote and most likely indicate the presence of one or more maternity roosts on the island and/or elsewhere in the archipelago (DEPWS, 2019).

Significant impact assessment has been completed in Table 23 against the EPBC significant impact guidelines 1.1.

Table 23 SIA for the ghost bat

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	<p>The ghost bat is assumed to be present in the vicinity of the Construction footprint, albeit likely for foraging purposes given the field survey did not record evidence of suitable roosting habitat (i.e. caves, rock crevices and old mine shafts).</p> <p>Given the narrow and linear nature of the Project and the general lack of highly suitable roosting habitat within the Project Area, the construction of a pipeline is unlikely to lead to a long-term reduction in the size of any local population.</p> <p>It's very likely that any present ghost bat individuals will continue to inhabit the area post-construction for foraging purposes.</p>	Low likelihood of a significant residual impact
2. Reduce the area of occupancy (AOO) of an important population	<p>The field surveys did not identify evidence of suitable roosting habitat (i.e. caves, rock crevices and old mine shafts) within the Project Area. Therefore, the Project is unlikely to remove any roosting and/or breeding locations for the ghost bat.</p> <p>The foraging habitat within the Construction footprint will likely remain post-construction, and the Project was considered unlikely to reduce the AOO of the species.</p>	Low likelihood of a significant residual impact
3. Fragment an existing important population into two or more populations	<p>Populations of the species are highly structured, being genetically distinct at both regional and local scales, including the population on Groote Eylandt. Given the highly mobile nature of the species and lack of suitable roosting habitat within the Construction footprint, the Project is unlikely to introduce any permanent novel infrastructure that is likely to fragment any local populations.</p>	Low likelihood of a significant residual impact
4. Adversely affect habitat critical to the survival of a species	<p>As discussed above, the field survey did not identify any highly suitable roosting habitat for the species.</p>	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of an important population	<p>The field survey did not identify any highly suitable roosting habitat for the species. It was assumed to be highly unlikely that the species was breeding within the Project Area and therefore breeding cycles are unlikely to be disturbed.</p>	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>The Project Area will continue to provide suitable foraging area for the species post-construction. Additionally, the field survey did not identify any highly suitable roosting habitat for the species. As such, the Project is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	Low likelihood of a significant residual impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in	<p>According to the Conservation advice, there is evidence of ghost bats preying upon cane toads in Kakadu NP; bats have been found dead with chewed toads in their throats (White and Bullen pers. comm., cited in Qld DEHP 2015).</p>	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
the vulnerable species' habitat	Currently, cane toads are thought to be absent from Grootte Eylandt. Where any materials and/or machinery are required to be transported to the island to support the construction of the pipeline, there is a risk of introducing invasive fauna species which may have a detrimental impact on the ghost bat. Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk. GEMCO has a robust cane toad biosecurity programme which has resulted in no individuals reaching the island throughout the duration of operations.	
8. Introduce disease that may cause the species to decline	The Project is unlikely to introduce a disease that may cause the species to decline.	Low likelihood of a significant residual impact
9. Interfere substantially with the recovery of the species	Based on all the information provided above, the Project is unlikely to significantly interfere with the recovery of the species.	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures it is concluded that the project will result in the low likelihood of a significant residual impact to ghost bat.

6.4.2.6 Northern brushtail possum

The northern brushtail possum is a semi arboreal, nocturnal marsupial that occurs sporadically throughout northern Australia, from the Gulf of Carpentaria in the east, through the NT and the northern islands, to the Kimberley in Western Australia (TSSC, 2021). It occurs predominantly in tall, open Eucalypt forests with a shrubby understory that contains small, fleshy fruits. The sub-species is also known to occur in mangrove forests and rainforests particularly those that contain hollow-bearing trees. Where tree hollows are limited (often in northern Australia), the species is known to inhabit semi-urban areas and human infrastructure, particularly around Darwin. The northern brushtail possum's diet comprises small fruits, flowers, and leaves.

There are two historical records of the species within the desktop search extent (NR Maps, 2024). The closest record of the species is approximately 800 m east of the Construction footprint, with the most recent recorded sighting in 2012. The species was not recorded during field surveys.

Significant impact assessment has been completed in Table 24 against the EPBC significant impact guidelines 1.1.

Table 24 SIA for the northern brushtail possum

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	Based on the known habitat preferences for the species, highly suitable habitat for species within the Construction footprint is very limited to non-existent (i.e. general lack of hollow bearing trees or tall open Eucalypt Forest, modified or minimal ground cover). The Project may result in fragmentation or barriers to fauna movement across the extent of the Project. Fauna crossings or other design measures will act to limit the impacts of this and allow fauna movement to occur.	Low likelihood of a significant residual impact
2. Reduce the area of occupancy (AOO) of an important population	The estimated EOO for this species is 571,694 km ² , and the AOO estimated at 1392 km ² . Given that the total area assessed during the field survey was 153.5 ha or 1.53 km ² , and this is likely considerably larger than the currently undetermined final disturbance footprint. Based on the above, the Project would generate impacts to <0.1 % of the AOO of the species and therefore is rated at a low likelihood of significant impact.	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
3. Fragment an existing important population into two or more populations	<p>Being highly mobile and an adept semi-arboreal species, any individuals of the northern brushtail possum will not be fragmented in the landscape across the extent of the Project.</p> <p>The 29 fauna crossing points constructed across the pipeline will act to mitigate this and allow continual fauna movement across the Construction footprint.</p>	Low likelihood of a significant residual impact
4. Adversely affect habitat critical to the survival of a species	<p>No recovery plan for the species is provided, and therefore no habitat critical to the survival of the species is defined.</p> <p>Based on the known habitat preferences for the species, highly suitable habitat for species within the Construction footprint is very limited to non-existent (i.e. general lack or very low abundance of hollow bearing trees or tall open Eucalypt Forest, modified or minimal ground cover).</p> <p>The species may temporarily occur throughout the extent of the Construction footprint for occasional transition or foraging purposes, and it's expected this will remain accessible after the completion of construction.</p> <p>As such, the project was assessed as a low likelihood of adversely impacting on habitat critical to the survival of the species.</p>	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of an important population	<p>Based on the known habitat preferences for the species, highly suitable habitat for species within the Construction footprint is very limited to non-existent (i.e. general lack of hollow bearing trees or tall open Eucalypt Forest, modified or minimal ground cover).</p> <p>Given the above, the species is highly unlikely to breed within the Construction footprint due to lack of available hollows.</p>	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>Based on the known habitat preferences for the species, highly suitable habitat for species within the Construction footprint is very limited to non-existent (i.e. general lack of hollow bearing trees or tall open Eucalypt Forest, modified or minimal ground cover).</p> <p>As such, its assumed that the impacts to vegetation within the Construction footprint will not cause the species to decline overall. Additionally, there is an abundance of habitat of a similar or increased suitability in the adjacent vegetation which will remain available for the species.</p>	Low likelihood of a significant residual impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Cats are already known in the island, and although widespread on Groote Eylandt, they appear to be at low densities compared to the mainland (Heiniger and Gillespie 2017).</p> <p>Given the static nature of the pipeline, it was considered unlikely the Project would introduce any novel activities or infrastructure which would introduce or increase the threat of invasive species.</p> <p>Invasive species will be managed through the implementation of mitigation measures (i.e. weed management activities) which will limit the potential for the establishment and proliferation of invasive species. Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk.</p>	Low likelihood of a significant residual impact
8. Introduce disease that may cause the species to decline	<p>According to the Conservation Advice, disease is a potential threat to the subspecies. There has been an observed increase in the NT of the prevalence and abundance of exotic black rats, which are known vectors for some diseases that have caused mammal extinctions elsewhere.</p> <p>However, given the static nature of the pipeline, it was considered unlikely the Project would introduce any novel activities or infrastructure which would introduce or increase the threat of invasive species.</p>	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
9. Interfere substantially with the recovery of the species	<p>No recovery plan for the species has been provided on the species profile (SPRAT 2024).</p> <p>The Project is unlikely to interfere the recovery actions outlined in the Conservation Advice for the species, as</p> <ul style="list-style-type: none"> – The Project is unlikely to impact on any important habitat for the species – The Project is unlikely to introduce or increase the levels of feral predators – The Project will not act to negatively impact on fire regimes in the area – The Project will no act to interfere with any long-term monitoring activities 	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures it is concluded that the project will result in the low likelihood of a significant residual impact to northern brushtail possum.

6.4.2.7 Mertens' water monitor

Mertens' water monitor occurs patchily across tropical northern Australia, from the west Kimberley in Western Australia (WA), across the north of the NT, to the wet tropics in far north Queensland (DCEEW, 2023). This species is a highly aquatic lizard that seldom ventures more than 5 –10 m from the edge of the water (Wilson and Knowles 1988; Mayes 2006; Smith and Griffiths 2009). This species has been recorded in perennial and semi-permanent pools in upper catchment areas, including springs, seeps, swamps, creeks and gorges (DCEEW, 2023). Mertens' water monitor is an active predator (Mayes 2006) that forages primarily in the water and at the water-land interface (Mayes et al. 2005; Mayes 2006; Wilson and Swan 2021).

There are 10 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 100 m from the Construction footprint, with the most recent recorded sighting in 2018. Groote Eylandt is assumed to support a healthy population of this species due to the absence of cane toads, however, no island wide targeted surveys have been undertaken to establish the population size and extent (DEPWS, 2019).

Significant impact assessment has been completed in Table 25 against the EPBC significant impact guidelines 1.1.

Table 25 SIA for Mertens' water monitor

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	<p>According to the conservation advice, all remnant populations of Mertens' water monitor within the distribution of the cane toad are important populations for sustaining this species and providing a source for dispersing individuals to support recovery.</p> <p>Additionally, populations on offshore islands that are free of cane toads are important for conserving genetic diversity of this species. As such, any individuals on Groote Eylandt are considered likely to represent part of an important population.</p> <p>The Project may result in fragmentation or barriers to fauna movement across the extent of the Project. Fauna crossings at all riparian zones where monitors occupy, or other design measures will act to limit the impacts of this and allow fauna movement to occur.</p> <p>The minimisation of disturbance of suitable habitat (i.e. riparian vegetation, watercourses) and pre-clearance targeted surveys will assist to further minimise the risk of a significant impact to suitable habitat, individuals and/or the species.</p>	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:		
2. Reduce the area of occupancy (AOO) of an important population	According to the conservation advice, the AOO of the species is listed to be >1500 km ² , although it is likely to occur across a much larger AOO than recorded. The total area assessed during the field survey (153.5 ha or 1.53 km ² - which is likely considerably larger than the currently undetermined final disturbance footprint) represents an insignificant proportion (~0.085 %) of the total AOO of the species.	Low likelihood of a significant residual impact
3. Fragment an existing important population into two or more populations	<p>This assessment assumes that the pipeline will cross any watercourses either elevated above the watercourse or buried for the extent of the watercourse. Given the species strong preference for riparian areas (with water present), this will allow continued dispersal within watercourses.</p> <p>Outside of these areas, the pipeline may act as a barrier to fauna movement throughout the landscape, restricting transitions from east to west. Individuals may be restricted from access to the near coastal zone, foraging areas or any potential nesting habitat in the vicinity of the Construction footprint. Further crossing points have been incorporated into the design (with a total of 53 crossing points (including at the 29 existing culverts) incorporated at the time of preparing this report). These crossing points are a mixture of buried and elevated crossings.</p> <p>As such, the Project is unlikely to introduce any permanent novel infrastructure that has the potential to fragment any local populations. Fauna crossings will act to facilitate movement across the landscape. As such, this was assessed as a low likelihood of a significant impact.</p>	Low likelihood of a significant residual impact
4. Adversely affect habitat critical to the survival of a species	<p>Habitat critical to survival of Mertens' water monitor includes all areas where this species persists following the establishment of cane toads. As such, Groote Eylandt was considered to represent critical habitat for the species. Within the Project Area, the field survey identified a number of watercourses in varying states from semi-permanent (non-flowing at time of assessment but may retain water depending throughout dry season depending on rainfall in wet season) to likely ephemeral or seasonal.</p> <p>As above, where the Project can avoid significant disturbance to the riparian zone of the observed watercourses with water present, it's likely that impacts will be negligible and may only persist for a limited period during construction where individuals may be disturbed.</p> <p>The disturbance footprint (<1.53 km²) will be minimised through the detailed design of the project, suggesting the final footprint will represent a much-reduced area.</p>	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of an important population	<p>As previously mentioned, any individuals on Groote Eylandt are considered likely to represent part of an important population. Given majority of the project consists of static water transport infrastructure, the ongoing impacts of the project are expected to be negligible and wont impact on the breeding cycle of the important population outside of the construction period.</p> <p>Construction has the potential to disrupt or disturb any breeding individuals within or adjacent to the Construction footprint. Timing construction outside of the usual mating period for the species will act to minimise impacting on the breeding cycle of the species. Pre-clearance surveys will also assist to avoid impacting on any nest sites within the final disturbance footprint.</p>	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Where the Project can avoid significant disturbance to the riparian zone with water present, it's likely the Construction footprint will continue to provide suitable habitat for the species post-construction. Additionally, given the relatively narrow and linear extent of the Project, its unlikely to impact on a significant extent of suitable habitat for the species.	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:		
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>This species was formerly common and widespread along watercourses throughout monsoon tropical regions of northern Australia, however, is vulnerable to poisoning from ingestion of cane toads, and has suffered significant population declines on the mainland as cane toads have dispersed (Shine 2010).</p> <p>Where any materials and/or machinery are required to be transported to the island to support the construction of the pipeline, there is a risk of introducing invasive fauna species (i.e. cane toads) which would have a detrimental impact on Mertens' water monitor.</p> <p>Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk.</p> <p>GEMCO has a robust cane toad biosecurity programme which has resulted in no individuals establishing on the island throughout the duration of operations.</p>	Low likelihood of a significant residual impact
8. Introduce disease that may cause the species to decline	The Project is unlikely to introduce a disease that may cause the species to decline.	Low likelihood of a significant residual impact
9. Interfere substantially with the recovery of the species	Based on all the information provided above, the Project is unlikely to significantly interfere with the recovery of the species.	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures it is concluded that the project will result in the low likelihood of a significant residual impact to Mertens' water monitor.

6.4.2.8 Northern blue-tongue Skink

Northern blue-tongue skink (*Tiliqua scincoides intermedia*) is listed as Critically Endangered under the EPBC Act effective from 21 December 2023.

The northern blue-tongue skink occurs across northern Australia from Eighty Mile Beach in Western Australia (WA), across the southern Kimberley and north of the NT, to approximately the Gregory Downs / Cloncurry area in western Queensland (Qld). It is not clear where the eastern limit of this subspecies' range occurs in north Qld due to a sampling gap.

The distribution of the northern blue-tongue skink includes Mornington, Vanderlin, Groote and Bickerton Islands in the Gulf of Carpentaria, Croker, Melville, Bathurst and Quoin Islands to the north of the NT.

The main factor that makes the northern blue-tongue skink eligible for listing as Critically Endangered is a very severe and sustained population reduction over the last three generations, which is predicted to continue as the cane toad (*Rhinella marina*) continues to advance across its range. Importantly, cane toads are not present on Groote Eylandt.

There are seven records of the species from Groote Eylandt on iNaturalist. The species was only listed in December 2023, potentially explaining the lack of records or official databases. Recent anecdotal reports from pre-clearance surveys on the GEMCO leases also suggest that two additional individuals have been recorded in 2024.

Significant impact assessment has been completed in Table 26 against the EPBC significant impact guidelines 1.1.

Table 26

SIA for the northern blue-tongue skink

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	<p>The conservation advice for the species refers to important populations as “All remnant populations of the northern blue-tongue skink within the distribution of the cane toad are important populations for sustaining this species and providing a source population for dispersing individuals to support recovery” and that “All northern blue-tongue skink populations on offshore islands that are free of cane toads are insurance populations for ensuring the long-term genetic diversity of this taxon” (DCCEEW, 2023).</p> <p>Applying the above to the Groote Eylandt population results in the population on the island not being classified as an ‘important’ population by the definition however, in practicality an insurance population should also be considered important.</p> <p>The conservation advice lists the main threats to the species as cane toad proliferation, cattle, water buffalo, feral pigs, frequent fire regimes, post fire predation by feral cats, mining, water drawdown, inundation, illegal collection and traditional hunting (DCCEEW, 2023).</p> <p>Northern blue-tongue skinks occupy small home ranges of between 2-12 ha meaning the pipeline is unlikely to severely restrict movement of individuals between ranges over the long term.</p> <p>It is unlikely the construction of the water pipeline will result in the decline of an important population and may in some cases benefit the species by provided potential refuge from predators.</p>	Low likelihood of a significant residual impact
2. Reduce the area of occupancy (AOO) of an important population	As the population on Groote Eylandt is not defined as an important population, the construction of the pipeline is unlikely to reduce the area of occupancy of an important population.	Low likelihood of a significant residual impact
3. Fragment an existing important population into two or more populations	As the population on Groote Eylandt is not defined as an important population, the construction of the pipeline is unlikely to fragment of an important population. The provision of 29 connectivity points through the 12 km pipeline in alignment with existing Rowell highway culverts is considered sufficient to allow for potential genetic flow through the project area.	Low likelihood of a significant residual impact
4. Adversely affect habitat critical to the survival of a species	<p>The species occurs in a wide variety of ecosystems. Vegetation associations include riparian forest, vine scrub, monsoon rainforest, pandanus-lined gorges, melaleuca forest, eucalypt woodland and savanna, sparse and dense shrubland, and spinifex and tussock grassland. Most detections have occurred near seasonal or permanent water (Shea 1992). GPS tracking of the species determined that individuals spent 95 % of their time in small, fragmented patches of relatively dense vegetation that provide cool, shaded and damp conditions (Price <i>et al.</i>, 2013).</p> <p>Whilst the above suggest the species occur in a variety of habitats, the majority of the surveyed alignment lacks the structural complexity cover dependent species such as the northern blue-tongue skink rely upon. Importantly, it is stated that most detections occur near seasonal or permanent water.</p>	Low likelihood of a significant residual impact
5. Disrupt the breeding cycle of an important population	Given majority of the project consists of static water transport infrastructure, the ongoing impacts of the project are expected to be negligible and wont impact on the breeding cycle of the important population outside of the construction period. Restrictions regarding works around and in riparian zones will aim to safeguard the species.	Low likelihood of a significant residual impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Where the Project can avoid significant disturbance to the riparian zone, it is likely the Project Area will continue to provide suitable habitat for the species post-construction. Additionally, given the relatively narrow and linear extent of the Project, its unlikely to impact on a significant extent of suitable habitat for the species.	Low likelihood of a significant residual impact

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:		
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Where any materials and/or machinery are required to be transported to the island to support the construction of the pipeline, there is a risk of introducing invasive fauna species (i.e. cane toads) which would have a detrimental impact on Mertens' water monitor. Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk. GEMCO has a robust cane toad biosecurity programme which has resulted in no individuals reaching the island throughout the duration of operations.	Low likelihood of a significant residual impact
8. Introduce disease that may cause the species to decline	The Project is unlikely to introduce a disease that may cause the species to decline.	Low likelihood of a significant residual impact
9. Interfere substantially with the recovery of the species	Based on all the information provided above, the Project is unlikely to significantly interfere with the recovery of the species.	Low likelihood of a significant residual impact

Based on the above assessment with the application of identified avoidance and mitigation measures it is concluded that the project will result in the low likelihood of a significant residual impact to northern blue-tongue skink.

6.4.3 EPBC Act migratory species

Marine, terrestrial and wetland migratory species are assessed against the significant impact criteria for migratory species. The outcomes of each of the following assessments resulted in the low likelihood of a significant residual impact to any migratory species with the application of identified avoidance and mitigation measures.

6.4.3.1 Migratory marine species

The Significant Impact Guidelines 1.1 defines several key characteristics to consider when assessing significant impacts to a migratory species. According to the Guidelines, 'important habitat' for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.

Listed migratory species cover a broad range of ecological niches with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species.

A total of 10 marine migratory species listed under the EPBC Act have been assessed as 'confirmed present', 'likely to' or 'may' occur within the northern extent of the Construction footprint.

All of these species occur in coastal habitats and are listed as migratory under the EPBC Act. They have been grouped in Table 27 due to the similarity of their habitat requirements and relevance to the Project for assessment under the EPBC significant impact guidelines 1.1. The species assessed are as follows:

- *Pandion haliaetus* – eastern osprey – confirmed present
- *Sterna hirundo* – common tern – confirmed present
- *Calidris ruficollis* – red-necked stint
- *Chlidonias leucopterus* - white-winged black tern
- *Hydroprogne caspia* - caspian tern
- *Pluvialis fulva* - pacific golden plover
- *Sterna dougallii* - roseate tern
- *Sterna hirundo* - common tern
- *Sterna sumatrana* - black-naped tern

– *Sternula albifrons* - little tern.

Table 27 SIA for migratory marine species

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:		
1. Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	<p>Based on field survey analysis, it is unlikely the project area is a site of high fidelity for any of the above species. The two species recorded present were both observed flying over or adjacent to the project area.</p> <p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint at its northern extent, and the total footprint of the marine impact area (<5 ha), the Construction footprint is unlikely to provide important habitat of any migratory species.</p> <p>Conversely, during the operational phase of the project, the pipeline and associated infrastructure may provide roosting and/or resting opportunities for many of these species.</p>	Low likelihood of a significant residual impact
2. Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	<p>Migratory marine birds are potentially at risk from predation by foxes and cats. Off-leash dogs are considered threats to many shorebird species (Weston and Stankowich 2013). The construction of linear pipeline infrastructure is not expected to introduce or amplify the presence of any feral predators.</p> <p>Where any materials and/or machinery are required to be transported to the island to support the construction of the pipeline, there is a risk of introducing invasive fauna species (i.e. cane toads) which may have a detrimental impact on shorebirds.</p> <p>Invasive species will be managed through the implementation of mitigation measures (i.e. weed management activities) which will limit the potential for the establishment and proliferation of invasive species. Biosecurity inspections will assist to reduce the risk of introduction. Where possible, using machinery already located on the island and reducing the need for importing resources will also reduce the risk.</p> <p>It should be noted that GEMCO has a robust cane toad biosecurity programme which has resulted in no individuals reaching the island throughout the duration of operations.</p>	Low likelihood of a significant residual impact
3. Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	<p>Whilst many of the above species breed in the northern hemisphere, the project area lacks potential breeding sites for species such as eastern osprey.</p> <p>While foraging health is important to allow migration back to breeding grounds, the relatively small area of habitat impacted will have no influence on foraging resource availability within the region. Also, the field surveys did not indicate the Construction footprint contains any significant populations of any migratory species.</p> <p>Based on the relatively narrow (<150 m across) and linear extent of the Construction footprint, the Project is unlikely to be able to provide sufficient quantity of habitat for an 'ecologically significant proportion' of the population of any migratory species.</p>	Low likelihood of a significant residual impact

6.4.3.2 Migratory terrestrial species

The Significant Impact Guidelines 1.1 defines several key characteristics to consider when assessing significant impacts to a migratory species. According to the Guidelines, 'important habitat' for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.

Within the Guidelines, each migratory terrestrial species has a specific definition of 'important habitat', including five species that were assessed as 'may occur' in the Construction footprint:

- **Fork-tailed swift:** Almost entirely aerial favours dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, riparian woodlands, health land or saltmarsh.

- **Red-rumped swallow:** Non-breeding habitat only: predominately forages over wetlands and open well-watered grasslands.
- **Barn swallow:** Non-breeding habitat only: occurs in the air above open vegetated areas including native and agricultural grasslands as well as over open water area.
- **Oriental cuckoo:** Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open *Casuarina*, *Acacia* or *Eucalyptus* woodlands. Frequently at edges or ecotones between habitat types. Riparian forest is favoured habitat in the Kimberley region.
- **Grey wagtail:** Non-breeding habitat only: has a strong association with water, particularly rocky substrates along water courses but also lakes and marshes.

Listed migratory species cover a broad range of ecological niches with different life cycles and population sizes. Therefore, what is an ‘ecologically significant proportion’ of the population varies with the species.

Significant impact assessment has been completed in Table 28 against the EPBC significant impact guidelines 1.1.

Table 28 SIA for migratory terrestrial species

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:		
1. Substantially modify, destroy or isolate an area of important habitat for a migratory species	<p>The results of the surveys indicate the Construction footprint does not constitute a site of high fidelity for any known migratory species.</p> <p>Based on the relatively narrow and linear extent of the Construction footprint, it is unlikely to provide important habitat.</p> <p>The final impact footprint of 26.72 ha and associated clearing footprint of 10.4 ha is negligible in the context of impacts tot important habitat for the above species. Additionally, the Construction footprint does not meet the criteria of ‘important habitat’, as it does not support an ecologically significant proportion of the population during critical life stages.</p> <p>Being highly mobile, the migratory fauna area unlikely to be isolated from other individuals or areas of suitable habitat by the Project.</p>	Low likelihood of a significant residual impact
2. Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	<p>Feral cats are known to occur on Groote Eylandt. The Project is unlikely to introduce any novel activities or infrastructure which would increase or amplify the impacts of feral cats (or any other feral predators) within the area.</p> <p>Invasive species will be managed through the implementation of mitigation measures (i.e. weed management activities) which will limit the potential for the establishment and proliferation of invasive species.</p>	Low likelihood of a significant residual impact
3. Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	<p>The Construction footprint does not impact any habitat that would support ecologically significant proportions of the population of any migratory terrestrial species. The Construction footprint supports some suitable foraging habitat and would not constitute important habitat as it would not support an ecologically significant proportion of the population. The linear extent of the Project suggests any disturbance will not entirely remove or restrict access to any suitable habitat, much of which is abundant and available in the surrounding habitat.</p> <p>Also, the field surveys did not indicate the Construction footprint contains any significant populations of any migratory species.</p>	Low likelihood of a significant residual impact

6.4.3.3 Migratory wetland species

The Significant Impact Guidelines 1.1 defines several key characteristics to consider when assessing significant impacts to a migratory species. According to the Guidelines, 'important habitat' for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.

The following wetland migratory species were assessed as 'may occur' after the likelihood of occurrence assessment:

- *Gallinago megala* - Swinhoe's snipe
- *Glareola maldivarum* - oriental pratincole
- *Acrocephalus orientalis* - oriental reed-warbler
- *Charadrius veredus* - oriental plover

Significant impact assessment has been completed in Table 29 against the EPBC significant impact guidelines 1.1.

Table 29 SIA for wetland migratory species

Criteria	Assessment of Significance	Outcome
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:		
1. Substantially modify, destroy or isolate an area of important habitat for a migratory species	<p>The results of the surveys indicate the Construction footprint does not constitute a site of high fidelity for any known migratory species.</p> <p>Based on the relatively narrow and linear extent of the Construction footprint, it is unlikely to provide important habitat.</p> <p>The final impact footprint of 23.33 ha and associated clearing footprint of 10.44 ha is negligible in the context of impacts to important habitat for the above species. Additionally, the Construction footprint does not meet the criteria of 'important habitat', as it does not support an ecologically significant proportion of the population during critical life stages.</p> <p>Being highly mobile, the migratory fauna area unlikely to be isolated from other individuals or areas of suitable habitat by the Project.</p>	Low likelihood of a significant residual impact
2. Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	<p>Feral cats are known to occur on Groote Eylandt. The Project is unlikely to introduce any novel activities or infrastructure which would increase or amplify the impacts of feral cats (or any other feral predators) within the area.</p> <p>Invasive species will be managed through the implementation of mitigation measures (i.e. weed management activities) which will limit the potential for the establishment and proliferation of invasive species.</p>	Low likelihood of a significant residual impact
3. Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	<p>The Construction footprint does not impact any habitat that would support ecologically significant proportions of the population of any migratory terrestrial species. The Construction footprint supports some suitable foraging habitat and would not constitute important habitat as it would not support an ecologically significant proportion of the population. The linear extent of the Project suggests any disturbance will not entirely remove or restrict access to any suitable habitat, much of which is abundant and available in the surrounding habitat.</p> <p>Also, the field surveys did not indicate the Construction footprint contains any significant populations of any migratory species.</p>	Low likelihood of a significant residual impact

7. Conclusion

GEMCO proposes to construct a water disposal pipeline within the western portion of Groote Eylandt. A terrestrial ecological assessment of the Construction footprint has been undertaken to identify potential impacts on terrestrial ecosystems and threatened species. This report has been prepared to provide the methods and results of an ecological assessment undertaken for the Project.

A desktop review of existing data, mapping layers, and existing site photographs was undertaken. This informed a field survey conducted in April 2024 and further field survey effort in August 2024. The key findings are summarised below:

- The Construction footprint is characterised by natural (e.g. fire, stormwater and flooding) and anthropogenically (e.g. clearing, infrastructure) modified vegetation indicating a low overall ecological value.
 - Restricted ground cover vegetation in many areas limit the availability of refuge for a range of terrestrial fauna species.
 - No TECs were mapped within the Construction footprint.
- Based on the results of the field survey, no NT and/or Commonwealth listed threatened flora species were detected during the vegetation survey within the Construction footprint.
 - Two threatened flora species were assessed as ‘may occur’ within the Construction footprint post-survey.
 - One threatened fauna species, the northern quoll, was observed during the field surveys.

The key potential impacts of the Project include:

- **Fauna injury and mortality:** Construction work within the Construction footprint has the potential to cause direct wildlife injury and mortality if animals are struck by machinery or injured during the clearing process.
- **Habitat removal:** Clearing of vegetation has the potential to remove habitat for fauna species resulting in displacement of individuals and potential increased pressure on adjacent habitat.
- **Disruption of fauna behaviour:** Construction activities may result in a temporary, localised disturbance to fauna behaviour in local habitats through construction-related noise and vibration (and lighting, if required).
- **Spread of weeds:** Vegetation clearing and soil disturbance during construction has the potential to degrade local habitats through facilitating the introduction and spread of established introduced species.
- **Proliferation of pest fauna:** Construction activities have the potential to attract localised concentrations of exotic fauna by increasing the availability of food and water through inappropriate waste disposal and water management. Exotic fauna species can adversely impact native wildlife by increasing levels of predation and competition.
- **Waterway degradation:** Vegetation clearing, and earthworks may expose sediment to erosive forces, which could degrade through overland flow discharge to the drainage features through mobilisation of pollutants, increased turbidity and/or sediment deposition. Impact of pipeline infrastructure on overland flow has been addressed through design including hydrological modelling to determine the number and location of crossings to maintain overland flow conditions with minor change.
- **Restriction of movement/landscape fragmentation:** Given the confirmed presence of threatened and common terrestrial fauna species, the construction of pipeline infrastructure has the potential to restrict movement throughout the landscape. This has been addressed through the installation of 53 pipeline crossing points along the pipeline infrastructure.

Development and implementation of avoidance features through pipeline siting and crossing design and a CEMP including the mitigation measures proposed in Section 6.3 of this report will act to minimise and mitigate against such impacts.

Significant impact assessments found low likelihood of significant residual impacts against any MNES as outlined in Table 30 with the application of the proposed avoidance and mitigation measures.

Table 30 Summary of significant residual impact assessments.

Matters	Likelihood of a significant residual impact
MNES	
Threatened shorebirds	Low
Northern masked owl	Low
Northern quoll	Low
Ghost bat	Low
Northern brushtail possum	Low
Mertens' water monitor	Low
Northern blue-tongue skink	Low
Migratory marine birds	Low
Migratory terrestrial birds	Low
Migratory wetland birds	Low

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Appendices

Appendix A

Desktop assessment results



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 25-Oct-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	36
Listed Migratory Species:	48

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	78
Whales and Other Cetaceans:	10
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	3

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	7
Key Ecological Features (Marine):	None
Biologically Important Areas:	3
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species [\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Chloebia gouldiae listed as Erythrura gouldiae Gouldian Finch [90091]	Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Conilurus penicillatus Brush-tailed Rabbit-rat, Brush-tailed Tree-rat, Pakooma [132]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat known to occur within area	In feature area
Notomys aquilo Northern Hopping-mouse, Woorrentinta [123]	Endangered	Species or species habitat known to occur within area	In feature area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat may occur within area	In feature area
Trichosurus vulpecula arnhemensis Northern Brushtail Possum [83091]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Acanthophis hawkei Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
Tiliqua scincoides intermedia Northern Blue-tongued Skink [89838]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Varanus mertensi Mertens' Water Monitor, Mertens's Water Monitor [1568]	Endangered	Species or species habitat known to occur within area	In feature area
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In feature area
Glyphis glyphis Spear-tooth Shark [82453]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In feature area
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sousa sahalensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat known to occur within area	In feature area
Migratory Terrestrial Species			
Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area	In feature area
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area	In feature area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands

[\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		

Commonwealth Land Name	State	Buffer Status
Defence - NORFORCE DEPOT - GROOTE EYLANDT [70068]	NT	In buffer area only

Listed Marine Species	[Resource Information]		
Scientific Name	Threatened Category	Presence Text	Buffer Status

Scientific Name	Threatened Category	Presence Text	Buffer Status
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Bird

[Acrocephalus orientalis](#)

Oriental Reed-Warbler [59570]		Species or species habitat may occur within area overfly marine area	In feature area
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[Actitis hypoleucos](#)

Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
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[Anous stolidus](#)

Common Noddy [825]		Species or species habitat may occur within area	In feature area
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[Apus pacificus](#)

Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
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[Bubulcus ibis as Ardea ibis](#)

Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
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[Calidris acuminata](#)

Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
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[Calidris canutus](#)

Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
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[Calidris ferruginea](#)

Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
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[Calidris melanotos](#)

Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
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Scientific Name	Threatened Category	Presence Text	Buffer Status
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area	In feature area
Cecropis daurica as Hirundo daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area overfly marine area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area	In feature area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In feature area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In feature area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In feature area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In feature area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In feature area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In feature area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In feature area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In feature area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Halicampus spirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In feature area
Haliichthys taeniophorus Ribbioned Pipehorse, Ribbioned Seadragon [66226]		Species or species habitat may occur within area	In feature area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In feature area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In feature area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area	In feature area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area	In feature area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In feature area
Mammal			
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In feature area
Reptile			
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In feature area
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In feature area
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In feature area
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area	In feature area
Hydrophis atriceps Black-headed Sea Snake [1101]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In feature area
Hydrophis hardwickii as Lapemis hardwickii Spine-bellied Sea Snake [93516]		Species or species habitat may occur within area	In feature area
Hydrophis inornatus Plain Sea Snake [1107]		Species or species habitat may occur within area	In feature area
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In feature area
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area	In feature area
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In feature area
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area	In feature area
Hydrophis pacificus Pacific Sea Snake, Large-headed Sea Snake [1112]		Species or species habitat may occur within area	In feature area
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area	In feature area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In feature area
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis zweiffei as Enhydrina schistosa Australian Beaked Sea Snake [93514]		Species or species habitat may occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
Parahydrophis mertoni Arafura Smooth Sea Snake, Northern Mangrove Sea Snake [1090]		Species or species habitat may occur within area	In feature area

Whales and Other Cetaceans [[Resource Information](#)]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Sousa sahalensis Australian Humpback Dolphin [87942]		Species or species habitat known to occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Habitat Critical to the Survival of Marine Turtles [\[Resource Information \]](#)

Scientific Name	Behaviour	Presence	Buffer Status
Aug - Sep			
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur	In feature area
Dec - Jan			
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur	In feature area
Nov - May			
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur	In feature area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State	Buffer Status
Anindilyakwa	Indigenous Protected Area	NT	In feature area
Anindilyakwa	Indigenous Protected Area	NT	In feature area

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
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Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Winchelsea Island Manganese Mine Project, NT	2021/8877		Assessment	In buffer area only
Controlled action				
Eastern Leases Project, Groote Eylandt, Northern Territory	2014/7228	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Eastern Leases 2010 Exploration Drilling Program	2010/5455	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Acoustic and Resistivity Sub-Bottom Profiling Survey	2011/6116	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Eastern Leases 2013 Exploration Drilling Program, Groote Eylandt, NT	2013/6848	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Eastern Leases Manganese Exploration Drilling	2008/4563	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Groote Eylandt Offshore Marine Surveys	2010/5643	Referral Decision	Completed	In feature area

Biologically Important Areas			[Resource Information]	
Scientific Name	Behaviour	Presence	Buffer Status	
Marine Turtles				
Chelonia mydas				
Green Turtle [1765]	Interesting	Likely to occur	In feature area	
Eretmochelys imbricata				
Hawksbill Turtle [1766]	Interesting	Likely to occur	In feature area	
Natator depressus				
Flatback Turtle [59257]	Interesting	Likely to occur	In feature area	

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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Appendix B

**Post survey likelihood of occurrence
assessment**

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
Flora					
<i>Eleocharis retroflexa</i>	Field	Vulnerable	NL	<p><i>Eleocharis retroflexa</i> is known from Queensland and the Northern Territory. In Queensland it is known from the Eubenangee Swamp, north of Garradunga and Blackfellows Creek near Cairns. In the Northern Territory it is known from two swamps on the Wingate Mountains plateau and sandstone plateau in Nitmiluk National Park. This species is conserved within Eubenangee Swamp National Park and Nitmiluk National Park (Briggs & Leigh, 1996; Woinarski et al., 2007).</p> <p>There is no population and extent of occurrence data available for this species in Australia (Woinarski et al., 2007). <i>E. retroflexa</i> has a pantropical distribution and also occurs in tropical America and Asia (Kern, 1974).</p> <p>It grows in shallow water on the margins of seasonal swamps (BRI collection records, n.d.) and occurs within the Wet Tropics (Queensland) and Northern Territory Natural Resource Management Regions.</p>	<p>May occur</p> <p>There are no historical records of the species within the desktop search extent (NR Maps, 2023). Based on the results of field surveys, some potentially suitable habitat is present within the Construction footprint in the form of source code 55 vegetation mapping community. This community includes damp sedgeland.</p> <p>Despite the lack of records, this species has been assessed as may occur due to adequate habitat in place.</p>
<i>Utricularia singeriana</i>	Field	NL	V	<p><i>Utricularia singeriana</i> thrives in specific habitats within its range in Northern Territory and Western Australia. Typically found in areas that experience seasonal dryness, which is crucial for its growth cycle. It often grows in sandy swamps that are flooded during certain times of the year. The plant flowers after the water recedes from the margins of these swamps. Like many other <i>Utricularia</i> species, it requires wet substrates, which can include wet soil or shallow water layers on top of the substrate (Taylor, P. 1989).</p>	<p>May occur</p> <p>Although not detected during field surveys and no previous records occurring within the desktop search extent, habitat was present for the species.</p>
BIRDS					
<i>Numenius madagascariensis</i> Eastern curlew	PMST, NR Maps	CE, Mig	CE	<p>The eastern curlew has a primarily coastal distribution and is commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats often with beds of seagrass (DCCEEW, 2023; Menkhorst et al., 2019). The species roosts during high tide periods on sandy spits, sandbars and islets, especially on beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves (DCCEEW, 2023). The eastern curlew nests in the Northern Hemisphere summer from early May to late June and does not breed in Australia, the species moves south towards Australia for the austral summer as early as July (DCCEEW, 2023).</p>	<p>Unlikely to occur</p> <p>There are 19 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1 km southeast of the Construction footprint, with the most recent recorded sighting in 2004.</p> <p>Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.</p>
<i>Calidris tenuirostris</i> Great knot	NR Maps	CE, Mig	E	<p>The great knot has been recorded around the entirety of the Australian coastline; however, the species is most common in northern Australia</p>	<p>Unlikely to occur</p> <p>There are four historical records of the species within the desktop</p>

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				(DCCEEW, 2023a). the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats (Menkhorst et al., 2019). Occasionally found on exposed reefs or rock platforms, mangroves, intertidal saltmarsh and nontidal lagoons (DCCEEW, 2023a). Non-breeding visitor to Australia.	search extent (NR Maps, 2023). The closest record of the species is approximately 600 m north of the Construction footprint, the date of these records is unknown. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Calidris ferruginea</i> Curlew sandpiper	PMST, NR Maps	CE, Mig	CE	The curlew sandpiper is widely distributed around Australia; though occurs in high densities in coastal areas (DCCEEW, 2023a; Menkhorst et al., 2019). Small numbers are known to occur in inland Australia (DCCEEW, 2023a). Preferred habitats include intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and non-tidal swamps, lakes and lagoons (DCCEEW, 2023a). They are also recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains (DCCEEW, 2023a).	Unlikely to occur There are nine historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 2 km west of the Construction footprint over the ocean, with the most recent recorded sighting in 1980. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Rostratula australis</i> Australian painted snipe	PMST	E	E	The Australian painted snipe has a broad distribution across, though is most common in eastern Australia, where it has been recorded at scattered locations throughout much of Queensland, NSW and Victoria (DCCEEW, 2023). The species generally inhabits shallow, terrestrial freshwater wetlands, including temporary and permanent lakes, swamps, claypans and waterlogged grasslands (DCCEEW, 2023, Menkhorst et al., 2019). Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum (DCCEEW, 2023) A rare species seldom seen.	Highly unlikely to occur There are no historical records of the species within the desktop search extent (NR Maps). Suitable habitat for the species is not present within the Construction footprint, as such, the species has been assessed as highly unlikely to occur.
<i>Erythrura gouldiae</i> Gouldian finch	PMST	E	V	The species inhabits tropical eucalypt and paperbark woodlands, where they feed on grass seeds and drink at waterholes (DCCEEW, 2023a). During the breeding season, they inhabit small areas of open woodland retaining hollow bearing trees, with a grassy understory containing sorghum (<i>Sorghum</i> spp.), <i>Schizachyrium</i> spp. and spinifex (<i>Trodia</i> spp.) and within 2-4 km of perennial waterholes or springs (DCCEEW, 2023a).	Highly unlikely to occur There are no historical records of the species within the desktop search extent (NR Maps). The Construction footprint lacks highly suitable nesting habitat for the species. Additionally, given the lack of known records, the species has been assessed as highly unlikely to occur.
<i>Erythrotriorchis radiatus</i> Red goshawk	PMST	E	V	The red goshawk is widely distributed throughout northern and eastern Australia, particularly in a wide coastal strip along eastern Queensland, through to Cape York and the Northern Territory / Kimberly. The species occurs in a range of habitats, often at ecotones, including	Highly unlikely to occur There are no historical records of the species within the desktop search extent (NR Maps). The Construction footprint lacks highly suitable nesting habitat for the species, which may be present in a transient nature or flying over

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				coastal and sub-coastal tall open forests, tropical savannahs crossed by wooded or forested watercourses, woodlands, edges of rainforests and gallery forests along watercourses, and wetlands that include Melaleuca and Casuarina species (Menkhorst et al., 2019). The species typically nests in tall trees within 1 km of permanent water and favours habitats that support a high abundance of bird species (Pizzey and Knight, 1999).	the site. Additionally, given the lack of known records, the species has been assessed as highly unlikely to occur.
<i>Charadrius mongolus</i> Lesser sand plover	NR Maps	E, Mig	E	In Australia, the lesser sand plover is found around the entire coast, but is most common in the Gulf of Carpentaria, and along the east coast of Queensland and northern NSW (EOH, 2021). This species is almost exclusively coastal in its occurrence, and favours beaches of sheltered bays, saltmarshes, mangroves, harbours and estuaries with large intertidal sandflats or mudflats (Pizzey and Knight, 1999).	Unlikely to occur There are nine historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 600 m from the Construction footprint; and the most recent record was from 2020. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Calidris canutus</i> Red knot	PMST	E, Mig	E	The red knot is a non-breeding visitor to Australia, occurring widely around the Australian coast and with few inland records (DCCEEW, 2023a). Gathers in large flocks on the coast in sandy estuaries with tidal mudflats and in sheltered embayments of the coastline (Pizzey and Knight, 1999; Menkhorst et al., 2019). The species roost on sandy beaches, spits and mudflats close to feeding grounds. Usually forages near the water's edge.	Unlikely to occur There are no historical records within the desktop search extent (NR Maps, 2023). Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Falco hypoleucos</i> Grey falcon	NR Maps	V	V	The grey falcon is a raptor species that occurs at unusually low densities, exclusively in the arid and semi-arid zones of Australia (Schoenjahn, 2013). It inhabits a range of habitat types, including lightly timbered woodlands, <i>Acacia</i> shrublands and <i>Triodia</i> grasslands with annual rainfall under 500 mm (Menkhorst et al., 2019). The species' core breeding habitat lies within areas of the hottest climate classes, specifically, within the central deserts of Western Australia (Schoenjahn, 2018).	Unlikely to occur There are two historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 4.8 km west of the project area on the mainland. The species is known to prefer the arid inland, with sporadic records near the coast (Debus 2023). Additionally, claims of the species in or near coastal eastern Australia and on adjacent coastal islands are now considered erroneous. As such the species has been assessed as unlikely to occur.
<i>Limosa lapponica baueri</i> Alaskan Bar-tailed godwit	PMST	V	V	The bar-tailed godwit has a broad distribution across much of Australia, preferring coastal regions and excluding the central deserts and mountainous regions (DCCEEW, 2023a). Favours estuaries, sheltered bays, intertidal wetlands and mangrove communities (Menkhorst et al., 2019). Occasionally occurs in seagrass beds, saltmarsh or the outer margins of mangroves (Pizzey	May occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). According to eBird, the species has been recorded on Groote Eylandt, predominantly on Angurukirikba Beach. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				and Knight, 1999). A non-breeding visitor to Australia.	area with poor substrate for invertebrate foraging resources). However, this species can be more generalist than other shorebird species and as such, the species has been assessed as may occur in a transient nature.
<i>Pluvialis squatarola</i> Grey plover	NR Maps	Mig	NL	The species has been recorded in all Australian states and territories where it is most prevalent on the western and southern coastlines. The species is a non-breeding visitor to Australia where it occurs almost entirely in coastal areas including sheltered embayments, estuaries and lagoons, mudflats, sandflats. The species has been recorded in terrestrial wetlands including near-coastal lakes, swamps (DCCEEW, 2023).	Unlikely to occur There are 5 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 580 m east of the Construction footprint, with the most recent recorded sighting in 2004. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Charadrius leschenaultii</i> Greater sand plover	PMST, NR Maps	V, Mig	V	The greater sand plover occurs widely around the Australian coastline, with numbers greatest in northern Australia (DCCEEW, 2023a). The species is almost entirely coastal, occurring in a range of littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons (Menkhorst et al., 2019). A non-breeding visitor to Australia, with breeding occurring in central Asia.	Unlikely to occur There are 13 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 600 m from the Construction footprint, with the most recent recorded sighting in 2012. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Tyto novaehollandiae kimberli</i> Masked owl (northern)	NR Maps	V	V	The masked owl (northern) occurs throughout northern Australia, from Mackay to the Kimberley region of Western Australia (DCCEEW, 2023). The species inhabits riparian forest, rainforest, open forest, Melaleuca swamps, edges of mangroves, margins of sugar cane fields (DCCEEW, 2023; Menkhorst et al., 2019). Key habitat requirements for the species include a large home range, presence of hollow-bearing trees for nesting and the abundance of arboreal and small mammals (Woinarski, 2004).	Likely to occur There are 20 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 300 m from the Construction footprint, with the most recent recorded sighting in 2018. Suitable habitat for the species was very marginal to absent within the Construction footprint (i.e. eucalypt woodland containing suitable hollows), however the species is likely to be present for foraging purposes in a transient nature.
<i>Limosa limosa</i> Black-tailed godwit	NR Maps	E, Mig	NL	The black-tailed godwit has been widely recorded in scattered locations around Australia's coastline (DCCEEW, 2023). The species is commonly found in sheltered bays and estuaries with large intertidal mudflats or sandflats and is occasionally recorded on rocky coasts or coral islets (Menkhorst et al., 2019). Forages on wide intertidal mudflats or sandflats, in soft mud or	Unlikely to occur There are 30 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 3.3 km north of the Construction footprint, with the most recent recorded sighting in 2004. Suitable habitat for the species is very limited within the Construction

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		EPBC Act	TPWC Act		
				shallow water and occasionally in shallow estuaries. A non-breeding visitor of Australia, with breeding occurring in northern Russia.	footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Limnodromus semipalmatus</i> Asian dowitcher	PMST	V, Mig	NL	The Asian dowitcher has a coastal distribution, from northern NSW to central Western Australia (Menkhorst et al., 2019). Most common between Port Hedland and Broome (DCCEEW, 2023). Occurs almost exclusively on large, tidal mudflats, coastal lagoons, tidal creeks and salt flats, and commonly found in the ponds and channels of saltworks /sewage farms (DCCEEW, 2023). A non-breeding visitor to Australia, with breeding occurring in Siberia and northeastern China.	Highly unlikely to occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as highly unlikely to occur.
<i>Tringa nebularia</i> Common greenshank	PMST	E, Mig	NL	The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. Typically occurs in sheltered coastal areas with large mudflats, saltmarshes, mangroves or seagrasses (DoEE, 2019). Species also occurs in permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains (DoEE, 2019).	May occur There are 64 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 550 m east of the Construction footprint, with the most recent recorded sighting in 2015. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources). However, the number of previous records suggest the species may use the area in a transient nature for roosting or rest. As such, the species has been assessed as may occur.
<i>Calidris acuminata</i> Sharp-tailed sandpiper	PMST	V, Mig	NL	Species inhabits muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grasses, saltmarshes, or other low vegetation (DCCEEW 2023). Their habitat includes lagoons, swamps, lakes, and pools near the coast, as well as dams, waterholes and salt pans (DCCEEW 2023).	May occur There are 48 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 2 km west of the Construction footprint, with the most recent recommended sighting in 2015. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources). However, the species is more generalist in nature than other shorebird species and, as such, may be present in a fleeting, transient nature to sample foraging grounds or to rest/roost. The species has been assessed as may occur.
<i>Xenus cinereus</i> Terek sandpiper	NR Maps	V, Mig	NL	The Terek Sandpiper mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves	Unlikely to occur There is one historical record of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 500 m east of the

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				(DCCEEW, 2024). Preferring to roost in or among mangroves, birds may perch in branches or roots up to 2 m from the ground, or beneath them in the shade on hot days. Occasionally, they roost in dead trees or among tangled driftwood (DCCEEW, 2024).	Construction footprint, with no record date. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
Mammals					
<i>Notomys Aquilo</i> Northern hopping-mouse	PMST, NR Maps	E	CE	<p>The northern hopping-mouse distribution is minimal within in Australia, concentrated to the whole of Groote Eylandt and small parts of Northern Territory (DCCEEW, 2023). The northern hopping-mouse prefers northern Australia's wet-dry tropics and is the only species that occurs outside the arid and semi-arid zone. The species has been reported in a range of habitats (including eucalypt open forests, heathlands, or grasslands and dunefields), on sandy substrates (Woinarski et al, 1999; Woinarski et al. 2014, Diets 2016, pers comm, 22 January). Ward (2014) found the species prefers habitats supporting floristically diverse heathlands and/or grasslands close to the coast as well as in woodlands with a diverse understory.</p> <p>Recent surveys have verified the inland occurring northern hopping-mouse's preference for sandy areas around weathered sandstone, with 95% of recorded burrows within 500 m of sandstone or quartzite edges and a median distance of 136 m (GEMCO 2022; Barden and Diets 2022). A 500 m buffer from sandstone margins encompasses most records from Groote Eylandt, including studies by Barden (2019-2023), Heiniger (2020b), Diets (2017), GEMCO Southern Mammals Small Mammal Study, Eastern Leases Environmental Impact Assessment (Cumberland Ecology 2015), and Coffey Environments (2010). Few burrows beyond 500 m are near riparian corridors or in sand on river flood terraces. Some burrows over 500 m away were found in a broad valley between sandstone areas in the Eastern Lease North area. The sole mainland record, held by the Museum and Art Gallery of the Northern Territory, also fits this pattern (Dixon 2019).</p>	<p>Unlikely to occur</p> <p>There are three historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1.5 km north of the Construction footprint, with the most recent recorded sighting in 1969.</p> <p>Suitable habitat for the species was observed to be heavily modified (i.e. fire) and generally unsuitable for this species based on known habitat requirements, including within ~130 - 500m from sandstone or quartzite edges, which are not present within the vicinity of the construction footprint.</p>
<i>Dasyurus hallucatus</i> Northern quoll	PMST, NR Maps	E	CE	<p>The northern quoll was once distributed throughout much of northern Australia; however, the species range is now highly fragmented due to habitat clearing and cane toad invasion (DCCEEW, 2023). The species inhabits a variety of habitats, ranging from eucalypt woodlands to rainforests (Hill and Ward, 2010). Species particularly</p>	<p>Confirmed present</p> <p>There are 440 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 300 m from the Construction footprint, with the most recent recorded sighting in 2018.</p>

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
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				prefers areas that contain rock crevices, hollow logs and termite mounds (DCCEEW, 2023).	Field surveys confirmed presence with tracks recorded in the north and south of the project area. At least six individuals were detected on cameras over four nights of survey. Suitable habitat for the species was found within the Construction footprint (i.e. fallen logs). Additionally, the species forages within the Construction footprint.
<i>Conilurus penicillatus</i> Brush-tailed rabbit-rat	PMST	V	E	Formerly widely spread across the tropical woodlands and open forests of northern Australia, the brush-tailed rabbit-rat has declined extensively. The species occurs in northern Kimberley, the Top End of the Northern Territory, Bentinck Island and southern New Guinea (DCCEEW, 2016). The species is predominantly recorded in lowland eucalypt forests and woodlands, dominated by Darwin woollybutt (<i>Eucalyptus miniata</i>) and/or Darwin stringybark (<i>E. tetradonta</i>). This species shelters in the hollows of trees, logs and in crowns of pandanus or sand-palms (DCCEEW, 2016).	Unlikely to occur There are no historical records within the desktop search extent (NR Maps, 2023). The species is patchily distributed throughout lowland woodland and forest habitats on Groote, with a relative stronghold on the northern peninsula (Heiniger and Gillespie 2017). Suitable habitat for the species within the Construction footprint, is marginal and heavily modified. As such the species has been assessed as unlikely to occur.
<i>Saccolaimus saccolaimus nudicluniatus</i> Bare-rumped sheath-tailed bat	PMST	V	NL	The bare-rumped sheath-tail bat is predicted to occur across of northern Australia (DCCEEW, 2023). Preferred habitat for the species typically includes lowland areas supporting a range of woodland, forest and open environments with roosts typically within tree hollows, caves, overhangs or man-made structures (DCCEEW, 2023).	Unlikely to occur There are no historical records within the desktop search extent (NR Maps, 2023). Marginally suitable habitat for the species does exist within the desktop search extent, however, due to the lack of records within the Construction footprint the species has been assessed as unlikely to occur.
<i>Macroderma gigas</i> Ghost bat	PMST, NR Maps	V	NL	The Ghost Bat is a large, carnivorous bat that perches in vegetation to ambush prey as well as gleaning surfaces while in flight (Bullen 2021). The ghost bat inhabits a highly fragmented distribution, with geographically disjunct colonies occurring in the Pilbara, Kimberley, Northern Territory, the Gulf of Carpentaria and coastal and near coastal eastern Queensland (DCCEEW 2023). This species is known to occur in rainforest areas, vine shrub, open woodlands and arid zone (McKenzie and Hall, 2008), and roosts in caves, rock crevices and old mine shafts (TSSC, 2016b). The species requires multiple roosting sites and move between several caves seasonally or as dictated by weather conditions (TSSC, 2016b).	May occur There are six historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1.2 km from the Construction footprint, with the most recent recorded sighting in 2017. Suitable roosting habitat for the species was not observed during the field surveys, however, the species is likely to be present for foraging purposes.
<i>Xeromys myoides</i> Water mouse	PMST	V	NL	The water mouse has a coastal distribution from northern NSW north to Darwin (DCCEEW, 2023). The species inhabits mangroves and the associated saltmarsh, sedgeland, clay pans, heathlands and freshwater wetlands. Low-tide saltmarsh	Unlikely to occur There are no historical records within the desktop search extent (NR Maps, 2023). Very minor areas of suitable habitat (i.e. sedgeland) for the species were recorded during the

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
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				communities are utilized for foraging, particular areas supporting salt couch and samphire (Van Dyck et al., 2013). Nesting habitat occurs below the high-tide mark, usually amongst dense mangrove / <i>Casuarina</i> vegetation.	field surveys at the coastal interface, however this is considered marginal and lacks dense mangroves below the high-tide mark suitable for nesting. Given the results of the field surveys and the lack of known records, the species has been assessed as unlikely to occur.
<i>Trichosurus vulpecula arnhemensis</i> Northern brushtail possum	PMST, NR Maps	V	NL	The northern brushtail possum is a semi arboreal, nocturnal marsupial that occurs sporadically throughout northern Australia, from the Gulf of Carpentaria in the east, through the NT and the northern islands, to the Kimberley in Western Australia (TSSC, 2021). It occurs predominantly in tall, open Eucalypt forests with a shrubby understorey that contains small, fleshy fruits. The sub-species is also known to occur in mangrove forests and rainforests particularly those that contain hollow-bearing trees. Where tree hollows are limited (often in northern Australia), the species is known to inhabit semi-urban areas and human infrastructure, particularly around Darwin. The northern brushtail possum's diet comprises small fruits, flowers, and leaves.	May occur There are two historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 800 m east of the Construction footprint, with the most recent recorded sighting in 2012. Suitable habitat for the species was highly modified (i.e. removal of ground cover layer by repeated fire) within the Construction footprint and very few large hollow bearing trees were recorded however the species may pass through the area during dispersal or foraging. As such, the species has been assessed as may occur.
<i>Rattus tunneyi</i> Pale field-rat	NR Maps	NL	V	The Pale Field-rat formerly occurred in arid and semi-arid areas of the Northern Territory (NT) and western and northern Western Australia (DEPWR, 2021). The Pale Field-rat occurs in a wide range of habitats, including tall grasslands, rocky slopes, woodlands and monsoon forests with dense understorey's dominated by grasses and sedges (DEPWR, 2021).	Unlikely to occur There are two historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 4.5 km southeast of the Construction footprint, however, all records do not indicate a date of sighting recorded. As such, the species current status on Groote is uncertain. Subsequent surveys have failed to detect the species (Heiniger and Gillespie 2017). Suitable habitat for the species was highly modified (i.e. removal of ground cover layer by repeated fire), within the Construction footprint. As such, the species has been assessed as unlikely occur.
Reptiles					
<i>Acanthophis rugosus</i> Plains death adder	PMST	V	V	The exact distribution of the plains death adder is unknown. The species is known to occur from Western Queensland across the Northern Territory into the northeast of Western Australia. The species inhabits flat, treeless, cracking-soil riverine floodplains. In the Northern Territory, isolated populations are found Barly Tableland on the Queensland to the east of Darwin. The extent of occurrence of the plain death adder is estimated to be approximately 720,000 km ² and its	Highly unlikely to occur There are no historical records within the desktop search extent (NR Maps, 2023). Suitable habitat for the species was not observed within the Construction footprint. As such the species has been assessed as highly unlikely to occur.

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				area of occupancy is estimated to be approximately 233,480 km ² .	
<i>Varanus mertensi</i> Mertens' water monitor	NR Maps	E	V	Mertens' water monitor occurs patchily across tropical northern Australia, from the west Kimberley in Western Australia (WA), across the Top End of the Northern Territory (NT), to the wet tropics in far north Queensland (DCEEW, 2023). This species is a highly aquatic lizard that seldom ventures more than 5–10 m from the edge of the water (Wilson & Knowles 1988; Mayes 2006; Smith & Griffiths 2009). This species has been recorded in perennial and semi-permanent pools in upper catchment areas, including springs, seeps, swamps, creeks and gorges (DCEEW, 2023). Mertens' water monitor is an active predator (Mayes 2006) that forages primarily in the water and at the water-land interface (Mayes et al. 2005; Mayes 2006; Wilson & Swan 2021). It usually eats freshwater crabs (<i>Holthuisana</i> sp.), fish, insects, amphipods, spiders and frogs, however, it will also consume most invertebrate and small vertebrate prey.	Likely to occur There are 10 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 100 m from the Construction footprint, with the most recent recorded sighting in 2018. Suitable habitat for the species was recorded within the Construction footprint (i.e. permanent shallow pools within ephemeral water courses), and therefore the species was considered as likely to occur.
<i>Varanus panoptes</i> yellow-spotted monitor	NR Maps	NL	V	<i>Varanus panoptes</i> has a broad geographic range across the far North of Australia from the Kimberley to Cape York Peninsula, and southwards through most of Queensland. In the Northern Territory (NT), it has been recorded across most of the Top End and the Gulf Region (NT Government, 2012). robust ground-dwelling monitor occupying a variety of habitats, including coastal beaches, floodplains, grasslands and woodlands. It feeds mostly on small terrestrial vertebrates and insects. It has an excellent sense of smell and often digs up prey, especially eggs of marine and freshwater turtles (Blamires 2004, Doody et al. 2007). It lays a clutch of eggs in a burrow in the ground, with egg-laying usually in the Wet season (NT Government, 2012).	Unlikely to occur There are four unconfirmed historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 3.9 km from the Construction footprint, with the most recent recorded sighting in 2014. Most records of yellow-spotted monitors reported from the Groote archipelago have been only visual sightings and cannot be verified (DEPWS 2019). Additionally, the only known specimens from the Groote area were all misidentified Gould's sand monitors. This suggests further surveys are required to confirm if the species is present on Groote Eylandt. Potentially suitable habitat for the species was observed within the Construction footprint, albeit heavily modified (i.e. grassland habitat removed by fire). As such, the species has been assessed as unlikely to occur.
<i>Tiliqua scincoides intermedia</i> Northern blue-tongue skink	PMST	CE	NL	The northern blue-tongue skink occurs in a wide variety of ecosystems. It has been recorded from dissected sandstone plateaus and gorges, limestone ranges, granite, basalt and dolerite hills, glacial shale undulations, sand plains, sandy waterways, swamps, cracking clay floodplains and coastal flats. Vegetation associations include riparian forest, vine scrub, monsoon rainforest, pandanus-lined gorges,	May occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). There are seven records of the species from Groote Eylandt on iNaturalist. The species was listed in December 2023 and this may explain the lack of records or official databases.

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				<p><i>Melaleuca</i> forest, eucalypt woodland and savanna, sparse and dense shrubland, and spinifex and tussock grassland. Most – but not all – detections have occurred near seasonal or permanent water (Shea 1992; AWC unpublished data; DAC unpublished data; WAC unpublished data).</p> <p>Northern blue-tongue skinks are recorded sheltering under shrubs and thick grasses, in leaf litter, within burrows, and under built structures and discarded household items. They tend to avoid areas with bare ground (Shea 1992; Price-Rees et al. 2013a).</p>	Suitable habitat for the species was present but highly modified within the Construction footprint (i.e. removal of ground cover layer by repeated fire). Additionally, the species was not detected during the field survey.
Migratory species (excluding threatened migratory already assessed above)					
<i>Phaethon lepturus</i> White-tailed tropicbird	PMST	Mig	NL	The white-tailed tropicbird occurs throughout the tropics of the northern Indian Ocean (DCCEEW, 2023). The species is a relatively common visitor to the seas off northern Western Australia and occasionally sighted close to the Western Australia mainland (DCCEEW, 2023). Known to inhabit tropical waters with sea-surface temperatures of more than 22°C. Breeds on islands and atolls, where it nests in on bare sandy ground, in closed-canopy rainforest and on rocky cliffs (DCCEEW, 2023).	<p>Highly unlikely to occur</p> <p>There are no historical records within the desktop search extent (NR Maps, 2023).</p> <p>Given the Construction footprint only extends to the nearshore and likely shallow coastal area, the suitable habitat for the species was considered minimal. As such, the species has been assessed as highly unlikely to occur.</p>
<i>Fregata ariel</i> Lesser frigatebird	PMST, NR Maps	Mig	NL	The lesser frigatebird occurs throughout the tropical waters of the Indian Ocean and the west and Central Pacific Ocean. The species breeds on small, remote islands in mangrove forests, shrubs, and bare ground. The species forages on fish, squid, seabird eggs, chicks, and has been known to scavenge for carrion and fish scraps (DCCEEW, 2023).	<p>Highly unlikely to occur</p> <p>There are two historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1.4 km north of the Construction footprint, with the most recent recorded sighting in 1989.</p> <p>Given the Construction footprint only extends to the nearshore and likely shallow coastal area, the suitable habitat for the species was considered minimal. As such, the species has been assessed as highly unlikely to occur.</p>
<i>Fregata minor</i> Greater frigatebird	PMST	Mig	NL	The greater frigatebird occurs in open ocean waters from Canberra, around northern Australia to Broome (DCCEEW, 2023). The species forages throughout tropical and subtropical Indian, Pacific, and south Atlantic Oceans, feeding on flying fish and some cephalopods, all food taken while in flight.	<p>Highly unlikely to occur</p> <p>There are no historical records within the desktop search extent (NR Maps, 2023).</p> <p>Given the predominantly terrestrial nature of the Project and minimal interaction with open ocean waters, the species has been assessed as highly unlikely to occur.</p>
<i>Anous stolidus</i> Common noddy	PMST	Mig	NL	The common noddy occurs mainly in oceans off the Queensland coast, but the species also occurs off the north-west and central Western Australia coastline (DCCEEW, 2023). The species occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. During the non-	<p>Highly unlikely to occur</p> <p>There are no historical records within the desktop search extent (NR Maps, 2023).</p> <p>Given the predominantly terrestrial nature of the Project and minimal interaction with open ocean waters, the species has been</p>

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				breeding seasons, the species occurs in groups throughout the pelagic zone.	assessed as highly unlikely to occur.
<i>Calonectris leucomelas</i> Streaked shearwater	PMST	Mig	NL	The streaked shearwater has a coastal distribution breeding on islands off the southern Russian, east China, Korea and Taiwan. In the non-breeding season, they migrate to waters off New Guinea and around northern Australia.	Highly unlikely to occur There are no historical records within the desktop search extent (NR Maps, 2023). Given the Construction footprint only extends to the nearshore and likely shallow coastal area, the suitable habitat for the species was considered minimal. As such, the species has been assessed as highly unlikely to occur.
<i>Apus pacificus</i> Fork-tailed swift	PMST, NR Maps	Mig	NL	The fork-tailed swift occurs over much of the Australian mainland, excluding only the Western Australian deserts (DCCEEW 2023). Throughout its range, the species occurs mostly over inland plains, above foothills and in coastal areas (DCCEEW 2023). The species is almost entirely aerial favours dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, riparian woodlands, health land or saltmarsh (Menkhorst et al., 2019; Pizzey and Knight, 1997). They are also found at treeless grassland and sandplains covered with spinifex.	May occur There are 19 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1.2 km north of the Construction footprint, with the most recent recorded sighting in 2012. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Sterna sumatrana</i> Black-naped tern	NR Maps	Mig	NL	Black-naped terns are found mainly in central and eastern Northern Territory, the Gulf of Carpentaria and Torres Strait and through the islands and waters of the Great Barrier Reef and Coral Sea (DCCEEW, 2023). Black-naped terns breed and roost on islands, which are very occasionally close to or attached to the mainland at low tides, and forage in seas surrounding colonies (DCCEEW, 2023). Black-naped terns are mainly associated with small, offshore sand and coral cays, coral reefs and lagoons, and sandy and rocky islands and islets, and in the surrounding seas (DCCEEW, 2023).	May occur There are 29 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately within the Construction footprint, with the most recent recorded sighting in 1980. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Onychoprion anaethetus</i> Bridled tern	NR Maps	Mig	NL	Bridled Terns are widespread, breeding on offshore islands in western, northern and north-eastern Australia (DCCEEW, 2023). The species forages in offshore, continental shelf waters and is only rarely recorded along mainland coasts, breeding on islands, including vegetated coral cays, rocky continental islands and rock stacks (DCCEEW, 2023). Nests are usually found in rocky areas or on coral, concealed in crevices or caves up to 1.5 m deep, under rocks, among talus or coral rubble, on ledges of cliffs, or on the ground beneath low shrubs, roots of Pandanus, vines or among grasses (DCCEEW, 2023).	Unlikely to occur There are two historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1.4 km north of the Construction footprint, with the most recent recorded sighting in 1978. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as unlikely to occur.
<i>Sula leucogaster</i> Brown booby	NR Maps	Mig	NL	The Brown Booby uses both marine and terrestrial habitat. The species occurs in, but is not restricted to,	Unlikely to occur

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				tropical waters of all major oceans, often staying close to breeding islands. The species is known to approach mainland coastlines more than other boobies and has been recorded in coastal waters, harbours and estuaries and near offshore islands but seldom flying over land (DCCEEW, 2023). The Brown Booby utilises tropical islands, continental islands, sand cays and atolls for breeding. The Brown Booby nests on the ground in a variety of sites, from rugged rocky terrain (cliffs, steep slopes) on larger islands, to beaches, sand bards, coral rubble and guano flats on cays (DCCEEW, 2023).	There is one historical record of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 3.6 km west of the Construction footprint, with no record date. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as unlikely occur.
<i>Hydroprogne caspia</i> Caspian tern	NR Maps	Mig	NL	The Caspian tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes, waterholes, reservoirs, rivers and creeks (DCCEEW, 2023). The Caspian tern usually forages in open wetlands, including lakes and rivers. They often prefer sheltered shallow water near the margins, but can also be found in open coastal waters (DCCEEW, 2023). The Caspian Tern breeds on variable types of sites including low islands, cays, spits, banks, ridges, beaches of sand or shell, terrestrial wetlands and stony or rocky islets or banks. Nests may be in the open, or among low or sparse vegetation, including herbfield, tussocks, samphire or other prostrate sand-binding plants (DCCEEW, 2023).	May occur There are 12 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 600 m north of the Construction footprint, with the most recent recorded sighting in 2004. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Sterna hirundo</i> Common tern	NR Maps	Mig	NL	Common terns are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores (DCCEEW, 2023). Common Terns forage in marine environments, often close to the shore, including sheltered embayments and in the surf-zone, but also well out to sea. They also forage in near-coastal terrestrial wetlands, including estuaries, rivers and swamps (DCCEEW, 2023). Common Terns nest on the ground in the open, usually on bare substrates, occasionally near vegetation or in it, or on a floating mat of vegetation. They usually nest on islands, either marine or in lakes, only sometimes on mainland beaches or promontories or salt or freshwater marshes (DCCEEW, 2023).	May occur There are 13 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 450 m north of the Construction footprint, with the most recent recorded sighting in 1979. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Plegadis falcinellus</i>	NR Maps	Mig	NL	The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and	Unlikely to occur There are 28 historical records of the species within the desktop

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
Glossy ibis				rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons (DCCEEW, 2023). Glossy ibis roost in trees or shrubs usually near, but sometimes far, from water bodies (DCCEEW, 2023).	search extent (NR Maps, 2023). The closest record of the species is approximately within the Construction footprint, with the most recent recorded sighting in 2015. Potentially suitable habitat for the species does not exist within the lineal extent of the Construction footprint, as such, previous record within the project area is considered erroneous and the species has been assessed as unlikely to occur.
<i>Tringa brevipes</i> Grey-tailed tattler	NR Maps	Mig	NL	The grey-tailed tattler has a coastal distribution throughout Australia, though is most common in the northern Queensland (DCCEEW, 2023). The species inhabits sheltered coasts with reefs and rock platforms or with intertidal mudflats (Menkhorst et al., 2019). Less frequently recorded in intertidal mudflats, estuaries and coastal lagoons, especially those fringed with mangroves (DCCEEW, 2023). A non-breeding visitor to Australia, with breeding occurring in northern Siberia.	May occur There are 15 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 500 m east of the Construction footprint, with the most recent recorded sighting in 2012. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Numenius minutus</i> Little curlew	NR Maps	Mig	NL	The little curlew is widespread along the eastern coastline of Australia (DCCEEW, 2023). The species feeds in short, dry grassland and sedges occurring on dry floodplains and black-soil plains, which contain scattered, shallow freshwater pools or areas that receive temporary inundation (DCCEEW, 2023). A non-breeding visitor to Australia.	Unlikely to occur There are 18 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1.3 km east of the Construction footprint, with the most recent recorded sighting in 2012. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Charadrius dubius</i> Little ringed plover	NR Maps	Mig	NL	The breeding habitat is open gravel areas near freshwater, including gravel pits, islands and river edges across the Palearctic including northwestern Africa. They nest on the ground on stones with little or no plant growth.	Highly unlikely to occur There are 2 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 4.2 km south of the Construction footprint, with no recorded dates. Very low numbers of the species visit Australia each year and the species is considered a vagrant. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur. As such, the species has been assessed as highly unlikely to occur.

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
<i>Sternula albifrons</i> Little tern	NR Maps	Mig	NL	The Little Tern is widely but patchily spread through Europe, southern, eastern and south-eastern Asia, Indonesia and Australasia. Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. Little Terns are widespread on islands off the Northern Territory coast but appear to be less often on offshore continental islands or coral cays off Queensland	May occur There are 11 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 300 m north of the Construction footprint, with the most recent recorded sighting in 1998. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Tringa stagnatilis</i> Marsh sandpiper	NR Maps	Mig	NL	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (DCCEEW, 2023). The Marsh Sandpiper usually forages in shallow water at the edge of wetlands, roosting or loafing on tidal mudflats, near low saltmarsh, and around inland swamps (DCCEEW, 2023).	May occur There are 39 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 700 m west of the Construction footprint, with the most recent recorded sighting in 2015. Potentially suitable habitat for the species is limited within the Construction footprint, however considering the number of nearby records, the species has been assessed as may occur.
<i>Pluvialis fulva</i> Pacific golden plover	NR Maps	Mig	NL	Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as <i>Sarcocornia</i> , or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks (DCCEEW, 2023). This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons (DCCEEW, 2023). They usually roost near foraging areas, on sandy beaches and spits or rocky points, islets or exposed reefs, occasionally among or beneath vegetation including mangroves or low saltmarsh, or among beachcast seaweed (DCCEEW, 2023).	May occur There are 24 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 1 km north of the Construction footprint, with the most recent recorded sighting in 1990. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources). However, this species can be more generalist than other shorebird species and as such, the species has been assessed as may occur in a transient nature.
<i>Calidris ruficollis</i> Red-necked stint	NR Maps	Mig	NL	Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores (DCCEEW, 2023). Red-necked Stint mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water (DCCEEW, 2023). Red-necked Stint roosts on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle, sometimes in saltmarsh or other vegetation (DCCEEW, 2023).	May occur There are 16 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 600 m east of the Construction footprint, with the most recent recorded sighting in 1980. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources). However, this species can be more generalist than other shorebird species and as such, the species

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
					has been assessed as may occur in a transient nature.
<i>Sterna dougallii</i> Roseate tern	NR Maps	Mig	NL	The Roseate Tern occurs in coastal and marine areas in subtropical and tropical seas. The species inhabits rocky and sandy beaches, coral reefs, sand cays and offshore islands (DCCEEW, 2023). Roseate tern forage around islands on the continental shelf, either in lagoons or offshore (DCCEEW, 2023). The Roseate Tern usually roosts or loafs in the intertidal zone on islands, including on the upper sections of beaches, above the high-water mark (but still in the wash-zone) on banks, spits and bars, usually of coral or sand (DCCEEW, 2023).	May occur There is one historical record of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 380 m northwest of the Construction footprint, with the most recent recorded sighting in 1998. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Gallinago megala</i> Swinhoe's snipe	NR Maps	Mig	NL	Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds (DCCEEW, 2023).	May occur There are seven historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 4.5 km northwest of the Construction footprint, with the most recent record in 2015. Limited suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Numenius phaeopus</i> Whimbrel	NR Maps	Mig	NL	The whimbrel occurs in scattered locations around the Australian coastline, including the entire length of the Queensland coast (DCCEEW, 2023). The species generally forages on intertidal mudflats and along the muddy banks of estuaries and in coastal lagoons, either in open unvegetated areas or among mangroves and occasionally found on sandy beaches, among rocks or on exposed coral or rocky reefs and rock platforms (DCCEEW, 2023). A non-breeding visitor to Australia, with breeding occurring in northern and western Alaska.	Unlikely to occur There are 13 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 500 m east of the Construction footprint, with the most recent recorded sighting in 2004. Suitable habitat for the species is very limited within the Construction footprint (small, highly disturbed area with poor substrate for invertebrate foraging resources), as such, the species has been assessed as unlikely to occur.
<i>Chlidonias leucopterus</i> White-winged black tern	NR Maps	Mig	NL	In Australia, and elsewhere in their non-breeding range, the species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands. White-winged Black Terns frequent tidal wetlands, such as harbours, bays, estuaries and lagoons, and their associated tidal sandflats and mudflats. Terrestrial wetlands, including swamps, lakes, billabongs, rivers, floodplains, reservoirs, saltworks, sewage ponds and outfalls are also inhabited (DCCEEW, 2024). The White-winged Black Tern mainly forages aerially, over water or over muddy or sandy edges of wetlands, the species often roosts or loafs on ground at the edges of wetlands, including sandflats, mudflats, beaches, spits,	May occur There are 13 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 300 m northwest of the Construction footprint, with the most recent recorded sighting in 2015. Potentially suitable habitat for the species does exist within the Construction footprint in a limited capacity, as such, the species has been assessed as may occur.

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				banks, islets and rocks (DCCEEW, 2024).	
<i>Tringa glareola</i> Wood sandpiper	NR Maps	Mig	NL	The wood sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially <i>Melaleuca</i> and River Red Gums <i>Eucalyptus camaldulensis</i> and often with fallen timber.	Unlikely to occur There are 19 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 4.1 km south of the Construction footprint, with the most recent recorded sighting in 2015. Suitable habitat for the species is very limited within the Construction footprint, as such, the species has been assessed as unlikely to occur.
<i>Rhipidura rufifrons</i> Rufous fantail	PMST	Mig	NL	The rufous fantail is distributed throughout northern and eastern coastal Australia, though is considered more common in the north (DCCEEW, 2023x). The species inhabits sclerophyll forests, often in gullies dominated by eucalypts and usually within a dense shrubby understory that often includes ferns (Menkhorst et al., 2019; Pizzey and Knight, 1999). Movement patterns for the rufous fantail are not well-known, and eastern populations are believed to migrate to northern Australian during the winter (DCCEEW, 2023).	Unlikely to occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). According to the ALA, the species has been recorded twice on Groote Eylandt, both on the southern extent of the island. Based on the results of the field surveys, the species has been assessed as unlikely to occur.
<i>Cecropis daurica</i> Red-rumped swallow	PMST	Mig	NL	The red-rumped swallow is a non-breeding migrant to northern Australia between December and February, where it has been recorded from Cairns in the east, Groote Eylandt in the north, to Broome in the west. The species is an aerial insectivore, typically foraging over wetlands, swamps, rivers, dams, and open areas such as gold courses and sugar cane plantations (DCCEEW, 2023).	May occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). According to the ALA, the species has been recorded once on Groote Eylandt, in close proximity to Angurugu. Potentially suitable habitat for the species does exist within the Construction footprint combined with the largely aerial nature of the species, the species has been assessed as may occur.
<i>Hirundo rustica</i> Barn swallow	PMST	Mig	NL	The barn swallow occurs throughout coastal, tropical areas of Queensland, Northern Territory and Western Australia (Menkhorst et al., 2019). The species inhabits open country in coastal lowlands near water, especially wetlands (Menkhorst et al., 2019). Also known from <i>Melaleuca</i> woodland, mesophyll shrub thickets and tussock grassland (DCCEEW, 2023).	May occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). According to the ALA, the species has been recorded once on Groote Eylandt, in close proximity to Alyangula. Potentially suitable habitat for the species does exist within the Construction footprint combined with the largely aerial nature of the species, the species has been assessed as may occur.
<i>Cuculus optatus</i> Oriental cuckoo	PMST, NR Maps	Mig	NL	The species inhabits coastal regions across northern and eastern Australia, as well as offshore islands (DCCEEW 2023). Species utilises a range of vegetated habitats, including monsoon rainforests, wet sclerophyll	May occur There are three historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 3.3 km south of

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
				forests, open woodlands and along the edges of forests (DCCEEW 2023).	the Construction footprint, with no recorded dates. Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Motacilla flava</i> Yellow wagtail	PMST	Mig	NL	The species is found in highly variable habitats, but typically found in open grassy flats near water. Habitats include open areas of low vegetation such as grasslands, pastures, sport fields and damp open areas (DCCEEW 2023).	Unlikely to occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). Suitable habitat for the species does not exist within the Construction footprint, as such, the species has been assessed as unlikely to occur.
<i>Motacilla cinerea</i> Grey wagtail	PMST	Mig	NL	The grey fantail occurs widely across western and Central Australia, only reaching the eastern coastline around the Townsville region (DCCEEW, 2023). However, only scattered, isolated records are known. Species inhabits forests and woodlands in close proximity to running water (Pizzey and Knight, 1997). Recorded along beaches and rockpools during migration (Menkhorst et al., 2019).	May occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Pandion haliaetus</i> Osprey	PMST	Mig	NL	The eastern osprey is distributed around the Australian coastline, excluding only Victoria and Tasmania (NSW EOH, 2020). Preferred habitats for the species include coastlines, estuaries, bays and inlets, river systems and lake complexes, and the species are known to venture inland, particularly in northern Queensland (Pizzey and Knight, 1999) The species favours large, emergent trees, cliff faces and high vantage points as nesting habitat, usually in exposed locations and within 1 km of water (Boekel 1976),	May occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Acrocephalus orientalis</i> Oriental reed-warbler	PMST	Mig	NL	The Oriental reed-warbler is a non-breeding migrant to northern Australia during the wet season months (October – March). Upon migration, the species may occur in any vegetated habitat; however, they are most commonly recorded in aquatic vegetation including mangroves, along waterways and waterbodies. The species has also been recorded in sugar cane plantations (DCCEEW, 2023).	May occur There are no historical records of the species within the desktop search extent (NR Maps, 2023). Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.
<i>Actitis hypoleucos</i> Common sandpiper	PMST, NR Maps	Mig	NL	The common sandpiper is widely distributed across much of Australia, including Tasmania and several offshore islands (DCCEEW, 2023). Species inhabits coastal wetlands and some inland wetlands. They mostly occur around muddy margins or rocky shores, and occasionally around lakes, billabongs, reservoirs, dams and claypans (Menkhorst et al., 2019). Species generally forages in shallow water and on bare soft mud edges of wetlands (DCCEEW, 2023).	Unlikely to occur There are 106 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 700 m north of the Construction footprint, with the most recent recorded sighting in 2015. Suitable habitat for the species is very limited within the Construction footprint, as such, the species has

Species	Source	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
		EPBC Act	TPWC Act		
					been assessed as unlikely to occur.
<i>Charadrius veredus</i> Oriental plover	PMST	Mig	NL	The Oriental plover is a non-breeding migrant to northern Australia. Upon arrival, the species spends a several weeks inhabiting coastal environments such as estuarine mudflats, rocky beaches, or nearby coastal grasslands before dispersing inland to flat, open, semi-arid grasslands, clay pans, and dry paddocks. The species is also known to move to wooded grasslands during the wet season months (DCCEEW, 2023).	<p>May occur</p> <p>There are four historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 700 m north of the Construction footprint, with no dates recorded.</p> <p>Suitable habitat for the species is very limited within the Construction footprint, as such, the species has been assessed as unlikely to occur.</p>
<i>Calidris melanotos</i> Pectoral sandpiper	PMST	Mig	NL	The pectoral sandpiper is widely distributed across Australia; however, the species is known to favour coastal areas (DCCEEW, 2023). Species inhabits shallow fresh to saline wetlands. The species is found within coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, creeks, floodplains and artificial wetlands (Menkhorst <i>et al.</i> , 2019). The species is a non-breeding visitor to Australia, with breeding occurring in northern America and northern Russia.	<p>Unlikely to occur</p> <p>There is one historical record of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 4.2 km south of the Construction footprint, with no dates recorded.</p> <p>Suitable habitat for the species is very limited within the Construction footprint, as such, the species has been assessed as unlikely to occur.</p>
<i>Glareola maldivarum</i> Oriental pratincole	PMST	Mig	NL	Within Australia, the Oriental Pratincole is widespread in northern areas, especially the coastal Pilbara, Kimberley area, Top End of the Northern Territory, and parts of the Gulf of Carpentaria (DCCEEW, 2023). Species inhabits open plains, floodplains and grasslands, and often occur near terrestrial wetlands, such as billabongs, lakes or creeks, reservoirs and riparian habitats (Menkhorst <i>et al.</i> , 2019).	<p>May occur</p> <p>There are 15 historical records of the species within the desktop search extent (NR Maps, 2023). The closest record of the species is approximately 750 m west of the Construction footprint, with no recorded dates.</p> <p>Potentially suitable habitat for the species does exist within the Construction footprint, as such, the species has been assessed as may occur.</p>

Appendix C

Field Survey Flora List

Family	Species Name	Vernacular Name
Anacardiaceae	<i>Buchanania obovata</i>	Green Plum
Aristolochiaceae	<i>Aristolochia thozetii</i>	
Asparagaceae	<i>Lomandra tropica</i>	Lomandra
Burseraceae	<i>Canarium australianum</i>	Canarium
Combretaceae	<i>Terminalia carpentariae</i>	Wild Peach
Commelinaceae	<i>Cartonema spicatum</i>	Cartonema
Commelinaceae	<i>Commelina ensifolia</i>	Scurvy Grass
Cupressaceae	<i>Callitris intratropica</i>	Cypress Pine
Cycadaceae	<i>Cycas arnhemica</i>	
Dilleniaceae	<i>Hibbertia tomentosa</i>	Hibbertia
Droseraceae	<i>Drosera burmanni</i>	Tropical Sundew
Eriocaulaceae	<i>Eriocaulon willdenovianum</i>	Eriocaulon
Euphorbiaceae	<i>Euphorbia hirta</i>	Asthma Plant
Fabaceae	<i>Acacia auriculiformis</i>	Black Northern Wattle
Fabaceae	<i>Acacia difficilis</i>	River Wattle
Fabaceae	<i>Acacia holosericea</i>	Silver Wattle
Fabaceae	<i>Acacia latescens</i>	Wattle
Fabaceae	<i>Acacia oncinocarpa</i>	Wattle
Fabaceae	<i>Acacia simsii</i>	Wattle
Fabaceae	<i>Bossiaea bossiaeooides</i>	Bossiaea
Fabaceae	<i>Erythrophleum chlorostachys</i>	Camel Poison
Goodeniaceae	<i>Scaevola taccada</i>	Cardwell Cabbage
Haloragaceae	<i>Gonocarpus leptothecus</i>	Gonocarpus
Hemerocallidaceae	<i>Dianella longifolia</i>	Blueberry Lily
Lamiaceae	<i>Mesosphaerum suaveolens</i>	Mint Weed
Lauraceae	<i>Cassytha filiformis</i>	Dodder Laurel
Lecythidaceae	<i>Planchonia careya</i>	Cockatoo Apple
Malvaceae	<i>Brachychiton paradoxus</i>	Red-flowered Kurrajong
Malvaceae	<i>Helicteres cana</i>	Helicteres
Malvaceae	<i>Seringia corollata</i>	Keraudrenia
Malvaceae	<i>Thespesia populneoides</i>	Northern Cottonwood
Malvaceae	<i>Waltheria indica</i>	Waltheria
Meliaceae	<i>Owenia vernicosa</i>	Candlestick Tree
Myrtaceae	<i>Asteromyrtus symphyocarpa</i>	Liniment Bush
Myrtaceae	<i>Calytrix brownii</i>	Calytrix
Myrtaceae	<i>Corymbia kombolgiensis</i>	Paper-fruited Bloodwood
Myrtaceae	<i>Corymbia polycarpa</i>	Long-fruited Bloodwood
Myrtaceae	<i>Eucalyptus miniata</i>	Darwin Woollybutt
Myrtaceae	<i>Eucalyptus tetradonta</i>	Darwin Stringybark
Myrtaceae	<i>Melaleuca dealbata</i>	Swamp Tea-tree
Myrtaceae	<i>Melaleuca leucadendra</i>	Broad-leaved Tea-tree
Myrtaceae	<i>Melaleuca viridiflora</i>	Paperbark
Pandanaceae	<i>Pandanus spiralis</i>	Pandanus Palm
Phyllanthaceae	<i>Breynia cernua</i>	Breynia
Picrodendraceae	<i>Petalostigma banksii</i>	Smooth-leaved Quinine
Poaceae	<i>Alloteropsis semialata</i>	Cockatoo Grass
Poaceae	<i>Aristida holathera</i>	Erect Kerosene Grass
Poaceae	<i>Cenchrus pedicellatus</i>	Pennisetum
Poaceae	<i>Chloris barbata</i>	Purpletop Chloris
Poaceae	<i>Digitaria ctenantha</i>	Comb Finger Grass

Family	Species Name	Vernacular Name
Poaceae	<i>Eriachne burkittii</i>	Wanderrie Grass
Poaceae	<i>Heteropogon contortus</i>	Black Speargrass
Poaceae	<i>Pseudopogonatherum contortum</i>	Pseudopogonatherum
Poaceae	<i>Triodia procera</i>	Spinifex
Proteaceae	<i>Banksia dentata</i>	Banksia
Proteaceae	<i>Grevillea heliosperma</i>	Rock Grevillea
Proteaceae	<i>Grevillea pteridifolia</i>	Golden Parrot Tree
Proteaceae	<i>Grevillea pungens</i>	Grevillea
Proteaceae	<i>Hakea arborescens</i>	Tree Hakea
Proteaceae	<i>Persoonia falcata</i>	Wild Pear
Pteridaceae	<i>Platyzoma microphyllum</i>	Braid Fern
Restionaceae	<i>Dapsilanthus spathaceus</i>	Dapsilanthus
Rhamnaceae	<i>Alphitonia excelsa</i>	Red Ash
Rubiaceae	<i>Spermacoce elaiosoma</i>	Spermacoce
Rutaceae	<i>Boronia lanuginosa</i>	Boronia
Santalaceae	<i>Exocarpos latifolius</i>	Native Cherry
Santalaceae	<i>Santalum lanceolatum</i>	Northern Sandalwood
Sapindaceae	<i>Dodonaea hispidula</i>	Distichostemon
Sapotaceae	<i>Planchonella arnhemica</i>	Pouteria
Sapotaceae	<i>Sersalisia sericea</i>	Pouteria
Smilacaceae	<i>Smilax blumei</i>	
Taccaceae	<i>Tacca leontopetaloides</i>	Tacca
Thymelaeaceae	<i>Pimelea punicea</i>	Thecanthes
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica Snakeweed
Violaceae	<i>Afrohybanthus enneaspermus</i>	Ladys Slipper
Poaceae	Cenchrus sp	Mission Grass
Poaceae	Cynodon dactylon	Couch Grass
Poaceae	Digitaria bicornis	Crabgrass
Poaceae	Echinochloa colona	Jungle Rice
Lamiaceae	Hyptis suaveolens	Hyptis
Convolvulaceae	Merremia dissecta	White convolvulus creeper
Poaceae	Sporobolus sp	Rats tail Grass
Verbenaceae	Stachytarpheta cayennensis	Snakeweed

Appendix D

Field Survey Fauna List

Table 31 Fauna species recorded during the field surveys.

Species Name	Common Name
Birds	
<i>Haliastur indus</i>	Brahminy kite
<i>Haliastur sphenurus</i>	Whistling kite
<i>Sphecotheres vieilloti</i>	Australian figbird
<i>Oriolus sagittatus</i>	Olive-backed oriole
<i>Icterus nigrogularis</i>	Yellow oriole
<i>Chlamydera nuchalis</i>	Great bowerbird
<i>Philemon citreogularis</i>	Little friarbird
<i>Philemon argenteiceps</i>	Silver-crowned friarbird
<i>Aprosmictus erythropterus</i>	Red-wing parrot
<i>Trichoglossus rubritorquis</i>	Red-collared lorikeet
<i>Psitteuteles versicolor</i>	Varied lorikeet
<i>Cacatua sanguinea</i>	Little corella
<i>Cacatua galerita</i>	Sulphur-crested cockatoo
<i>Cacatua roseicapilla</i>	Galah
<i>Calyptorhynchus banksii</i>	Red-tailed black cockatoo
<i>Grallina cyanoleuca</i>	Magpie lark
<i>Corvus orru</i>	Torresian crow
<i>Gymnorhina tibicen</i>	Australian magpie
<i>Artamus leucorhynchus</i>	White-breasted woodswallow
<i>Artamus cinereus</i>	Black-faced woodswallow
<i>Burhinus grallarius</i>	Bush stone-curlew
<i>Vanellus miles</i>	Masked lapwing
<i>Larus novaehollandiae</i>	Silver gull
<i>Sterna hirundo</i>	Common tern^
<i>Geopelia humeralis</i>	Bar-shouldered dove
<i>Geopelia placida</i>	Peaceful dove
<i>Coracina papuensis</i>	White-bellied cuckoo-shrike
<i>Coracina novaehollandiae</i>	Black-faced cuckoo-shrike
<i>Lalage leucomela</i>	Varied triller
<i>Pachycephala rufiventris</i>	Rufous whistler
<i>Myiagra rubecula</i>	Leaden flycatcher
<i>Cracticus nigrogularis</i>	Pied butcherbird
<i>Phaps chalcoptera</i>	Common bronzewing
<i>Merops ornatus</i>	Rainbow bee-eater
<i>Centropus phasianinus</i>	Pheasant coucal
<i>Dacelo leachii</i>	Blue-winged kookaburra
<i>Stizoptera bichenovii</i>	Double-barred finch
<i>Pardalotus striatus</i>	Striated pardalote
<i>Megapodius reinwardt</i>	Orange-footed scrub-fowl

<i>Pomatostomus temporalis</i>	Grey-crowned babbler
<i>Lichmera indistincta</i>	Brown honeyeater
<i>Stomiopera unicolor</i>	White-naped honeyeater
<i>Melithreptus albogularis</i>	White-throated honeyeater
<i>Gerygone levigaster</i>	Mangrove gerygone
<i>Podargus strigoides</i>	Tawny frogmouth
<i>Aquila audax</i>	Wedge-tailed eagle
<i>Accipiter fasciatus</i>	Brown goshawk
<i>Accipiter cirrocephalus</i>	Collared sparrowhawk
<i>Egretta sacra</i>	Eastern reef egret
<i>Nycticorax caledonicus</i>	Nankeen night heron
<i>Pandion haliaetus</i>	Eastern osprey^
<i>Dicrurus bracteatus</i>	Spangled drongo
<i>Falco peregrinus</i>	Peregrine falcon
<i>Malurus melanocephalus</i>	Red-backed fairy-wren
Mammals	
<i>Petaurus ariel</i>	Savannah glider
<i>Notamacropus agilis</i>	Agile wallaby
<i>Petrogale wilkinsi</i>	Eastern short-eared rock-wallaby
<i>Isodon macrourus</i>	Northern brown bandicoot
<i>Canis lupus familiaris</i>	Dingo
<i>Pteropus alecto</i>	Black flying fox
<i>Dasyurus hallucatus</i>	Northern quoll*
<i>Melomys burtoni</i>	Grassland Melomys
<i>Pseudomys delicatulus</i>	Delicate mouse
<i>Hydromys chrysogaster</i>	Rakali
<i>Felis catus</i>	Feral cat+
Reptiles	
<i>Hemidactylus frenatus</i>	Asian house gecko+
<i>Gehyra sp.</i>	Gecko
<i>Heteronotia binoei</i>	Bynoe's gecko
<i>Demansia olivacea</i>	Olive whipsnake
<i>Carlia amax</i>	Bauxite rainbow skink
<i>Lophognathus gilberti</i>	Gilbert's dragon
<i>Diporiphora bilineata</i>	Two-lined dragon
<i>Varanus gouldii</i>	Sand monitor
<i>Ctenotus inornatus</i>	Bar-shouldered skink
<p>Note:</p> <p>* denotes threatened species</p> <p>^ denotes migratory species,</p> <p>+ denotes feral species.</p>	



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