SUPPORTING DOCUMENT

NATIVE VEGETATION CLEARING PERMIT APPLICATION

LEICHHARDT PORT PTY LTD

15 FEBRUARY 2024

PREPARED FOR LEICHHARDT PORT PTY LTD
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ACKNOWLEDGEMENT OF COUNTRY

In the spirit of reconciliation Leichhardt Port Pty Ltd and Preston Consulting Pty Ltd acknowledge that this project is proposed on the lands of the Mardudhunera People. We pay our respects to Elders past, present and emerging and recognise their continuing connection to land, sea, culture and community.

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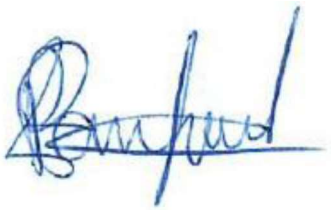
Author	Phoebe Ranford – Environmental Consultant, Preston Consulting Pty Ltd		15/02/2024
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CONTENTS

1 INTRODUCTION 1
1.1 Project Background 1
1.2 Purpose 1
2 PERMIT AREA 4
2.1 Boundary 4
2.2 Tenure and Land Access 4
2.3 Native Title 4
3 PROPOSED ACTIVITIES 4
4 ENVIRONMENTAL CHARACTERISTICS 4
4.1 Survey Details 5
4.2 Biogeographic Regions 8
4.3 Land Systems 8
4.4 Pre-European Vegetation 8
4.5 Flora and Vegetation 13
4.5.1 Significant Flora 13
4.5.2 Introduced Flora Species 14
4.5.3 Vegetation Type 14
4.5.4 Vegetation Condition 16
4.5.5 Threatened and Priority Ecological Communities 16
4.6 Fauna 20
4.6.1 Fauna Habitat 20
4.6.2 Significant Fauna 20
4.7 Water and Drainage 24
4.8 Current Land Use 24
5 STAKEHOLDER CONSULTATION 24
6 ASSESSMENT OF CLEARING AGAINST THE TEN CLEARING PRINCIPLES 24
7 SUMMARY AND CONCLUSIONS 28
GLOSSARY 29
REFERENCES 30

LIST OF TABLES

Table 1: Statewide extent of pre-European vegetation associations present in the Study Area 9
Table 2: Vegetation types recorded within the Permit Area 14
Table 3: Vegetation condition within the Permit Area 16
Table 4: Fauna habitats recorded within the Permit Area 20
Table 5: Listed fauna species which may occur within the Permit Area 20
Table 6: Assessment of proposed vegetation disturbance against the ten clearing principles 25

LIST OF FIGURES

Figure 1: Project Development Envelopes 2
Figure 2: Permit Area 3
Figure 3: Fauna study area 6
Figure 4: Flora and vegetation study areas 7
Figure 5: IBRA subregions 10
Figure 6: Land systems 11
Figure 7: Pre-European Vegetation 12
Figure 8: Vegetation Types 15
Figure 9: Vegetation Condition 17
Figure 10: Horseflat PEC within the Permit Area 18
Figure 11: Regional extent of the Horseflat PEC 19
Figure 12: Fauna Habitats 23

LIST OF ATTACHMENTS

Attachment 1: Proof of Ownership from Pilbara Ports Authority to undertake activities.

Attachment 2: Licence for Investigation Activities **(CONFIDENTIAL)**

Attachment 3: Permit Area Shapefile

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Leichhardt Port Pty Ltd is a wholly owned subsidiary of Leichhardt Industrials Pty Ltd (Leichhardt). Leichardt Salt Pty Ltd, another wholly owned subsidiary of Leichhardt, is in the planning phase of the proposed development of the Eramurra Solar Salt Project (Project), located in the western Pilbara region of Western Australia (WA) approximately 55 kilometres (km) southwest of Karratha. The Proposal is an evaporative solar project that utilises seawater to produce raw salt as a feedstock for dedicated processing facilities that will produce a high purity salt. The Proposal aims for average annual production rates of 5.2 million tonnes per annum. To meet this production, the following infrastructure will be developed:

- Seawater intake, pump station and pipeline;
- Concentration ponds totalling approximately 10,060 ha;
- Crystallisers, totalling approximately 1,840 ha;
- Drainage channels and bunds;
- Process plant and product dewatering facilities;
- Water supply (desalination plant);
- Bitterns disposal pipeline and outfall;
- Pumps, pipelines, roads, and support buildings including offices and communications facilities;
- Workshops and laydown areas;
- Landfill; and
- Other associated infrastructure.

The Project consists of three development envelopes as outlined in Figure 1. Test pits are required to identify soil properties relevant to structural foundation properties to ensure the design and construction of the foundations for the Project are sound. Groundwater monitoring bores are also to be installed to gather crucial baseline information to inform the groundwater modelling for the Project. The test pits and monitoring bores do not represent implementation of the Project. Leichhardt has been consulting with the Environmental Protection Authority (EPA) and Department of Climate Change, Energy, the Environment and Water (DCCEEW) regarding assessment of the Project.

1.2 PURPOSE

The purpose of this Native Vegetation Clearing Permit (NVCP) application is to seek permission to clear up to 3.5 hectares (ha) of native vegetation within the proposed 166 ha Permit Area (Figure 2) to facilitate required geotechnical work to determine soil structure, composition and stability as part of Project feasibility studies. The clearing permit is also required for the installation of six groundwater monitoring wells and associated access tracks.

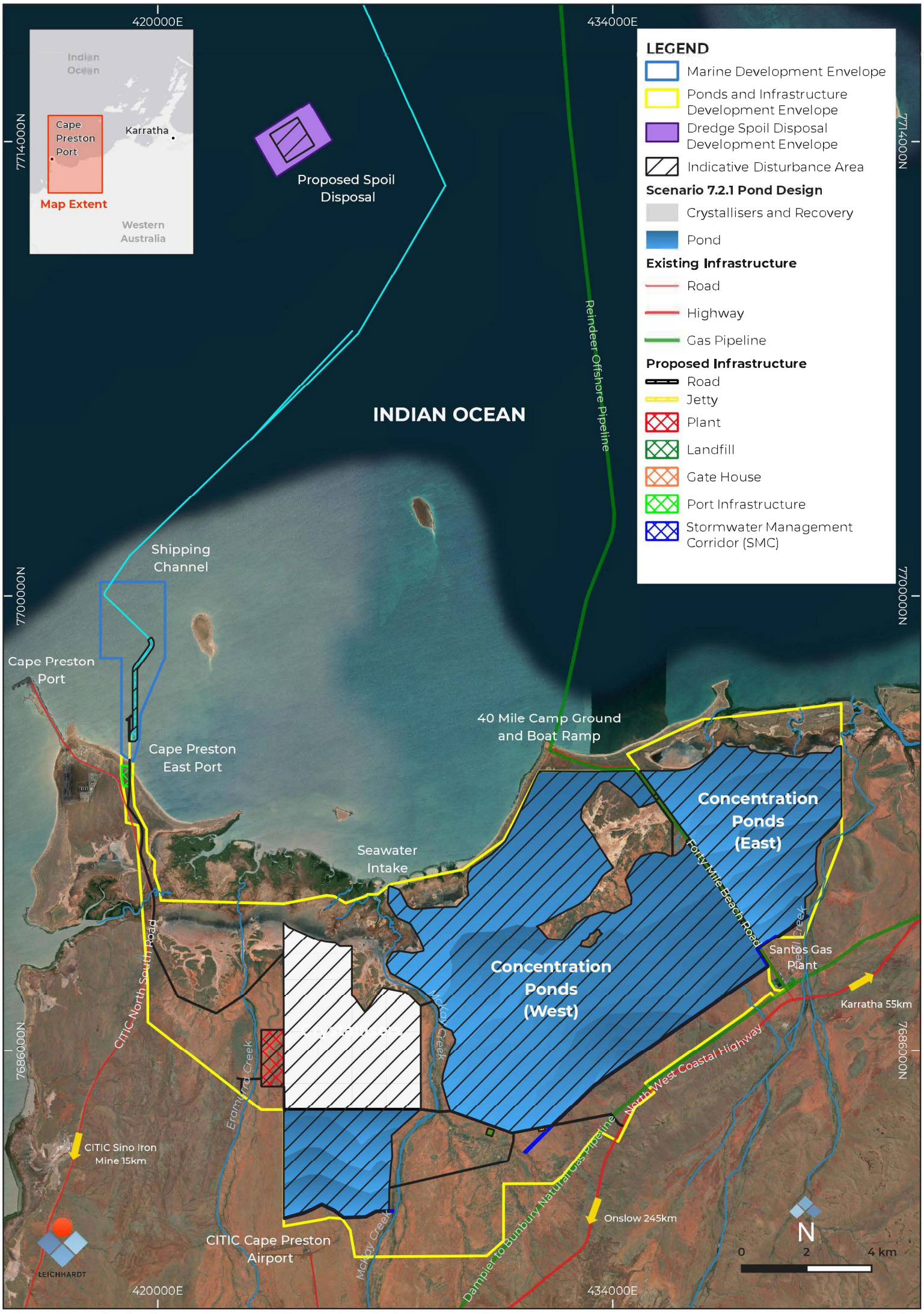
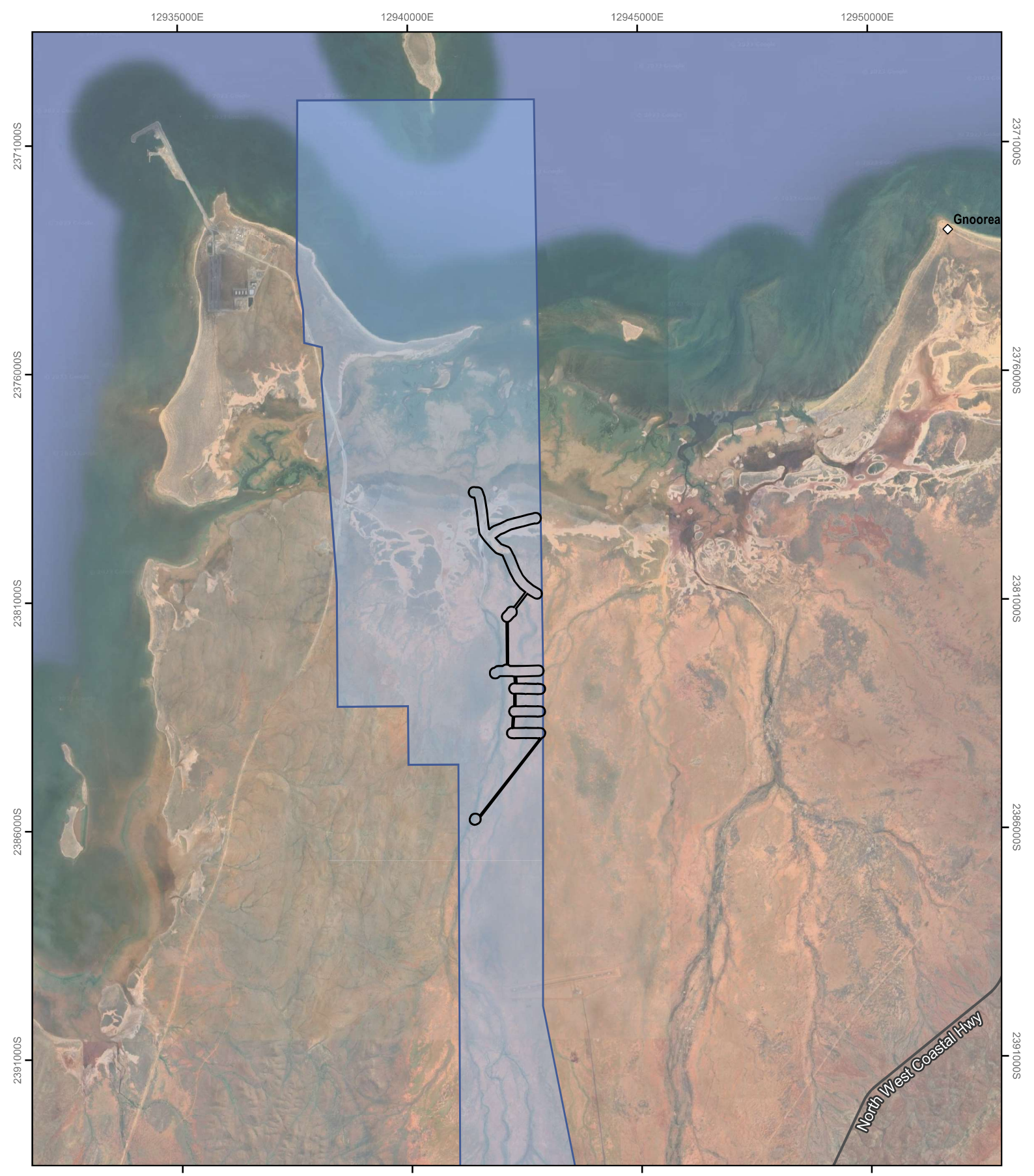


Figure 1: Project Development Envelopes



Legend

- Permit Area
- Pilbara Port Authority Reserve
- Freeways & Highways (LGATE-195)

Imagery: Google Satellite

GDA 2020 / MGA Zone 50

0 2 4 km

1:100,000 (A4)

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Figure 2: Permit area

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2 PERMIT AREA

A Purpose Permit is requested for the Permit Area to provide flexibility for test pit locations and access during the investigation program. Ecological surveys have been undertaken over the Permit Area as part of the suite of surveys and studies undertaken for the Project.

2.1 BOUNDARY

Clearing is to be conducted within the boundaries of the Permit Area shown in Figure 2. Key environmental values were identified in the baseline studies as outlined in Section 4.

2.2 TENURE AND LAND ACCESS

The Permit Area lies entirely within land reserved for the Pilbara Ports Authority (R 52734; Figure 2). Proof of ownership and authorisation from the Pilbara Ports Authority to undertake activity on the reserve has been attached with this application (Attachment 1 and 2).

2.3 NATIVE TITLE

All vegetation disturbance will occur within the Determined Claim Area WAD 127/1997 of the Yaburara and Mardudhunera People. Leichhardt has finalised negotiations for a Heritage Protection Agreement in May 2021 and a Social, Cultural Heritage Management Plan in April 2023. A Land Access Agreement is currently being negotiated with the Mardudhunera People.

3 PROPOSED ACTIVITIES

Clearing is required to facilitate geotechnical work to inform the design of the Project and the installation of monitoring wells to allow groundwater data to be collected. These activities will involve the following potential clearing activities:

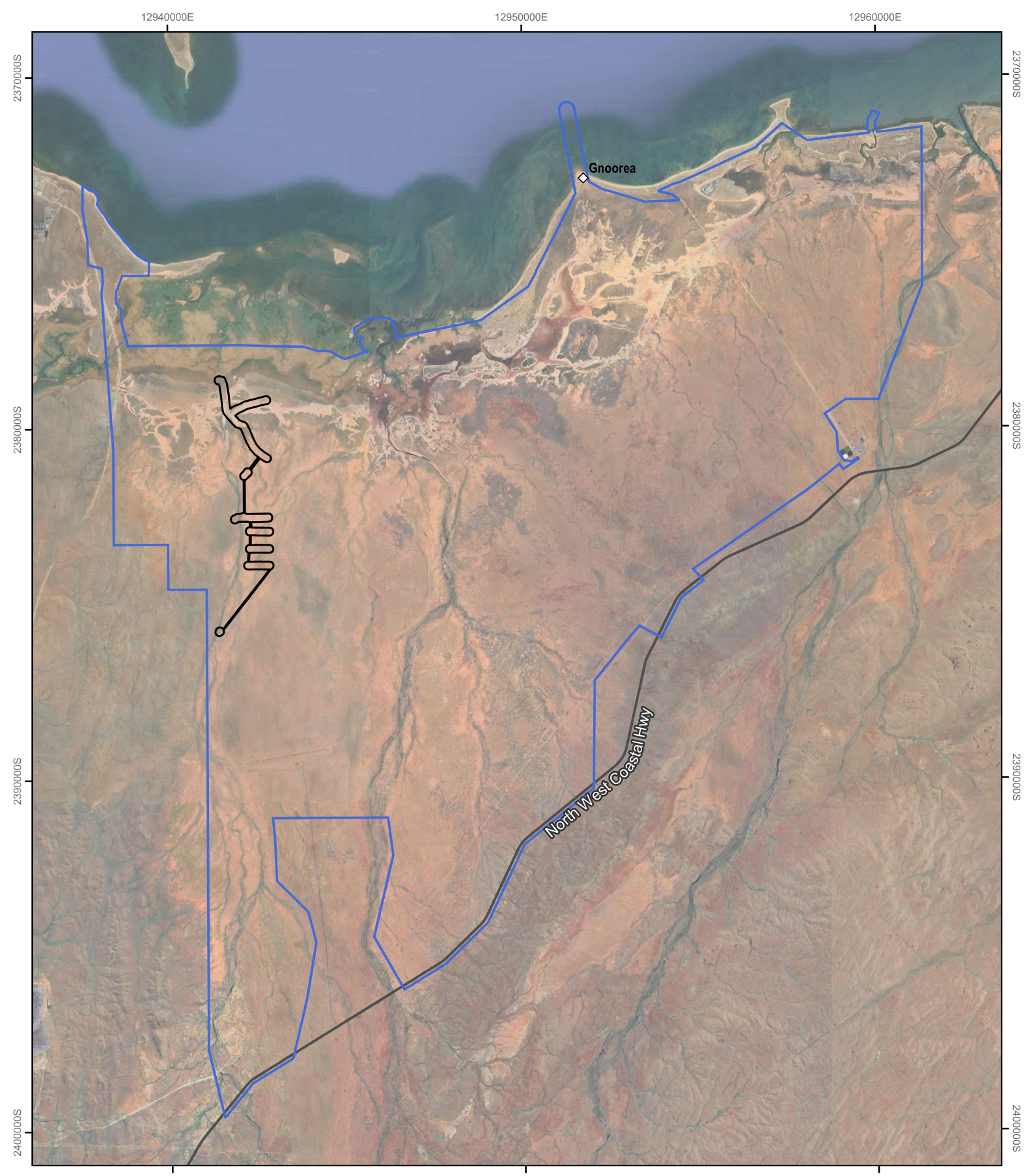
- Clearing as required (if bare ground is not available) to allow the excavation of approximately 12 test pits across the site to depths of up to 3 metres (m) (or shallower if restricted by refusal or collapsing);
- Clearing as required (if bare ground is not available) to allow the installation of six monitoring wells; and
- Access - damage to vegetation as a result of driving over the vegetation to access the sites.

4 ENVIRONMENTAL CHARACTERISTICS

Environmental characteristics of the Project Area relevant to this NVCP application are detailed in the following sections. The Permit Area represents 166 ha of the Study Area outlined in Figure 3.

4.1 SURVEY DETAILS

Phoenix Environmental Sciences Pty Ltd (Phoenix) conducted desktop assessments and detailed surveys of the Study Area for flora, vegetation, and terrestrial fauna (Phoenix 2022 & 2023). The detailed flora and fauna surveys cover the Study Area shown in Figure 3 and Figure 4. A desktop assessment was conducted within a 40 km radius of the Study Area to provide regional context for the flora, vegetation and fauna recorded during the field surveys.



Legend

- Permit Area
- Fauna Study Area
- Freeways & Highways (LGATE-195)

Imagery: Google Satellite

GDA 2020 / MGA Zone 50

0 2 4 km

1:130,000 (A4)

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Figure 3: Fauna study area

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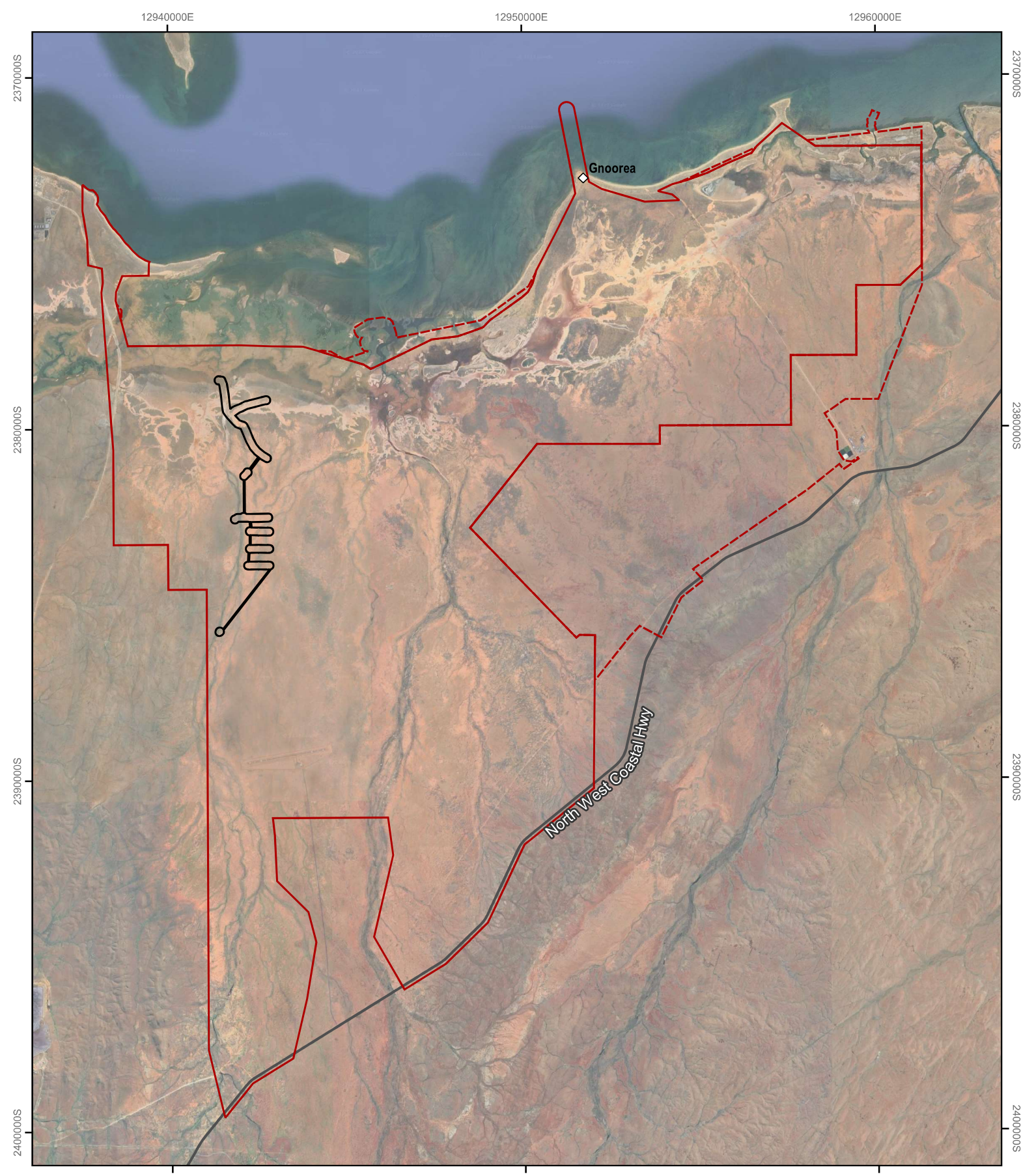

Legend

- Permit Area

Flora Study Areas

- Original Study Area
- Study Area Expansion
- Freeways & Highways (LGATE-195)

Imagery: Google Satellite

GDA 2020 / MGA Zone 50

0 2 4 km

1:130,000 (A4)

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Figure 4: Flora and vegetation study areas

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4.2 BIOGEOGRAPHIC REGIONS

The Permit Area lies entirely within the Pilbara Bioregion, specifically within the Roebourne Interim Biogeographic Regionalisation of Australia (IBRA) Subregion, bordered by the Chichester IBRA subregion (Figure 5). Subregions have been described in the *Biodiversity Audit of Western Australia's 53 Biogeographical Subregions* (May & McKenzie, 2001). The Roebourne subregion covers 2,008,983 ha, and is characterised as:

- Quaternary alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas;
- Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite. Islands are either Quaternary sand accumulations, or composed of basalt or limestone, or combinations of any of these three; and
- Climate is arid (semi-desert) tropical with highly variable rainfall, falling mainly in summer. Cyclonic activity is significant, with several systems affecting the coast and hinterland annually (May & McKenzie, 2001).

4.3 LAND SYSTEMS

The Permit Area is located within the Littoral System, Cheerawarra System, Rocklea System and the Horseflat System and represents less than 1% of these systems mapped within the Pilbara Bioregion (Figure 6).

The Littoral land system is characterised by bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests. The Cheerawarra land system is characterised by sandy coastal plains and saline clay plains supporting soft and hard spinifex grasslands and minor tussock grasslands. The Rocklea land system is characterised by basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs. The Horseflat Land System is characterised by Gilgaied clay plains supporting Roebourne Plains grass grasslands and minor grassy snakewood shrublands (Phoenix, 2022).

4.4 PRE-EUROPEAN VEGETATION

Regional-scale vegetation mapping by Shepherd et al. (2002) mapped two vegetation associations in the Permit Area (Table 1; Figure 7). The remaining pre-European extent of vegetation association 127 and 175 exceeds 99% and is therefore considered of Least Concern (Department of Primary Industry and Regional Development (DPIRD), 2018). Table 1 describes the pre-European and current extent of vegetation association 175.

Table 1: Statewide extent of pre-European vegetation associations present in the Study Area

Vegetation association	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Current extent in DBCA lands (%)	% of Study Area
127 – Bare areas; mud flats	778,381	778,381	100%	12.3%	25.69%
175 – Short bunch grassland – savanna / grass plain (Pilbara)	526,957.9	524,640.2	99.6 %	7.7%	74.31%

Legend

- Permit Area

IBRA7 Subregions

- Roebourne
- Chichester
- WA Towns
- Freeways & Highways (LGATE-195)

Imagery: Google Satellite

GDA 2020 / MGA Zone 50

0 3.5 7 km

1:200,000 (A4)

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Figure 5: IBRA subregions

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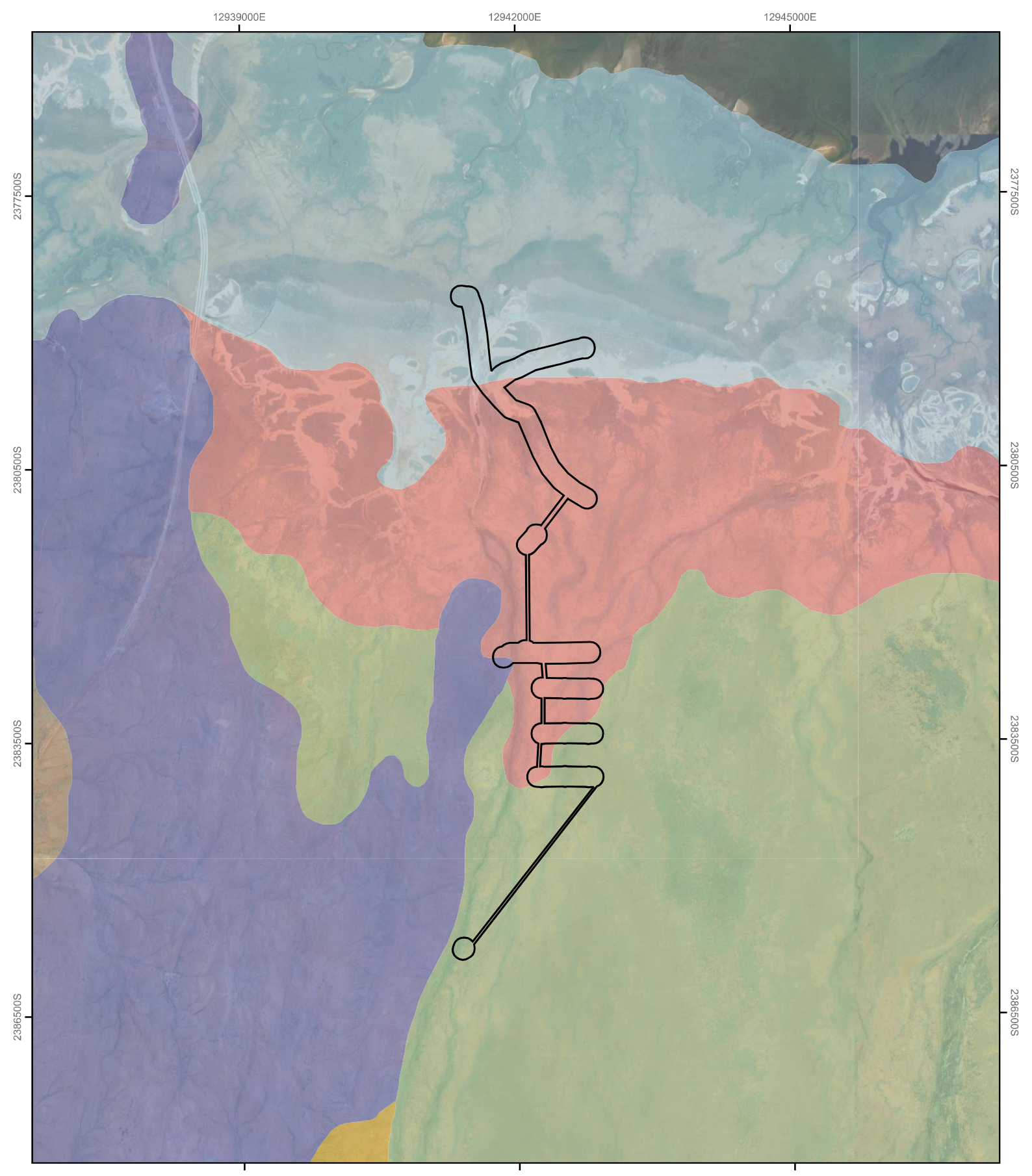

Legend

Permit Area

Imagery: Google Satellite

Land System (DPIRD-027)

- Boolgeeda system
- Cheerawarra system
- Horseflat system
- Littoral system
- Rocklea system

GDA 2020 / MGA Zone 50

0 1 2 km

1:50,000 (A4)

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Figure 6: Land systems

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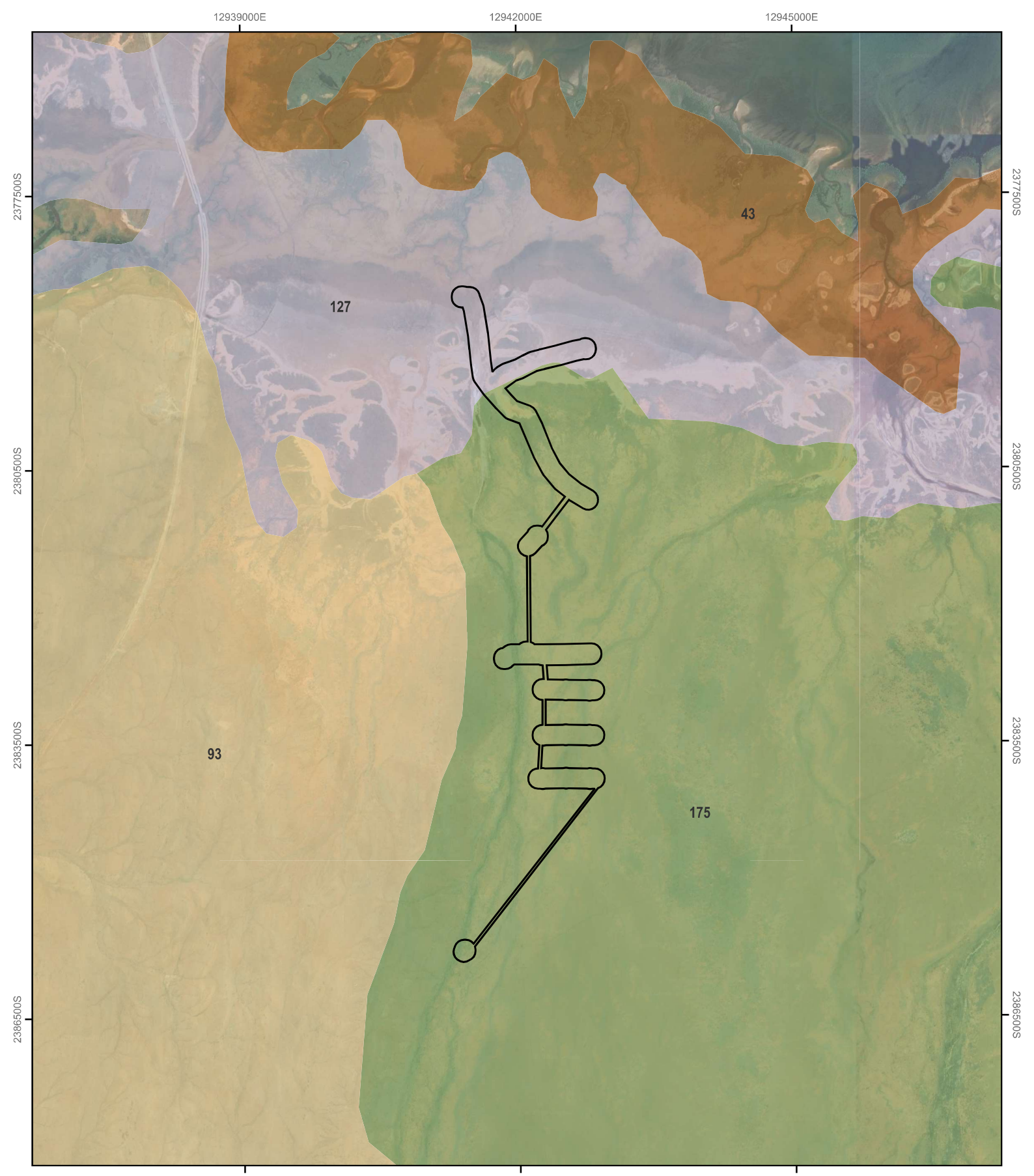

Legend

Permit Area

Pre-European Vegetation (DPIRD-006)

43

93

127

175

Imagery: Google Satellite

GDA 2020 / MGA Zone 50

0 1 2 km

1:50,000 (A4)

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Figure 7: Pre-European vegetation

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4.5 FLORA AND VEGETATION

4.5.1 SIGNIFICANT FLORA

Initial desktop studies conducted by Phoenix identified 21 individual significant flora species recorded within a 40 km radius of the Study Area. This comprised 20 Priority flora and one novel species. One Priority flora species, *Minuria tridens,* is also listed as Threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Two records of significant flora from the Department of Biodiversity, Conservation and Attractions (DBCA) search, *Cucumis* sp. Barrow Island (D.W. Goodall 1264) (Priority 2) and *Goodenia pallida* (Priority 3) were previously recorded within the Study Area. Two significant flora species were recorded during the survey, these species include *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (Priority 3) and novel species *Tecticornia halocnemoides* 'ovate seed aggregate'.

An assessment of the likelihood of the remaining 17 species was undertaken which determined that nine species were considered to possibly occur and eight considered unlikely to occur. The nine species identified as possibly occurring and their conservation status are:

- *Minuria tridens* (Priority 1);
- *Atriplex lindleyi* subsp. *conduplicate* (Priority 3);
- *Euphorbia australis* var. *glabra* (Priority 3);
- *Gomphrena cucullate* (Priority 3);
- *Gomphrena leptophylla* (Priority 3);
- *Gymnanthera cunninghamii* (Priority 3);
- *Stackhousia clementii* (Priority 3);
- *Terminalia supranitifolia* (Priority 3); and
- *Goodenia nuda* (Priority 4).

No Threatened or Priority Flora under the *Biodiversity Conservation Act 2016* (BC Act) or EPBC Act were recorded within the Permit Area. One Priority 3 flora species, *Rostellularia adscendens* var. *latifolia*, was recorded approximately 315 m west of the Permit Area along Eramurra Creek. No disturbance to vegetation associated with Eramurra Creek is being proposed as part of this NVCP.

Minuria tridens (Threatened – EPBC Act; P1 –BC Act) has been recorded in ten different locations across the Pilbara region in hummock grasslands, chenopod shrublands over grasslands and low coastal dune systems adjacent to saline mudflats. The nearest recording of the species is 28 km southwest of the Proposal at the Mardie Project. The Study Area is outside of the typical range of the species however it does contain suitable habitat, with vegetation type 'Te' being identified as suitable habitat for *M. tridens*. Only 5.25 ha (0.59%) of this vegetation type intersects with the Permit Area. Given the species was not recorded within the Study Area, the nearest record is 28 km away and the species has been recorded in more than one bioregion, the likelihood of the small scale clearing having a significant impact on this species is considered to be low.

The remaining Priority 3 and 4 flora species have widespread and numerous records throughout the Pilbara region, all found across more than one IBRA region and are unlikely to be significantly impacted as a result of the clearing, even if isolated records were present.

4.5.2 Introduced Flora Species

Twelve introduced flora species were recorded during the survey. One of these species, *Prosopis glandulosa x velutina,* is listed as both a Weeds of National Significance (WoNS) and Declared Pest. This species was recorded within one quadrat, outside the Permit Area. This introduced species is allocated to the category 2 – eradication category (DPIRD, 2021). This identifies organisms which should be eradicated from part or all of WA, at the state-wide scale.

4.5.3 Vegetation Type

Seventeen vegetation types were recognised within the Study area, and ten intersect the Permit Area. Vegetation types and their relative extents across the Permit Area are presented in Table 2 and shown in Figure 8.

Table 2: Vegetation types recorded within the Permit Area

Vegetation type	Description	Within Permit Area (ha)	% of total mapped
AbTw	Mid sparse to open shrubland of *Acacia bivenosa*, with occasional *A. stellaticeps* and *A. coriacea* (s.l.), over low hummock grassland of *Triodia wiseana*.	11.86	0.28
AssCc	Variably present tall sparse shrubland to shrubland of *Acacia sclerosperma* subsp. *sclerosperma, A. coriacea* (s.l.), and *A. inaequilatera*, over low sparse grassland to closed grassland of **Cenchrus ciliaris, Dactyloctenium radulans*, and **C. setiger*.	3.73	1.94
AxEx	Mid sparse shrubland to open shrubland of *Acacia xiphophylla,* over low isolated forbs of *Sida fibulifera, Ptilotus exaltatus*, and *Rhynchosia minima*, over low sparse to open tussock grassland of E*ragrostis xerophila, Dichanthium sericeum* subsp. *Humilius.**	27.11	0.93
EvAcCf	Variably present open forest of *Eucalyptus victrix* and/or *E. camaldulensis* (s.l.), over tall variably present open shrubland of *Acacia coriacea* (s.l.), over mid grassland to closed grassland of *Chrysopogon fallax, Eriachne flaccida,* and *Cenchrus* spp.	3.12	5.71
Ex	Low isolated forbs of S*ida fibulifera, Rhynchosia minima,* and *Indigofera trita*, over low tussock grassland to closed tussock grassland of *Eragrostis xerophila, Dichanthium sericeum* subsp. *humilius,* and *Sorghum plumosum*.	69.16	0.59
Mudflat	Mudflat	2.32	0.12
Mudflat/algal mat	Mudflat/algal mat	33.68	1.00
Te	Variably present mid isolated shrubs of *Acacia coriacea* (s.l.) and *A. bivenosa*, over mid isolated forbs of E*volvulus alsinoides* var. *villosicalyx, Arivela viscosa*, and *Rhynchosia minima*, over mid open to closed hummock grassland of *Triodia epactia* and **Cenchrus ciliaris.*	5.25	0.59
Tspp	Low open shrubland to shrubland of *Tecticornia* spp., variably with *Surreya diandra* and *Frankenia pauciflora*, over variably present isolated tussock grasses to tussock grassland of *Eragrostis falcata* and *Xerochloa laniflora*.	8.25	0.85
Tw	Isolated low shrubs of *Abutilon lepidum, Indigofera onophyla*, and *Triumfetta clementii,* over isolated forbs of *Trichodesma zeylanicum* var. *zeylanicum, Ptilotus auriculifolius* or *clementii,* and *Evolvulus alsinoides* var. *villosicalyx*, over low hummock grassland of *Triodia wiseana.*	1.89	0.23
	TOTAL	**166.37**	

*Indicates a weed species

Figure 8: Vegetation types

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4.5.4 VEGETATION CONDITION

All vegetation in the Permit Area (i.e., excluding mudflats) was recorded to be in Good to Excellent condition (Figure 9, Table 3).

Table 3: Vegetation condition within the Permit Area

Condition Rating	Within Permit Area (ha)
Excellent	112.51
Very Good	14.13
Good	3.73
Poor	-
Completely Degraded	-
N/A	36.00
TOTAL	**166.37**

4.5.5 THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

No Threatened Ecological Communities (TEC) are known to occur within the Permit Area. One Priority Ecological Community (PEC) is known to occur within the Permit Area; the Horseflat Land System of the Roebourne Plains (Priority 3; Horseflat PEC).

Phoenix recorded up to 11,720.6 ha of Horseflat PEC within the Study Area of which 69.2 ha (0.6%) occurs within the Permit Area (Figure 10). Additional regional mapping was undertaken by EnSTaR using remote sensing to further characterise the extent of the Horseflat PEC. Regional mapping indicated that the Horseflat PEC occupies a total area of 194,996.5 ha (Figure 11).

Legend

Permit Area

N/A

Vegetation Condition

Imagery: Google Satellite

Excellent

Very Good

Good

Poor

Completely Degraded

GDA 2020 / MGA Zone 50

0 0.5 1 km

1:32,000 (A4)

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Figure 9: Vegetation condition

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Legend

Permit Area

Horseflat PEC

Imagery: Google Satellite

GDA 2020 / MGA Zone 50

0 0.5 1 km

1:32,000 (A4)

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Figure 10: Horseflat PEC within the Permit Area

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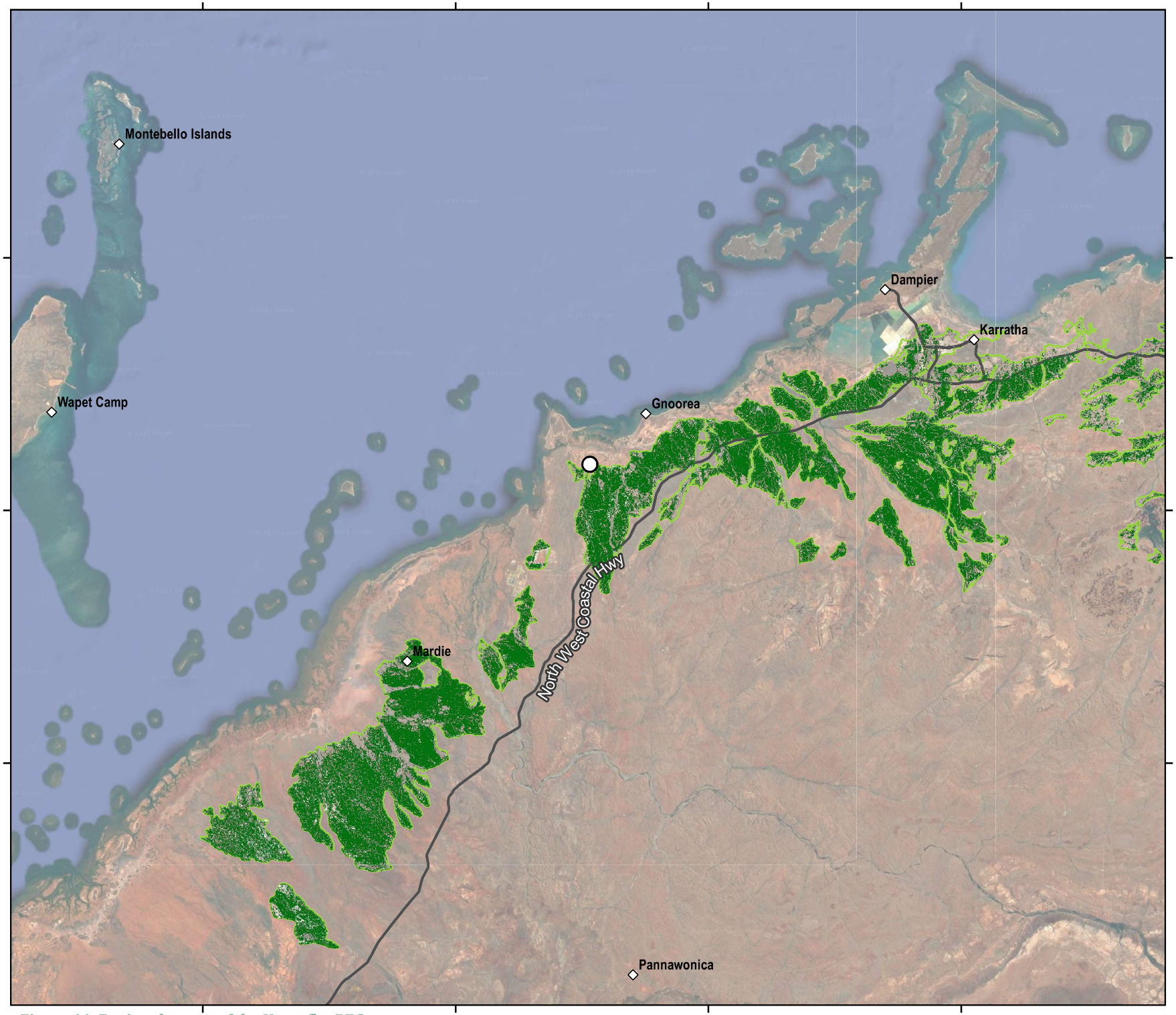

Figure 11: Regional extent of the Horseflat PEC

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4.6 FAUNA

4.6.1 FAUNA HABITAT

Phoenix (2023) identified 17 fauna habitats across the Study Area, six of which occur within the Permit Area (Table 4, Figure 12). The majority of the Permit Area (42.7%) consists of Tussock grassland habitat. None of the habitat types within the Permit Area are considered critical habitat for any significant fauna species, but may constitute broad foraging habitat for some species.

Table 4: Fauna habitats recorded within the Permit Area

Habitat Type	Within Permit Area (ha)	% of total mapped
Forest of *Eucalyptus* spp. over tall shrubland over grassland	3.13	5.68
Mudflat or salt flat	35.99	1.49
Samphire shrubland (inland)	8.25	2.80
Shrubland over spinifex grassland	17.19	0.32
Shrubland over tussock grassland	30.85	0.81
Tussock grassland	70.97	0.55
TOTAL	**166.37**	**-**

4.6.2 SIGNIFICANT FAUNA

A total of 60 significant terrestrial fauna were recorded or considered likely to occur within the study area, including seven mammals, two reptiles and 51 birds (Table 5).

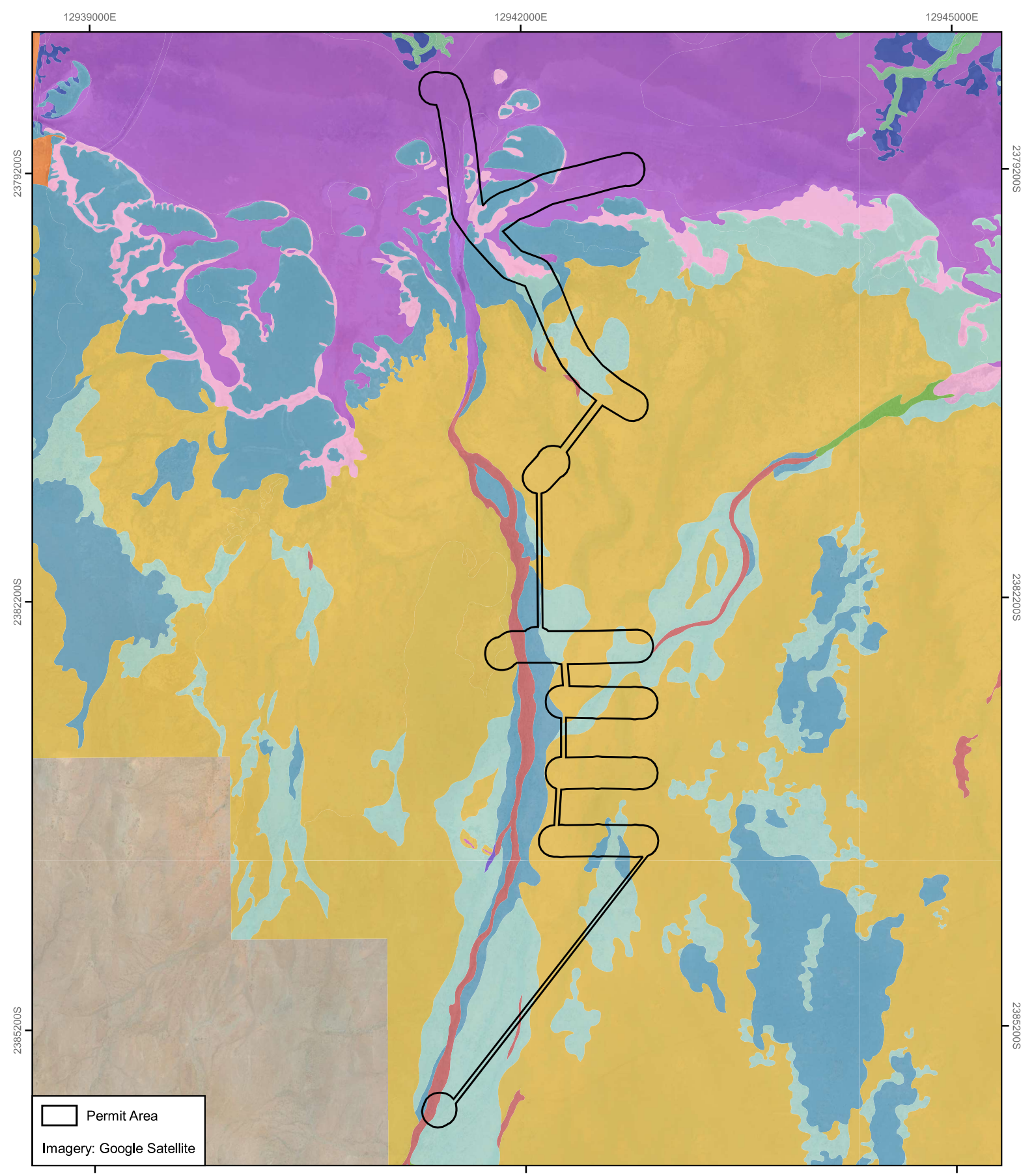
Table 5: Listed fauna species which may occur within the Permit Area

Species	Common name	Conservation status	Likelihood of occurrence
Mammals			
Dasyurus hallucatus	Northern Quoll	EN (EPBC Act; BC Act)	Recorded
Macroderma gigas	Ghost Bat	VU (EPBC Act; BC Act)	Likely
Rhinonicteris aurantia (Pilbara)	Pilbara Leaf-nosed Bat	VU (EPBC Act; BC Act)	Recorded
Mormopterus cobourgianus	North-Western Free-tailed Bat	P1 (DBCA)	Recorded
Hydromys chrysogaster	Rakali, Water Rat	P4 (DBCA)	Likely
Leggadina lakedownensis	Northern Short-tailed Mouse	P4 (DBCA)	Likely
Pseudomys chapmani	Western Pebble-mound Mouse	P4 (DBCA)	Likely
Reptiles			
Notoscincus butleri	Lined Soil-crevice Skink	P4 (DBCA)	Recorded
Liasis olivaceus barroni	Pilbara Olive Python	VU (EPBC Act; BC Act)	Likely

Species	Common name	Conservation status	Likelihood of occurrence
Ctenotus angusticeps	Airlie Island *Ctenotus*	P3 (DBCA)	Possible
Birds			
Calidris ferruginea	Curlew Sandpiper	CR/Mig. (EPBC Act; BC Act)	Recorded
Calidris tenuirostris	Great Knot	CR/Mig. (EPBC Act; BC Act)	Recorded
Limosa lapponica menzbieri	Bar-tailed Godwit (northern Siberian)	CR/Mig. (EPBC Act; BC Act);	Recorded
Numenius madagascariensis	Eastern Curlew	CR/Mig. (EPBC Act; BC Act)	Recorded
Calidris canutus	Red Knot	EN/Mig. (EPBC Act; BC Act)	Recorded
Charadrius mongolus	Lesser Sand Plover	EN/Mig. (EPBC Act; BC Act)	Recorded
Puffinus huttoni	Hutton's Shearwater	EN (BC Act)	Likely
Charadrius leschenaultii	Greater Sand Plover	VU/Mig. (EPBC Act; BC Act)	Recorded
Sterna nereis nereis	Australian Fairy Tern	VU (BC Act)	Recorded
Falco hypoleucos	Grey Falcon	VU (EPBC Act; BC Act)	Likely
Oxyura australis	Blue-billed Duck	P4 DBCA	Likely
Tringa brevipes	Grey-tailed Tattler	P4 (DBCA) Mig. (EPBC Act; BC Act)	Recorded
Falco peregrinus	Peregrine Falcon	OS (BC Act)	Likely
Actitis hypoleucos	Common Sandpiper	Mig. (EPBC Act; BC Act)	Recorded
Arenaria interpres	Ruddy Turnstone	Mig. (EPBC Act; BC Act)	Recorded
Apus pacificus	Fork-tailed Swift	Mig. (EPBC Act; BC Act)	Recorded
Calidris acuminata	Sharp-tailed Sandpiper	Mig. (EPBC Act; BC Act)	Recorded
Calidris alba	Sanderling	Mig. (EPBC Act; BC Act)	Recorded
Calidris melanotos	Pectoral Sandpiper	Mig. (EPBC Act; BC Act)	Recorded
Calidris ruficollis	Red-necked Stint	Mig. (EPBC Act; BC Act)	Recorded
Charadrius veredus	Oriental Plover	Mig. (EPBC Act; BC Act)	Recorded
Chlidonias leucopterus	White-winged Black Tern	Mig. (EPBC Act; BC Act)	Recorded
Glareola maldivarum	Oriental Pratincole	Mig. (EPBC Act; BC Act)	Recorded
Limosa limosa	Black-tailed Godwit	Mig. (EPBC Act; BC Act)	Recorded
Numenius minutus	Little Curlew	Mig. (EPBC Act; BC Act)	Recorded
Numenius phaeopus	Whimbrel	Mig. (EPBC Act; BC Act)	Recorded
Pandion cristatus	Osprey	Mig. (EPBC Act; BC Act)	Recorded
Pluvialis fulva	Pacific Golden Plover	Mig. (EPBC Act; BC Act)	Recorded
Pluvialis squatarola	Grey Plover	Mig. (EPBC Act; BC Act)	Recorded
Sternula albifrons	White-shafted Little Tern, Little Tern	Mig. (EPBC Act; BC Act)	Recorded
Sterna bergii	Crested Tern	Mig. (EPBC Act; BC Act)	Recorded
Sterna caspia	Caspian Tern	Mig. (EPBC Act; BC Act)	Recorded

Species	Common name	Conservation status	Likelihood of occurrence
Sterna dougallii	Roseate Tern	Mig. (EPBC Act; BC Act)	Recorded
Sterna hirundo	Common Tern	Mig. (EPBC Act; BC Act)	Recorded
Sterna nilotica	Gull-billed Tern	Mig. (EPBC Act; BC Act)	Recorded
Tringa nebularia	Common Greenshank	Mig. (EPBC Act; BC Act)	Recorded
Xenus cinereus	Terek Sandpiper	Mig. (EPBC Act; BC Act)	Recorded
Ardenna pacifica	Wedge-tailed Shearwater	Mig. (EPBC Act; BC Act)	Likely
Calidris subminuta	Long-toed Stint	Mig. (EPBC Act; BC Act)	Likely
Fregata ariel	Lesser Frigatebird	Mig. (EPBC Act; BC Act)	Likely
Gallinago stenura	Pin-tailed snipe	Mig. (EPBC Act; BC Act)	Likely
Hirundo rustica	Barn Swallow	Mig. (EPBC Act; BC Act)	Likely
Limicola falcinellus	Broad-billed sandpiper	Mig. (EPBC Act; BC Act)	Likely
Oceanites oceanicus	Wilso''s Storm Petrel	Mig. (EPBC Act; BC Act)	Likely
Plegadis falcinellus	Glossy Ibis	Mig. (EPBC Act; BC Act)	Likely
Sula leucogaster	Brown Booby	Mig. (EPBC Act; BC Act)	Likely
Tringa stagnatilis	Marsh Sandpiper	Mig. (EPBC Act; BC Act)	Likely
Tringa totanus	Common Redshank	Mig. (EPBC Act; BC Act)	Likely
Ardenna carneipes	Flesh-footed Shearwater	Mig. (EPBC Act; BC Act),VU (BC Act)	Possible
Calonectris leucomelas	Streaked Shearwater	Mig. (EPBC Act; BC Act)	Possible
Macronectes giganteus	Southern Giant Petrel	EN (EPBC Act), Mig. (EPBC Act; BC Act)	Possible
Limosa lapponica baueri	Bar-tailed Godwit (western Alaskan)	VU, Mig (EPBC and BC Act)	Possible
Phalaropus lobatus	Red-necked Phalarope	Mig. (EPBC Act; BC Act)	Possible
Tringa glareola	Wood Sandpiper	Mig. (EPBC Act; BC Act)	Possible
Motacilla flava	Yellow Wagtail	Mig. (EPBC Act; BC Act)	Possible

One significant fauna species, the Oriental Pratincole (Migratory - EPBC Act and BC Act), was recorded within the Permit Area, however habitat for this species is not restricted to the Permit Area. The Permit Area contains small proportions of broad foraging habitat for a number of significant fauna species.



Legend

- Cleared
- Forest of Eucalyptus spp. over tall shrubland over grassland
- Mangal community
- Mudflat or salt flat
- Samphire shrubland (inland)
- Samphire shrubland (tidal)
- Shrubland over spinifex grassland
- Shrubland over spinifex grassland on drainage
- Shrubland over tussock grassland
- Spinifex grassland
- Tidal channel and ocean
- Tussock grassland
- Tussock grassland on granite outcrop
- Woodland of Eucalyptus spp. over tussock grassland on drainage

GDA 2020 / MGA Zone 50

0 0.5 1 km

1:32,000 (A4)

Preston Consulting

LEICHHARDT

Figure 12: Fauna habitats

AS 13/11/2023

4.7 Water and Drainage

Land & Water Consulting (LWC) (2023) were engaged by Leichhardt to conduct a hydrology study of the Study Area. The following hydrological information is based on the information from this study.

Eramurra Creek, an ephemeral stream, can be seen on the western side of the Permit Area (Figure 1). The creek intersects the Permit Area at multiple locations. The Permit Area is located entirely within the Eramurra Creek catchment with a total catchment area of approximately 15,100 ha.

4.8 Current Land Use

The Permit Area lies entirely within land reserved for the Pilbara Ports Authority (R 52734). The land is generally flat, devoid of permanent physical infrastructure and consists of low-lying vegetation.

5 STAKEHOLDER CONSULTATION

Leichhardt has consulted with the following key stakeholders regarding the Project:

- EPA Services;
- DCCEEW;
- Mardudhunera People;
- Pilbara Ports Authority; and
- City of Karratha.

6 ASSESSMENT OF CLEARING AGAINST THE TEN CLEARING PRINCIPLES

The proposed vegetation disturbance has been assessed against the ten clearing principles described within *A Guide to the Assessment of Applications to Clear Native Vegetation* (Department of Environmental Regulation (DER), 2014; Table 6).

Table 6: Assessment of proposed vegetation disturbance against the ten clearing principles

Relevant Information	Assessment of Potential Impacts	Proposed Control Measures	Outcome – Assessment of Variance with Clearing Principle
1. Native Vegetation should not be cleared if it comprises a high level of biological diversity			
No significant flora species were identified within the Permit Area. Up to 69.2 ha of Horseflat PEC was recorded within the Permit Area. The Permit Area contains broad habitat for migratory birds and other significant fauna. However habitat within the Permit Area has not been identified as restricted or isolated and is well represented in the surrounding area. The vegetation in the Permit Area is identified as Vegetation Association 127 and 175. Vegetation Association 127 and 175 are currently classed as 'Least Concern', even when the clearing from the Mardie Project is considered.	The survey area is not located within a known biodiversity hotspot in WA. Up to 69.2 ha of Horseflat PEC occurs within the Permit Area, 0.6% of the local extent and 0.04% of the regional extent. Clearing or damage of up to 3.5 ha is unlikely to have a significant impact on the maintenance of this PEC. Mudflats and salt flats provide foraging habitat for migratory birds. Up to 36 ha of this habitat occurs within the Permit Area however only 3.5 ha of disturbance is being requested. Even if all clearing were to occur within this habitat type it would only result in a 0.1% reduction of the local extent. The proposed clearing will result in the removal of or damage to up to 3.5 ha of native vegetation, this clearing represents: • <0.01% of the remaining extent of Vegetation Association 127 and 175; and • Less than 6% of any local vegetation type or fauna habitat (conservatively assuming all clearing occurred in one vegetation type or fauna habitat).,	To minimise the impact of clearing on the environment, Leichhardt proposes the following control measures: • All clearing will be managed under a clearing contractor's Ground Disturbance Permit (or similar); • Areas of bare ground will be targeted for test pits and groundwater bores if available; • Access will be by driving over existing vegetation rather than clearing defined access tracks; • The total extent of vegetation clearing is limited to 3.5 ha; • The clearing areas will be identified using GPS coordinates; • All clearing kept to a minimum within the proposed Permit Area and completed only when required; and • All vehicles, equipment and personnel will be inspected and cleaned as required to prevent the incidental spread of weeds.	The proposed clearing is not likely to be at variance with this principle.
2. Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to WA			
Tussock grassland habitat type was the primary fauna habitat identified within the Permit Area (Figure 12). The Permit Area contains broad habitat for migratory birds and other significant fauna. However habitat within the Permit Area has not been identified as restricted or isolated and is well represented in the surrounding area.	No habitat identified within the Permit Area is considered to be isolated or restricted. There is fauna habitat within the Permit Area which may be utilised on occasion by significant fauna however this is unlikely to be necessary for the maintenance of a significant habitat given clearing is restricted to 3.5 ha and the low impact nature of the activities.	Implement control measures described above.	The proposed clearing not likely at variance with this principle.

Relevant Information	Assessment of Potential Impacts	Proposed Control Measures	Outcome – Assessment of Variance with Clearing Principle
3. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora			
No Threatened or Priority flora were recorded in the Permit Area. The nearest significant flora record is a Priority 3 record 315 m west of the Permit Area.	No known records of Threatened or Priority Flora will be impacted by the clearing. While it is possible that significant flora may occur within the Permit Area, the clearing of 3.5 ha of habitat for these species is unlikely to affect the continued existence of any significant flora.	Implement control measures described above.	The proposed clearing is not likely to be at variance with this principle.
4. Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a Threatened Ecological Community			
None of the vegetation previously recorded within the Permit Area was considered to represent a TEC.	Not applicable	Not applicable	The proposed clearing is not at variance with this principle.
5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared			
The Permit Area lies entirely within the Pilbara Bioregion, specifically located on the Roebourne IBRA Subregion. The Roebourne subregion covers 2,008,983 ha. The vegetation in the Permit Area is identified as Vegetation Association 127 and 175. Vegetation Association 127 and 175 have over 99.6% of pre-European extent remaining in the Pilbara (calculated prior to the construction of the Mardie Project) and are classed as Least Concern. This classification will remain even after the clearing for the Mardie Project is taken into account.	The Permit Area does not represent a significant remnant of native vegetation in an extensively cleared area. The proposed clearing will result in the removal of up to 3.5 ha of native vegetation, this clearing represents: • <0.01% of the remaining extent of Vegetation Association 127 and 175. • Less than 1.93% of Excellent vegetation within the Permit Area.	Implement control measures described above.	The proposed clearing is not at variance with this principle.
6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland			
The Permit Area is located within the Pilbara Surface Water Area. Eramurra Creek is listed as a significant stream and passes through the western area of the Permit Area.	The activities include a crossing of Eramurra Creek. This will not involve physical clearing of vegetation, instead vehicles will drive across this crossing on top of existing vegetation. The activities are therefore unlikely to have a significant impact on the vegetation growing in association with the creek.	Implement control measures described above.	The proposed clearing may be at variance with this principle

Relevant Information	Assessment of Potential Impacts	Proposed Control Measures	Outcome – Assessment of Variance with Clearing Principle
7. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation			
The area within and surrounding the Permit Area remains mostly uncleared. Twelve introduced species were recorded within the survey area, one of these species, *Prosopis glandulosa x velutina*, is listed as both a WoNS and Declared Pest. However, this species is not present within the Permit Area.	Land degradation will be limited to the 3.5 ha of proposed land clearing required for geotechnical investigations. This represents clearing of less than 1.93% of Excellent vegetation within the Permit Area. The proposed clearing will impact a relatively small area of vegetation and is unlikely to cause significant land degradation.	Implement control measures described above	The proposed clearing is not likely to be at variance with this principle.
8. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area			
The proposed clearing area does not occur within or adjacent to any conservation areas. The nearest conservation reserve is Great Sandy Island Nature Reserve, located approximately 4 km northeast of the Permit Area.	Not applicable	Not applicable	The proposed clearing is not at variance with this principle.
9. Native vegetation should not be cleared if the clearing is likely to cause deterioration in the quality of surface or underground water			
The Permit Area is located within the Pilbara Surface Water Area. Eramurra Creek runs along the western edge of the Permit Area and continues north to discharge into coastal areas. No vegetation associated with any drainage will be mechanically cleared.	The proposed clearing represents a small area of clearing in an otherwise relatively uncleared landscape. The proposed clearing is not expected to cause deterioration in the quality of surface or underground water. Geotechnical investigations will not intersect the water table or occur within any drainage lines.	Implement the control measures described above	The proposed clearing is not likely to be at variance with this principle.
10. Native vegetation should not be cleared if the clearing is likely to cause, or exacerbate, the incidence or intensity of flooding			
The region is generally arid tropical, with highly variable rainfall mainly in summer	The proposed vegetation clearing is small in scale and is not expected to cause, or exacerbate, the incidence or intensity of flooding within the Permit Area or surrounding landscape.	Implement the control measures described above	The proposed clearing is not at variance with this principle.

7 SUMMARY AND CONCLUSIONS

The purpose of this NVCP Application is to allow the clearing of up to 3.5 ha of native vegetation within a 166 ha Permit Area for geotechnical investigations and installation of monitoring wells as described in Section 3.

The following key points are noted:

- The area has been extensively surveyed for a number of different projects within the region and the results of these surveys have been used to assess the impacts of clearing;
- The proposed clearing will not result any significant impacts to the following:
    - Threatened and Priority Flora;
    - TECs;
    - Remnant vegetation;
    - Conservation areas;
    - Surface water and groundwater quality; and
    - Flooding intensity.

Leichhardt has also identified a number of control measures to minimise the impacts to native vegetation. These measures include the following:

- All clearing to be managed under a clearing contractor's Ground Disturbance Permit (or similar);
- Areas of bare ground will be targeted for test pits and groundwater bores if available;
- Access will be by driving over existing vegetation rather than clearing defined access tracks;
- The total extent of vegetation clearing is limited to up to 3.5 ha of disturbance;
- The clearing areas will be identified using GPS coordinates;
- All clearing kept to a minimum within the Permit Area and completed only when required; and
- All vehicles, equipment and personnel will be inspected and cleaned as required to prevent the incidental spread of weeds.

This NVCP application assessed the proposed vegetation clearing against the ten clearing principles described in *A Guide to the Assessment of Applications to Clear Native Vegetation* (DER, 2014).

GLOSSARY

Term	Meaning
BC Act	*Biodiversity Conservation Act 2016*
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DER	Department of Environmental Regulation
DPIRD	Department of Primary Industry and Regional Development
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ha	Hectare
IBRA	Interim Biogeographic Regionalisation of Australia
km	Kilometres
Leichhardt	Leichhardt Industrials Pty Ltd
LWC	Land & Water Consulting
m	Metres
NVCP	Native Vegetation Clearing Permit
PEC	Priority Ecological Community
Phoenix	Phoenix Environmental Sciences Pty Ltd
Project	Eramurra Salt Project
TEC	Threatened Ecological Community
WA	Western Australia
WoNS	Weeds of National Significance

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