



Atlas Stage 3 Gas Project

EPBC Act Ecology Significant Impact
Assessment Report

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22 March 2024

Atlas Stage 3 Gas Project

EPBC Act Ecology Significant Impact Assessment Report



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CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	1
1.1 Project Area Context.....	1
1.2 Purpose of Significant Impact Assessment.....	2
1.3 Project Description.....	4
1.3.1 Production Wells.....	4
1.3.2 Gathering System	7
1.3.3 Water Management	8
1.3.4 Temporary Accommodation Facilities.....	9
1.3.5 Other Ancillary Facilities and Incidental Petroleum Activities.....	9
1.3.6 Pre-construction/Pre-clearing Activities	10
1.3.7 Clearing and Civil Works.....	10
1.4 Ongoing Maintenance/Operations	11
1.4.1 Decommissioning and Remediation.....	11
2. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE RELEVANT TO THE PROJECT AREA.....	12
2.1 Terrestrial Ecology and Habitat Values.....	15
2.2 Threatened Ecological Communities	31
2.2.1 Brigalow TEC.....	32
2.2.2 Poplar Box Grassy Woodland TEC.....	32
2.3 Terrestrial Listed Threatened Flora Species.....	35
2.4 Aquatic Listed Threatened Flora Species	41
2.5 Terrestrial Listed Threatened Fauna Species	41
2.5.1 Koala.....	41
2.5.2 Greater Glider	46
2.5.3 Glossy Black-cockatoo.....	49
2.5.4 Dulacca Woodland Snail.....	52
2.5.5 White-throated Needletail	54
2.5.6 Listed Threatened Terrestrial Fauna Species with Potential to Occur	54
2.6 Aquatic Listed Threatened Fauna Species	63
2.7 Listed Migratory Species.....	63
2.7.1 Listed Migratory Species with Potential to Occur.....	63
3. POTENTIAL IMPACTS	65
3.1 Listed Threatened Ecological Communities.....	65
3.2 Listed Threatened Flora Species	65
3.3 Listed Threatened Fauna Species	65
4. MITIGATION AND MANAGEMENT MEASURES	73
5. SIGNIFICANT IMPACT ASSESSMENTS.....	77
5.1 Listed Threatened Ecological Communities.....	77
5.2 Listed Threatened Species Known or Likely to Occur	81
5.3 Listed Threatened Species with Potential to Occur	103
5.4 Listed Migratory Species Known or Likely to Occur.....	160
5.6 Cumulative Impacts	162
6. CONCLUSION	163
7. REFERENCES	166

APPENDIX A LIKELIHOOD OF OCCURRENCE OF MNES
APPENDIX B BOOBOOK CONSULTING TERRESTRIAL ECOLOGY REPORT

List of Tables

Table 2-1: MNES within the Project Area	12
Table 2-2: Summary of Habitat for Listed Threatened Species Known or Likely to Occur within the Project Area	13
Table 2-3: Terrestrial Broad Habitat Types and Vegetation Communities in the Project Area	16
Table 2-4: Low Ecological Value Land within the Project Area	24
Table 2-5: Description and Ground-truthed Extent of TEC within the Project Area.....	31
Table 2-6: Terrestrial Weeds of National Significance Relevant to the Project Area.	39
Table 2-7: Koala Habitat Types within the Project Area	44
Table 2-8: EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area	55
Table 2-9: EPBC Act Listed Migratory Species with Potential to Occur within the Project Area	64
Table 3-1: Potential Impacts to MNES	67
Table 4-1: Management and Mitigation Measures	73
Table 5-1: Significant Impact Assessment for the Brigalow Threatened Ecological Community	77
Table 5-2: Significant Impact Assessment for the Poplar Box Threatened Ecological Community	79
Table 5-3: Significant Impact Assessment for the Dulacca Woodland Snail	81
Table 5-4: Significant Impact Assessment for the Glossy Black-cockatoo	84
Table 5-5: Significant Impact Assessment for the Greater Glider.....	88
Table 5-6: Koala Habitat Types within the Project Area	92
Table 5-7: Koala Habitat and Impact Quantification	93
Table 5-8: Significant Impact Assessment for the Koala	93
Table 5-9: Significant Impact Assessment for Ooline	98
Table 5-10: Significant Impact Assessment for the White-throated Needletail.....	100
Table 5-11: Significant Impact Assessment for the Australian Painted Snipe	103
Table 5-12: Significant Impact Assessment for Belson's Panic.....	106
Table 5-13: Significant Impact Assessment for Brown Treecreeper.....	109
Table 5-14: Significant Impact Assessment for Collared Delma.....	112
Table 5-15: Significant Impact Assessment for Corben's Long-eared Bat	115
Table 5-16: Significant Impact Assessment for Diamond Firetail	118
Table 5-17: Significant Impact Assessment for Dunmall's Snake	121
Table 5-18: Significant Impact Assessment for Five-clawed Worm-skink	125
Table 5-19: Significant Impact Assessment for the Grey Snake	128
Table 5-20: Significant Impact Assessment for the Northern Quoll	132
Table 5-21: Significant Impact Assessment for Painted Honeyeater.....	136
Table 5-22: Significant Impact Assessment for Slender Tylophora	140
Table 5-23: Significant Impact Assessment for Southern Squatter Pigeon	143
Table 5-24: Significant Impact Assessment for Southern Whiteface.....	147
Table 5-25: Significant Impact Assessment for Yakka Skink.....	151
Table 5-26: Significant Impact Assessment for Yellow-bellied Glider (south-eastern).....	155
Table 5-27: Ecologically Significant Proportions of Populations for Migratory Species with a Potential to Occur.....	161

List of Figures

Figure 1-1: Project Area	3
Figure 2-1: Broad Vegetation Communities	22
Figure 2-2: Low Ecological Value Land within the Project Area	30
Figure 2-3: Threatened Ecological Communities within the Project Area	34
Figure 2-4: Mapped Ooline Habitat within the Project Area.....	36
Figure 2-5: EPBC Act Listed Flora Species with Potential to Occur within the Project Area	38
Figure 2-6: Locations of Terrestrial WoNS within the Project Area	40
Figure 2-7: Koala Habitat within the Project Area	45
Figure 2-8: Greater Glider Habitat within the Project Area	48
Figure 2-9: Glossy Black-cockatoo Habitat within the Project Area and White-throated Needle-tail Records	51
Figure 2-10: Dulacca Woodland Snail Habitat within the Project Area.....	53
Figure 2-11: Potential Habitat for EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area – Birds (Part 1).....	59
Figure 2-12: Potential Habitat for EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area – Birds (Part 2).....	60
Figure 2-13: Potential Habitat for EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area – Mammals.....	61
Figure 2-14: Potential Habitat for EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area – Reptiles	62

ACRONYMS AND ABBREVIATIONS

ALA	Atlas of Living Australia
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DESI	Department of Environment, Science and Industry
DoR	Department of Resources
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Fisheries Act	<i>Fisheries Act 1994</i>
PMST	Protected Matters Search Tool
RE	Regional Ecosystem
RoW	Gas, water gathering and track right of way
SEVT	Semi-Evergreen Vine Thicket
SIG 1.1	Significant Impact Guidelines 1.1 - Matters of National Environmental Significance
SPRAT	Species Profile and Threats Database
SRI	Significant Residual Impact
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Committee
WO	Wildlife Online
WONS	Weeds of National Significance

EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Senex Energy Pty Ltd (Senex) to document the terrestrial and aquatic ecological values to support the development of approvals documentation for the Atlas Stage 3 Gas Project (the 'Project') in the Surat Basin in southern-central Queensland. This Significant Impact Assessment (SIA) will be used to support the preparation and submission of approval documentation.

The Project will involve up to 151 new gas wells and associated well site facilities; gas and water gathering systems for the producing wells; access tracks for operational purposes; brine and produced water storage, borrow pits; and ancillary supporting facilities. The term 'Project Area' in this report equates to the 'Field Development Area' discussed in the Preliminary Documentation. The up to 530 ha area where direct impacts will occur within the Project Area, will be referred to as the disturbance footprint. The Project Area is approximately 9,772 ha. The Project Area is based upon Petroleum Lease (PL) 445, the northern part of PL 209, Authority to Prospect (ATP) 2059 (Petroleum Lease Application 1127) and parts of PL 1037.

The gas field will be progressively developed over a period of approximately 5 – 10 years. The average maximum production rate of the Project is expected to be approximately 60 terajoules per day, although variable potential production rates may be higher at times. Field development is planned to move generally from the north towards the south over the life of the Project.

This SIA documents the assessment of terrestrial and aquatic ecological values within the Project Area with a focus on the impacts to matters of national environmental significance (MNES). The SIA documents potential risks to biodiversity values and approaches to minimise the risk through avoidance, mitigation, and management measures.

Both terrestrial and aquatic ecological values of the Project Area were assessed using information obtained from desktop sources and field surveys conducted by suitably qualified ecologists. Desktop sources included available mapping products and species database records. The outcomes of the desktop assessment and field surveys were analysed to inform a likelihood of occurrence assessment relating to listed threatened species and ecological communities.

The Project Area is entirely within the Brigalow Belt Bioregion and occurs across a boundary between the Taroom Downs subregion in the north and Southern Downs subregion in the south. The northern components of the Project Area feature watercourses on floodplains, surrounded by undulating hills. Towards the southern areas of the Project Area the landscape features steeper slopes and outcropping towards the south-eastern boundary. Several watercourses (stream orders 2 - 5) intersect the Project Area, with named watercourses including Woleebee Creek, Conloi Creek, Hellhole Creek and Wandoan Creek. It is noted that terrestrial and aquatic habitats demonstrated varying levels of degradation, including cattle grazing, clearing, erosion and invasive species and the majority of aquatic habitats surveyed are of limited ecological value. Across all sample sites, aquatic macrophyte diversity was relatively poor with the highest diversity recorded in a billabong adjacent to Wandoan Creek.

The main land use within the Project Area is grazing of stock for beef production. Some flood plain areas have been developed for centre-pivot agriculture. Most of the Project Area is cleared with 9.48% mapped as remnant vegetation and as such 90.5% of the Project Area is classified cleared areas with non-native pastures.

Potential impacts to MNES were assessed against the following guidelines:

- MNES: Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (Department of Environment, Heritage, Water and the Arts [DEHWA], 2013) (SIG 1.1).

MNES Ecological Findings

For MNES protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), two listed threatened ecological communities (TEC), six listed threatened species (5 fauna and one flora) and two listed migratory species were identified as known or likely to occur in the Project Area, due to direct field observations within the Project Area or recent historical records.

The TECs were Brigalow (*Acacia harpophylla* dominant and co-dominant) and Poplar Box Grassy Woodland on Alluvial Plains.

The listed threatened species were the Dulacca Woodland Snail (*Adclarkia dulacca*), Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*), Greater Glider (*Petauroides volans*), Koala (*Phascolarctos cinereus*), Ooline (*Cadellia pentastylis*) and White-throated Needletail (*Hirundapus caudacutus*).

The listed migratory species were the White-throated Needletail and Fork-tailed Swift (*Apus pacificus*).

An additional 16 listed threatened species (14 fauna and two flora) and six listed migratory species were assessed as having the potential to occur in the Project Area.

Potential Impacts

Potential impacts considered as part of the Project include the following:

- Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities;
- Introduction and/or spread of weed species;
- Disturbance or displacement to fauna species from foraging or roosting habitat, or breeding places;
- Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials;
- Habitat fragmentation;
- Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects (for example through impeding migration pathways or inhibiting access to refuge areas); and
- Fauna injury during construction activities and movement of machinery/vehicles.

It is noted that KCB (2024) have determined that no impacts to Groundwater Dependent Ecosystems are likely as a result of the Project.

Mitigation and Management Measures

The Project will avoid disturbance to TEC and Ooline habitat, other remnant vegetation and advanced regrowth (which represents the majority of habitat for threatened and migratory fauna species). Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm on-ground biodiversity values will be undertaken by a suitably qualified person. It is noted that Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land).

Further mitigation measures that will, or have already been implemented to mitigate impacts resulting from the Project include:

- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-015];

- Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001];
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017];
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-0013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-0014];
- No-go' areas will be GPS located and clearly marked e.g., with signage, bunting, flagging tape;
- Restricting access tracks to only low-level traffic with restricted speed;
- Erosion and sediment control measures;
- Dust management; and
- Appropriate storage and handling of fuel, oil and chemicals and appropriate spill response equipment.

Significant Impact Assessment Outcomes

The significant impact assessments undertaken against the Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (SIG 1.1), assessed the potential impacts as well as the implemented mitigation and management measures, to determine whether or not the Project would result in any significant residual impacts to MNES assessed as either known or likely to occur in the Project Area.

The following details the significant impact assessment outcomes for MNES against the SIG 1.1. The outcomes for TECs in the Project Area are as follows:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) is present as 17 patches totalling 95.8 ha (<1%) of the Project Area, all of which will be avoided by the Project; and
- Poplar Box Grassy Woodland on Alluvial Plains is present as 10 patches totalling 32.3 ha (<0.4%) of the Project Area, all of which will be avoided by the Project.

The following details the significant impact assessment outcomes for listed threatened and/or migratory MNES that were assessed as either known or likely to occur in the Project Area:

- Dulacca Woodland Snail (*Adclarkia dulacca*) totalling 666.3 ha of habitat within the Project Area, all of which will be avoided by the Project;
- Glossy Black-cockatoo (south-eastern subspecies) (*Calyptorhynchus lathami lathami*) totalling 1,003 ha of habitat within the Project Area, all of which will be avoided by the Project;
- Greater Glider (*Petauroides volans*) totalling 528 ha of habitat within the Project Area, all of which will be avoided by the Project;
- Habitat for Koala (*Phascolarctos cinereus*) comprising 698.5 ha of foraging and breeding habitat within the Project Area, will be avoided through careful design of the Project such that there will be no disturbance to foraging and breeding habitat for the species. A total of 9,072.6 ha of Koala dispersal habitat occurs within the Project Area and impact upon this habitat will be minimised through careful design of the Project such that any direct disturbance to habitat for the species will not exceed 530 ha and the ability for Koalas to disperse across the landscape will not be impeded; and

- Habitat for Ooline (*Cadellia pentastylis*) is made up of 118.7 ha of habitat consisting of relatively narrow remnant and regrowth patches in the far south of the Project Area. Senex has committed to avoiding all individual plants (should any be found to occur within the proposed disturbance footprints). Additionally, as stated, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas as part of the application of the Project's mitigation measures to ensure that if any individual plants are present, they will be avoided.
- The White-throated Needletail (*Hirundapus caudacutus*) is known to occur within the Project Area, however it is likely only to be an aerial flyover visitor due to the lack of suitable roosting areas in the Project Area. Therefore, no habitat will be directly or indirectly impacted for this species. Further, the White-throated Needletail along with the Fork-tailed Swift were identified as listed migratory species known and likely to occur respectively. As with the White-throated Needletail, the Fork-tailed Swift was concluded to be an aerial flyover visitor only and so both migratory species were concluded to not be at risk of a significant impact from the Project.

Significant impact assessments were also conducted for listed threatened MNES that were assessed as having the potential to occur in the Project Area. It was concluded that all listed threatened species that have the potential to occur in the Project Area will not be significantly impacted by the Project. Significant impact assessments were deemed not necessary for listed migratory species having the potential to occur in the Project Area, based on the estimations that if populations of these species are present, they are likely to not be an ecologically significant proportion of the population.

Concluding Remark

As a substantial majority of the Project Area is cleared, the Project will be able to avoid direct impacts to MNES species and naturally vegetated habitat areas. The Project's mitigation measures, including the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] will be used to guide infrastructure siting, minimise direct and indirect disturbances and ensure the Project does not disturb MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat.

As detailed in the MNES impact assessment provided in Section 5, the Project has been assessed against the relevant Commonwealth guidelines (SIG 1.1) and it has been determined that, with the implementation of the proposed controls and mitigation measures, the Project is unlikely to result in any significant direct or indirect impacts to any MNES.

The Atlas Stage 3 Gas Project will be serviced by the Atlas to Reedy Creek (ARC) Pipeline which is the subject of a separate referral under the EPBC Act (EPBC 2023/09585). An assessment of cumulative impacts for both the ARC Pipeline and the Atlas Stage 3 Gas Project, determined that these projects would not result in a significant cumulative impact on any MNES.

1. INTRODUCTION

Senex, on behalf of its subsidiaries Senex Assets Pty Ltd and Senex Assets 2 Pty Ltd, proposes to develop, operate, decommission, and rehabilitate new coal seam gas wells and associated infrastructure on Petroleum Lease (PL) 445, the northern part of PL 209, Authority to Prospect (ATP) 2059 [Petroleum Lease Application (PL(A)) 1127] and parts of PL 1037 in the central part of the Surat Basin, Queensland. The project is referred to as the Atlas Stage 3 Gas Project (the 'Project').

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Senex Energy Pty Ltd (Senex) to prepare this *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Ecology Significant Impact Assessment (SIA) (EPBC Ecology SIA). This EPBC Ecology SIA has been prepared to provide an assessment of the significance of impacts to Matters of National Environmental Significance (MNES) within the Project Area using the EPBC Act *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (SIG 1.1) (Department of Environment [DoE], 2013). These MNES are prescribed under Sections 18, 18A, 20 and 20A of the EPBC Act and include Threatened Ecological Communities (TEC), listed threatened species and migratory species.

The term 'Project Area' in this report equates to the 'Field Development Area' discussed in the Preliminary Documentation. The up to 530 ha area where direct impacts will occur within the Project Area, will be referred to as the disturbance footprint. The Project Area is approximately 9,772 ha. The Project Area extends Southwest of the township Wandoan by 10 to 25 km and can be accessed via Jackson-Wandoan Road, Gurulmundi Road, Giligulgul Road, and local roads. The Project Area is situated within the Western Downs Regional Council (WDRC) boundary, southern inland Queensland.

Ecology desktop reviews, field surveys and assessment of ecological values were conducted by ecological specialists, with BOOBOOK Ecological Consulting Pty Ltd (BOOBOOK) completing the terrestrial component (BOOBOOK, 2022) and Freshwater Ecology Consulting Pty Ltd (Freshwater Ecology) conducting the aquatic component (Freshwater Ecology, 2022). Their findings, which form the basis of this assessment, are provided in the Ecological Assessment Report prepared by BOOBOOK Ecological Consulting, for ERM (BOOBOOK, 2022) and the Atlas Stage 3 Gas Project Aquatic Ecology Assessment 2022, prepared by Freshwater Ecology Pty Ltd for ERM (Freshwater Ecology, 2022). Attexo Group undertook targeted flora surveys including surveys for Ooline (*Cadellia pentastylis*) and prepared a threatened flora survey memorandum (Attexo, 2023).

1.1 Project Area Context

The Project Area consists of the ATP 2059 (PL(A) 1127), PL 445, PL 209 (northern portion) and PL 1037 (parts thereof) development blocks and includes parts of 28 cadastral land parcels comprising private and leasehold lands along with, road reserves and easements. The approximately 9,772 ha Project Area is within an established gas-producing region. The Project Area extends 10 to 25 km southwest of Wandoan and is accessed via Jackson-Wandoan Road, Gurulmundi Road, Giligulgul Road and local roads. The Project Area is within the boundary of Western Downs Regional Council, southern inland Queensland.

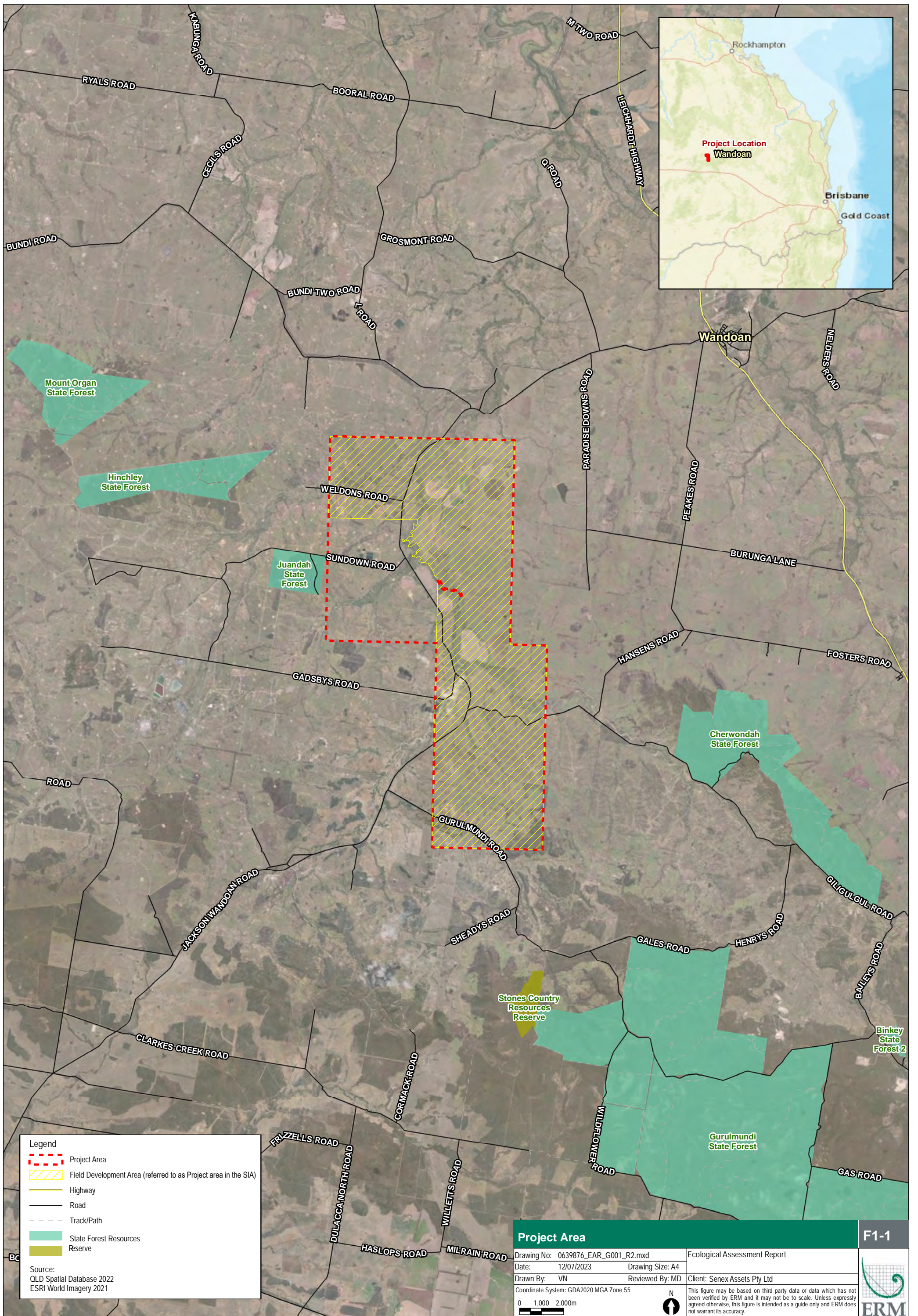
The Project Area is within the Brigalow Belt Bioregion and straddles a diffuse boundary between Subregion 25 (Taroom Downs) in the north and Subregion 26 (Southern Downs) in the south (Sattler and Williams 1999). ATP 2059 and PL 445 are entirely within Taroom Downs. The northern quarter of PL 209, south to the Woleebee Creek and Conloi Creek floodplains, is also within Taroom Downs, with the remainder in Southern Downs. The Project Area and context is presented on Figure 1-1.

1.2 Purpose of Significant Impact Assessment

This EPBC Act Ecology SIA provides an assessment of the proposed activities within the Project Area against the EPBC Act SIG 1.1 to determine if there is a potential for a significant impact to listed species and communities.

This EPBC Act Ecology SIA is a standalone report and has been conducted to demonstrate whether the Project and the associated proposed activities are likely to lead to a significant impact to MNES listed species or communities.

While the current assessment focuses on Project-specific impacts to MNES, consideration has also been given to cumulative impacts of the Atlas Stage 3 Gas Project (the Project) and the ARC Pipeline (the subject of a separate referral under the EPBC Act).



Legend

- Project Area
- Field Development Area (referred to as Project area in the SIA)
- Highway
- Road
- Track/Path
- State Forest Resources
- Reserve

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Project Area		F1-1
Drawing No: 0639876_EAR_G001_R2.mxd	Ecological Assessment Report	
Date: 12/07/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> 0 1,000 2,000m </div>		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

1.3 Project Description

The Project (proposed action) will involve up to 151 gas wells and associated well site facilities; gas and water gathering systems for the producing wells; access tracks for operational purposes; brine and produced water storages; borrow pits; and ancillary supporting facilities.

The Project Area is based upon PL 445, the northern part of PL 209, ATP 2059 (PL(A) 1127) and parts of PL 1037 (including the part that is east of Woleebee Creek). Figure 1-2 shows the relative location of each tenement. The Project Area excludes the part of the Project Area where the yet unconfirmed site for a new up to 300 ML Atlas Stage 3 brine storage will be located west of Woleebee Creek within previously cleared parts of eastern PL 1037. This storage will be proximate to the existing water management facilities including the existing 100 ML of brine storage and planned additional ≤ 200 ML of brine storage for Atlas CSG Project which are not part of the Project (noting the Atlas CSG Project referral (EPBC 2018-8329) included allowance for up to 300 ML of brine storage). The proposed ≤ 300 ML Atlas Stage 3 brine storage is part of the Project, and it is accepted this storage will be located away from any significant environmental values. The new Atlas Stage 3 brine storage location in PL 1037 will be located within a cleared area that has been subject to earlier ecology assessments for Senex's existing Atlas CSG Project (EPBC 2018-8329) and final siting will be subject to Senex's Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] (as detailed in Section 1.4.6) to ensure impacts to significant environmental values are avoided.

An application to convert ATP 2059 to a PL under the Queensland Petroleum and Gas (Production and Safety) Act 2004 was lodged with the Queensland Government, PL(A) 1127, the term ATP 2059 in this report therefore includes any renewal, replacement, substitution, consolidation, subdivision, variation or extension of the ATP 2059 tenement. The EA for ATP 2059 currently permits standard exploration activities. When the PL(A)1127 over this area is granted, an EA will be issued for the production activities. This EA will be required prior to the commencement of production activities on the new PL(A)1127. PL 445 and PL 209 were purchased from Australia Pacific LNG Pty Limited (APLNG) in late 2021. The Environmental Authorities for these PLs were transferred to Senex in early 2022 as part of the purchase. Development of these PL areas by APLNG has received approval under the Commonwealth EPBC Act in 2011 as part of APLNG's approval over a larger area 'to develop, construct, operate and decommission the coal seam gas field component of the Australia Pacific LNG Project in the Walloons gas fields within the Surat Basin in south central Queensland' (EPBC 2009/4974). However, the EPBC Act does not provide for the partial transfer of a component of a larger project to a new proponent. As such, Senex has completed additional assessments and developed this SIA to support the EPBC Act and Queensland State approvals. It is noted that the scale of the project (e.g., density of wells) previously approved within PL 445 and the northern portion of PL 209 as part of APLNG's larger project remains the same or less intense. The gas resource in southern portion of PL 209 is deeper than in the north and within geological strata with greatly reduced permeability. The commercial viability of extracting gas from this area is uncertain and Senex currently has no plans to develop this area.

The gas field will be progressively developed over a period of approximately 5 – 10 years. The average maximum production rate of the Project is expected to be approximately 60 terajoules per day, although variable potential production rates may be higher at times. Field development is planned to move generally from the north towards the south over the life of the Project.

1.3.1 Production Wells

Wells will generally be spaced 500 – 750 m apart. The up to 151 planned wells will be designed, constructed, decommissioned, and rehabilitated in accordance with the Queensland Code of Practice for constructing and abandonment of petroleum wells and associated bores in Queensland (Department of Natural Resources, Mines and Energy (Version 2), 16 December 2019). The code outlines mandatory requirements and good practice to achieve long term well integrity and appropriately reduce the risk of environmental harm.

Well sites will generally be constructed in an area of approximately 80 m by 70 m allowing the initial drilling and completion of the well (installing surface facilities). The layout and size of well sites will vary depending on the size and type of drilling rig, the program for completion of the well and the surrounding environment. Typically, 0.6 ha is required although smaller areas may be utilised where topography and vegetation cover allow. In these cases, well sites may be up to approximately 1 ha to accommodate site constraints. Well pads are designed and located based on flood modelling to avoid areas of concentrated flow such as gullies and waterways. Some well pads may require cut batters and fill batters that will have a local and minor impact to runoff on sloping land.

Well construction will involve a drill rig and other equipment such as drill fluid pumps, storage and processing and storage for water supply, fuel, and chemicals. Following initial drilling and commissioning of the well, sites will be partially rehabilitated, leaving an area of approximately 60 m by 60 m allowing an adequate area for workover rig operations.

Options for the management of residual drilling material to be used for the Project include onsite and offsite options. Where onsite management options are proposed, this will be undertaken in accordance with state approvals which require for the assessment of quality, potential impacts, and implementation of management measures.

Following the well drilling phase, the wells will be completed, and a pump installed to dewater the production reservoir. Separate connections will be provided at the well head for the gas and water streams. It is expected that produced water will be pumped to the surface by a downhole progressive cavity pump and connected from the wellhead tubing.

The standard well site facility will be fenced and generally consist of:

- A wellhead gas and water metering package;
- Gas and water separation equipment;
- Initially, natural gas power generation package to provide power for the electric motor driving the downhole pump (noting that it is possible that in future years wells may be powered by alternative sources including solar, hybrid and distributed power);
- Fuel and instrument gas scrubber to power the generator and supply gas to instruments;
- Sand/particulate filter separator for water and gas streams (where necessary); and
- Surface pressure piping constructed of steel to the required specification and connection to gathering system.

It will generally take up to 6 months to dewater each production well sufficiently for gas to flow; approximately 18 months to reach peak production. Once depleted of gas, wells will be progressively decommissioned and rehabilitated throughout the Project life. Decommissioning of individual wells is not expected to occur until after the well has been producing for at least 15 years but could be much longer (anticipated to be decommissioned between 20 and 50 years). The targeted maximum production rate is estimated to be between 300 – 950 thousand standard cubic feet (Mscf) per well per day.

In total the disturbance footprint required during construction of the 151 wells will total up to approximately 100 ha and after construction will occupy up to approximately 60 ha. All the areas to be utilised have been previously cleared. At the completion of the project all well pads will be rehabilitated to the condition of the adjoining land. An example of the Project infrastructure is provided in Photograph 1.1 to Photograph 1.3.



Photograph 1-1: Right of way at pipe installation stage showing temporary disturbance



Photograph 1-2: Intersection of two right of ways post construction showing no impedance to dispersal



Photograph 1-3: Typical coal seam gas well infrastructure showing small footprint and no barrier to dispersal

1.3.2 Gathering System

Gas and water from the wellsite facilities will be transported via the gas and water gathering system. The buried gathering system will enable gas at low pressure and water to flow through separate buried High-Density Polyethylene (HDPE) pipelines, up to 800 mm outer diameter.

To install the gathering lines, 18 m wide right-of-way will require some vegetation to be removed, a trench to be excavated, pipeline laid, the trench backfilled, and right-of-way reinstated (a 24m wide right of way will be required during construction for approximately 15 km of major trunk lines). In accordance with the Environmental Authority (EA) the RoW will be reinstated and re-profiled to a level consistent with the surrounding soils, original contours and established drainage lines so as not to impede surface water flows. Where possible, right-of-way will be aligned with existing roads/tracks, fence or power lines or other linear infrastructure to minimise disturbance to native vegetation and overall impact on land users. In general, the right-of-way will be rehabilitated except for a 6 m wide earthen access track which will be maintained along the RoW for ongoing operations access.

The gas gathering system will typically operate at 70 – 400 kilopascal gauge (kPag) (with a Maximum Allowable Operating Pressure of 615 kPag). The water gathering system will typically operate at 140 – 700 kPag (with a maximum operating pressure of approximately 1350 kPag).

Water will be transported to water processing facilities and gas to gas processing facilities through the gathering system.

The Project will avoid impacting riparian vegetation through the design of the Project and will be applying the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001]. The Project includes the following construction methodology for crossings of watercourses:

- Horizontal Directional Drill (HDD) gathering system crossings of Woleebee Creek within PL 1037 to avoid impacts to the watercourse,

- Several HDD are being considered for gathering system crossings of Woleebee Creek and other drainage features in PL 209, and
- Several HDD are being considered for gathering system crossings of Woleebee Creek, Wandoan Creek and other drainage features in ATP 2059.

HDD may be used to avoid impacts to watercourses and adjacent MNES habitat however there are a range of issues that limit its use more widely including the nature of the subsurface soil and bedrock materials at a proposed crossing and the ecological values potentially impacted adjacent to the riparian crossing. The potential issues will be assessed on a site-by-site basis during the Project operations. In any case, Senex have committed to avoidance of all TECs and MNES habitat (with the exception of Koala and Southern Squatter Pigeon dispersal habitat which is all in previously cleared areas).

In total the disturbance footprint required during construction of the gas and water gathering system (including temporary additional construction areas for drainage feature crossings, road crossings, inter-property tie-ins, HDD crossings) will total up to approximately 264 ha and after post-construction rehabilitation will occupy up to approximately 80 ha. Almost all the areas used have been previously cleared. At the completion of the Project, any areas not required to remain as access tracks for the use of the landholder will be rehabilitated to the condition of the adjoining land.

1.3.3 Water Management

Groundwater will be abstracted (pumped) from CSG production wells to depressurise the target production of coal seams. It is expected that the action may generate produced water up to a maximum rate of 6.5 ML per day.

The water management process for the produced water is expected to involve:

- New pre-engineered above ground tanks and/or purpose-built earthen dams with impervious liners and leakage detection/collection systems, which may be established on PL 209. However, to minimise impacts and improve operational efficiency, some of the water will be transferred to centrally located aggregation and brine storages that are already established for the Atlas CSG Project (EPBC 2018/8329) (these facilities are not part of the Project).
- The existing Water Treatment Facility (WTF) on PL 1037 established for the Atlas CSG Project (EPBC 2018/8329) (the WTF is not part of the Project) will treat water from the Project. Subject to water production rates and other field development characteristics, an additional WTF may also be constructed on PL 209. This additional WTF is part of the Project. If an additional WTF is required, it will be sited using Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] to ensure that there will be no significant impact to any listed MNES threatened species or TEC. As part of the WTF site selection risk assessment process potential impacts to MNES surface water values will be evaluated.
- Brine from the water treatment process will be stored in a new brine storage dam (up to 300 ML) which will be developed on PL 1037 and is part of the Project. Additional brine storage (up to 300 ML) may also be required on PL 209 if a WTF is established there. Further brine treatment options including concentration via solar evaporation may be used and result in a concentrated slurry or solid salt product.

In total, approximately 30 ha of brine storage and approximately 30ha of water storage will be established on previously cleared land for the Project.

The brine and water storage will be located in areas that avoid floodplains, shallow groundwater systems and other environmentally sensitive locations. Site preparation will involve removal of topsoil, excavation and compaction of subsoil and placement of impermeable/low permeability layers with leak detection/collection systems. All storages infrastructures which is considered regulated structures under the EA for the Project will be required to meet the Manual for assessing consequence categories and hydraulic performance of structures (DES 2016). An application for one or more

regulated structures must, where the location of the regulated structure is known, include a copy of the most recent consequence assessment undertaken for that regulated structure as per the Guideline for Structures which are dams or levees constructed as part of environmentally relevant activities (DES 2022).

For a dam to be considered a regulated dam, it must be determined to be in the 'significant' or 'high' consequence category, and a detailed dam design report must be submitted to Queensland Department of Environment, Science and Industry (DESI) following granting of the EA or as part of an EA Application. The following will apply with respect to any regulated dams required for the Project:

- Senex will design and construct dams in accordance with relevant legislation and Queensland standards and DESI guidelines;
- An independent third-party will be engaged to certify dams to ensure design, construction and hydraulic performance meet the design plan;
- Dams will be constructed under the supervision of a suitably qualified and experienced person and in accordance with the relevant DESI schedule of conditions relating to dam design, construction, inspection, and mandatory reporting requirements; and
- Senex will implement a seepage monitoring program for water storage dams, where required. The seepage monitoring program will identify infrastructure and procedures that are in place to detect loss of containment as early as possible.

Any low-hazard dams required for CSG water storage will be designed in accordance with accepted engineering standards. The dams will be designed with a floor and sides comprising material capable of containing the water for the life of the project.

1.3.4 Temporary Accommodation Facilities

It is expected that several temporary accommodation facilities will be required for construction and drilling activities. These facilities would be assembled onsite using prefabricated modular units with basic amenities such as modular sewage treatment plants and water tanks. It is expected that the temporary accommodation facilities would occupy up to approximately 20 ha of previously cleared land.

1.3.5 Other Ancillary Facilities and Incidental Petroleum Activities

It is expected that the following additional facilities and activities will be required to support construction and operations:

- Laydown, stockpile and site office areas (up to approximately 45 ha of previously cleared land);
- Borrow pits (up to approximately 11 ha of previously cleared land);
- Power/communication lines (overhead or underground);
- Plant and equipment service and maintenance facilities and workshops;
- Construction support, warehousing and administration buildings;
- Fuel and chemical storage;
- Washdown facilities;
- Ancillary infrastructure such as communications infrastructure, water supply and holding tanks and dams and energy supply;
- Groundwater monitoring bores installed to ensure the early detection of potential groundwater impacts in the alluvium and underlying geological formations resulting from CSG production;
- Environmental monitoring equipment and management controls; and
- Ecological, topographic, cadastral, geological, geophysical, and geotechnical surveys.

1.3.6 Pre-construction/Pre-clearing Activities

Senex have developed the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] to guide site selection to ensure impacts upon environmental values are avoided and minimised.

The Protocol includes the following steps:

- Desktop environmental constraints analysis;
- Site surveys including environmental and cultural heritage clearance surveys – findings are documented within a standardised Biodiversity Values Report;
- Post-survey environmental constraints analysis (which includes location refinements to further avoid and minimise impacts to field validated values, identification of no-access areas, identify site specific mitigation measures and controls); and
- Environmental constraints reporting (confirming siting complies with relevant approvals including disturbance limits and secondary approvals, quantifying any unavoidable impacts and identifying required mitigation measures).

1.3.7 Clearing and Civil Works

Most of the Project Area has been subject to extensive disturbance with approximately 90.5% being cleared of remnant native vegetation. Of the maximum ground disturbance area of up to 530 ha (4.3%) for the entire action, Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land).

Before the drill rig is mobilised to site, the drill site and access tracks are prepared through:

- Avoidance of timbered areas in nearly all cases. However, where individual trees/woody vegetation is present and unavoidable, it will be cleared within the well lease and access tracks and stored at the edge of disturbed areas for later use in rehabilitation. Recoverable timber hollows, larger rocks and other features will be stored for later microhabitat rehabilitation. Grasses and other ground covers will then be graded from the well pad footprint; and
- Topsoil removal using earthmoving equipment. This is stockpiled to one side of the lease and/or access track for later use in rehabilitation. Final earthmoving equipment preparations, such as site levelling are then completed.

Other civil works will be required for other infrastructure such as brine storage, water storage, temporary accommodation facilities, laydown areas, stockpile and site office areas, and other infrastructure.

All clearing and civils work will be undertaken in accordance with following management plans:

- Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001];
- Atlas Stage 3 Gas Project Significant Species Management Plan;
- Implementing the Senex Queensland Fauna and Stock Management Procedure [SENEX-CORP-EN-PRC-021];
- Weed and pest management measures through the implementation of the Senex Biosecurity Management Plan Queensland Operations [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023];
- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLAS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];

- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-014]; and
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017].

1.4 Ongoing Maintenance/Operations

The gas field will be progressively developed over a period of between approximately 5 – 10 years. Once all wells are producing, activities will transition to maintenance and operation of the existing infrastructure. This will include visual inspection and maintenance of well, gathering and water infrastructure equipment. All wells will also be monitored remotely with field staff responding through well visits as changes to normal operations are detected.

The well bore itself will generally be serviced by a workover rig approximately every three years, although some wells are expected to require more frequent servicing depending on performance.

The gathering system and access tracks will also be regularly monitored by field staff as they undertake well inspections and maintenance works (e.g., re-grading). In the unlikely event maintenance of gathering systems (in the form of pipeline maintenance) is required, ground disturbance and partial trenching will be experienced.

Rehabilitated areas will also be regularly monitored and maintained in accordance with the Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018] and the requirements of the EA.

All maintenance and operational work will be undertaken in accordance with following management plans:

- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- Atlas Stage 3 Gas Project Significant Species Management Plan;
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-014]; and
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017].

1.4.1 Decommissioning and Remediation

A maximum ground disturbance area of up to 530 ha (4.3%) for the Project is expected. Rehabilitation of some initial construction disturbances will commence early in the action and continue progressively so that a much smaller proportion will be occupied at any point in time. In almost all cases, surface infrastructure and temporary construction footprints will be located in previously cleared and disturbed areas.

Once operations have ceased, infrastructure will be decommissioned unless retention and transfer of ownership of assets is agreed with the landholder. Disturbed areas will be rehabilitated in accordance with the Project Atlas and the Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018] and the requirements of the *Environmental Protection Act 1994* (QLD). Rehabilitation will be undertaken progressively as disturbed land is no longer required for operational purposes in accordance with the relevant Environmental Authorities. This will include reprofiling disturbed land to original contours, re-establishment of surface drainage lines, re-establishment of ground cover vegetation and ensuring the rehabilitated land is safe and stable. Where the landholder and regulatory authority agree in writing, infrastructure such as access tracks and dams may be retained onsite for ongoing landholder use.

2. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE RELEVANT TO THE PROJECT AREA

The MNES within the Project Area are summarised in Table 2-1, with detailed descriptions provided in the following Sections.

Following ground-truthing of vegetation mapping during field surveys, the presence of two TECs have been confirmed within the Project Area.

Based on the outcomes of the targeted field surveys, five listed threatened fauna, Koala, Greater Glider, South-eastern Glossy Black-cockatoo, Dulacca Woodland Snail and White-throated Needletail, and one flora species, Ooline, have been identified as known or likely to occur within the Project Area (Table 2-2).

The Project Area occurs within the distribution for the Greater Glider (southern and central) (*Petauroides volans*). It is noted in the Conservation Advice, that it is likely that two separate taxa exist, to the level of subspecies in this area. However, it is noted that until such ambiguity is resolved, the listed entity will be referred to as *Petauroides volans* (DCCEEW, 2022a). For the sake of this analysis, this species will be referred to herein as the Greater Glider.

An additional 16 listed threatened species (two flora and 14 fauna) and six migratory species were determined to potentially occur given the overlap of distribution with the Project Area. For these species, potential future presence cannot be ruled out, although no records occur within the Project Area or in the locality and no observations were made during the field surveys.

The full likelihood of occurrence for every species identified in the PMST search for the Project Area is attached in Appendix A.

The following Sections detail the confirmed TECs and listed threatened and/or migratory species known and likely to occur in the Project Area, and potential habitat for species with potential to occur. The occurrence of these TECs and species habitats have been mapped and presented.

Table 2-1: MNES within the Project Area

Matter	Relevance to the Project Area
World heritage properties	There are no world heritage properties within the Project Area.
National heritage properties	There are no national heritage properties within the Project Area.
Wetlands of international importance	There are no wetlands of international importance associated with the Project Area.
Threatened species and ecological communities	<p>There are six EPBC Act listed threatened species (one flora and five fauna) that are known or likely to occur within the Project Area:</p> <ul style="list-style-type: none"> ■ Dulacca Woodland Snail (<i>Adclarkia dulacca</i>) (likely to occur) – Endangered; ■ Glossy Black-cockatoo (south-eastern subspecies) (<i>Calyptorhynchus lathami lathami</i>) (likely to occur) – Vulnerable; ■ Greater Glider (central and southern) (<i>Petauroides volans</i>) (known to occur)– Endangered; ■ Koala (<i>Phascolarctos cinereus</i>) (likely to occur) – Endangered; ■ Ooline (<i>Cadellia pentastylis</i>) (known to occur) – Vulnerable; ■ White-throated Needletail (<i>Hirundapus caudacutus</i>) (known to occur) – Vulnerable. <p>There are an additional 16 listed threatened species with potential to occur within the Project Area (Section 2.3.1.2 and 2.5.6).</p>

Matter	Relevance to the Project Area
	Two TECs that have been confirmed as known within the Project Area: <ul style="list-style-type: none"> ■ Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant); and ■ Poplar Box grassy woodland on alluvial plains.
Migratory species	There are two EPBC Act listed migratory species that are regarded as known or likely to occur within the Project Area: <ul style="list-style-type: none"> ■ White-throated Needletail (<i>Hirundapus caudacutus</i>) (known to occur); and ■ Fork-tailed Swift (<i>Apus pacificus</i>) (likely to occur). There are six listed migratory species with potential to occur within the Project Area (Section 2.7.1).
Commonwealth marine area	There are no Commonwealth marine areas within the Project Area.
The Great Barrier Reef Marine Park	The Great Barrier Reef is not associated with the Project Area
Nuclear actions	N/A to this Project.
Water resources	Considered as part of assessments by others.

Table 2-2: Summary of Habitat for Listed Threatened Species Known or Likely to Occur within the Project Area

MNES	Total Habitat in Project Area	Vegetation/Habitat Group/s
EPBC Act Listed Species (threatened and/or migratory)		
Dulacca Woodland Snail	<ul style="list-style-type: none"> ■ 666.3 ha. ■ Likely to occur from historical record in the Project Area. No observations in field surveys. 	<ul style="list-style-type: none"> ■ Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). ■ Eucalypt dominated woodlands mainly with <i>Eucalyptus crebra</i> and <i>E. populnea</i>.
Glossy Black-cockatoo	<ul style="list-style-type: none"> ■ 1,003 ha. ■ Likely to occur from historical record in the Project Area. No observations in field surveys. 	<ul style="list-style-type: none"> ■ Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>) ■ Callitris and Eucalypt dominated woodlands. ■ Eucalypt dominated woodlands mainly of <i>Eucalyptus crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>. ■ Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>. ■ Eucalypt open forest dominated by <i>E. populnea</i>.
Greater Glider (central and southern)	<ul style="list-style-type: none"> ■ 528 ha. ■ Known to occur from field survey observations. 	<ul style="list-style-type: none"> ■ Callitris and Eucalypt dominated woodlands.


MNES	Total Habitat in Project Area	Vegetation/Habitat Group/s
		<ul style="list-style-type: none"> ■ Eucalypt dominated woodlands mainly of <i>Eucalyptus crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>. ■ Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>. ■ Eucalypt open forest dominated by <i>E. populnea</i>.
Koala	<ul style="list-style-type: none"> ■ 698.5 ha foraging and breeding habitat and 9,072.6 ha dispersal habitat. ■ Likely to occur from historical records and scratches/scats observed during field surveys. 	<p>Foraging and breeding habitat:</p> <ul style="list-style-type: none"> ■ Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). ■ Callitris and Eucalypt dominated woodlands. ■ Eucalypt dominated woodlands mainly of <i>Eucalyptus crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>. ■ Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>. <p>Dispersal habitat:</p> <ul style="list-style-type: none"> ■ Cleared exotic pasture used for grazing. ■ Irrigated pastures and cropping. ■ Acacia regrowth. ■ Eucalypt regrowth. ■ Mixed acacia and eucalypt regrowth.
Ooline	<ul style="list-style-type: none"> ■ 118.7 ha habitat. ■ Known to occur from field survey observations. 	<p>Ooline habitat:</p> <ul style="list-style-type: none"> ■ Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). ■ Eucalypt dominated woodlands mainly of <i>Eucalyptus crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>. ■ Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>. ■ Eucalypt open forest dominated by <i>E. populnea</i>. <p>Area of potential occurrence:</p> <ul style="list-style-type: none"> ■ Cleared exotic pasture used for grazing.
White-throated Needletail	<ul style="list-style-type: none"> ■ 0 ha mapped as a likely flyover visitor only. ■ Known to occur from field survey observations. 	<ul style="list-style-type: none"> ■ No habitat mapped, flyover visitor only.


2.1 Terrestrial Ecology and Habitat Values


The Project Area has been classified into five broad habitat types, defined based on vegetation community type, structure, and is based on ground-truthed mapping using the RE verification method. These habitat types have then been considered as respective foraging, breeding, roosting, denning, dispersal, and movement functions for listed threatened and/or migratory species that are known, likely or have the potential to occur within the Project Area. This ground-truthed habitat mapping has been informed by these five habitat types, and subsequently used to identify areas of habitat for listed threatened species. It is noted that some species will have certain species-specific habitat requirements within each habitat type, for example some reptiles might have microhabitat requirements within Eucalypt woodlands that restrict them to certain portions of that habitat type. This was also further verified through ground-truthing during the field surveys.


The habitats in the Project Area are mostly in moderate to low condition, with signs of degradation and fragmentation due to cattle grazing, erosion, and the presence of introduced flora species. A summary of these habitat types, along with their vegetation community classifications and attributes, are provided in Table 2-3. The Project Area also includes low ecological value land within the Project Area. This has been identified and described in Table 2-3 and presented in Figure 2-1


Table 2-3: Terrestrial Broad Habitat Types and Vegetation Communities in the Project Area

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>)</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following REs:</p> <ul style="list-style-type: none"> ■ 11.3.1 - <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest, with or without scattered emergent <i>Eucalyptus</i> spp. ■ 11.9.5 - <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on fine-grained sedimentary rocks; and ■ 11.9.5a - <i>Acacia harpophylla</i> predominates and forms a fairly continuous canopy (10-18m high). Other tree species such as <i>Eucalyptus populnea</i>, <i>Casuarina cristata</i>, <i>Cadellia pentastylis</i> and <i>Brachychiton</i> spp. <p>The Project Area contains 209.5 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Belson's Panic ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Grey Snake ■ Koala ■ Northern Quoll ■ Ooline ■ Oriental Cuckoo ■ Painted Honeyeater ■ South-eastern Glossy-black Cockatoo ■ Southern Squatter Pigeon (dispersal habitat only when within 100 m of mapped breeding and foraging habitat) ■ Southern Whiteface ■ White-throated Needletail (aerial only) ■ Yakka Skink

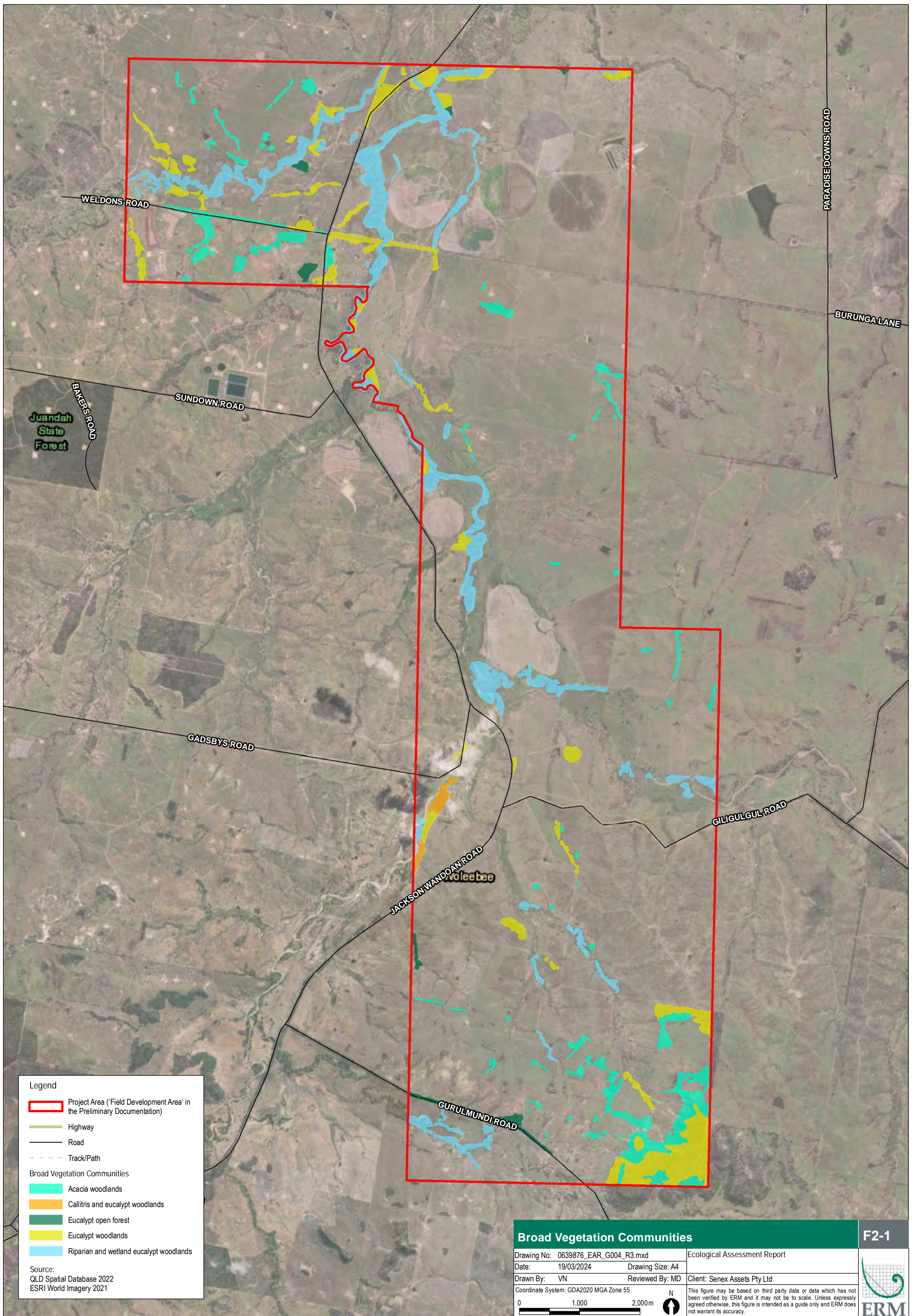
Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>Callitris and Eucalypt dominated woodlands</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following RE:</p> <ul style="list-style-type: none"> 11.3.19 - <i>Callitris glaucophylla</i>, <i>Corymbia spp.</i> and/or <i>Eucalyptus melanophloia</i> woodland on Cainozoic alluvial plains. <p>The Project Area contains 14.2 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Brown Treecreeper ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Koala ■ Northern Quoll ■ Oriental Cuckoo ■ South-eastern Glossy-black Cockatoo ■ Southern Squatter Pigeon ■ Southern Whiteface ■ White-throated Needle-tail (aerial only) ■ Yakka Skink

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>Eucalypt dominated woodlands mainly of <i>Eucalyptus crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i></p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following REs:</p> <ul style="list-style-type: none"> ■ 11.3.2 - <i>Eucalyptus populnea</i> woodland on alluvial plains; ■ 11.3.4 - <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains; ■ 11.3.17 - <i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains; ■ 11.3.39 - <i>Eucalyptus melanophloia</i> and/or <i>E. chloroclada</i> woodland to open woodland. ■ 11.10.7 - <i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rock; ■ 11.5.1 - <i>Eucalyptus crebra</i> and/or <i>E. populnea</i>, <i>Callitris glaucophylla</i>, <i>Angophora leiocarpa</i>, <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces; ■ 11.5.5 - <i>Eucalyptus melanophloia</i>, <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains and/or remnant surfaces. Deep red sands; ■ 11.9.2 - <i>Eucalyptus melanophloia</i> +/- <i>E. orgadophila</i> woodland to open woodland on fine-grained sedimentary rocks; ■ 11.9.7 - <i>Eucalyptus populnea</i>, <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks; ■ 11.10.7 - <i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks; and ■ 11.10.11 - <i>Eucalyptus populnea</i>, <i>E. melanophloia</i> +/- <i>Callitris glaucophylla</i> woodland on coarse-grained sedimentary rocks. 		<ul style="list-style-type: none"> ■ Belson's Panic ■ Brown Treecreeper ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Grey Snake ■ Koala ■ Northern Quoll ■ Ooline ■ Oriental Cuckoo ■ Painted Honeyeater ■ Slender Tylophora ■ South-eastern Glossy-black Cockatoo ■ Southern Squatter Pigeon ■ Southern Whiteface ■ White-throated Needletail (aerial only) ■ Yakka Skink

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>The Project Area contains 292.6 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Yellow-bellied Glider (south-eastern)
<p>Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>.</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following REs:</p> <ul style="list-style-type: none"> ■ 11.3.25 - <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines; and ■ 11.3.27f - Freshwater wetlands with <i>Eucalyptus coolabah</i> and/or <i>E. tereticornis</i> open woodland to woodland fringing swamps. <p>The Project Area contains 364.0 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Australian Painted Snipe ■ Brown Treecreeper ■ Collared Delma ■ Common Sandpiper ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Grey Snake ■ Five-clawed worm-skink ■ Koala ■ Latham's Snipe ■ Northern Quoll ■ Ooline ■ Oriental Cuckoo ■ South-eastern Glossy-black Cockatoo ■ Rufous Fantail ■ Satin Flycatcher ■ Sharp-tailed Sandpiper ■ Southern Squatter Pigeon

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
		<ul style="list-style-type: none"> ■ Southern Whiteface ■ White-throated Needletail (aerial only) ■ Yellow-bellied Glider (south-eastern)
<p>Eucalypt open forest dominated by <i>E. populnea</i></p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following RE:</p> <ul style="list-style-type: none"> ■ 11.9.10 - <i>Eucalyptus populnea</i> open forest with a secondary tree layer of <i>Acacia harpophylla</i> and sometimes <i>Casuarina cristata</i> on fine-grained sedimentary rocks. <p>The Project Area contains 29.5 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Belson's Panic ■ Brown Treecreeper ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Koala ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Grey Snake ■ Northern Quoll ■ Ooline ■ Oriental Cuckoo ■ Painted Honeyeater ■ South-eastern Glossy-black Cockatoo ■ Southern Squatter Pigeon ■ Southern Whiteface

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
		<ul style="list-style-type: none">■ White-throated Needletail (aerial only)■ Yakka Skink



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Highway
- Road
- Track/Path

Broad Vegetation Communities

- Acacia woodlands
- Callitris and eucalypt woodlands
- Eucalypt open forest
- Eucalypt woodlands
- Riparian and wetland eucalypt woodlands

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Broad Vegetation Communities		F2-1
Drawing No: 0639876_EAR_G004_R3.mxd	Ecological Assessment Report	
Date: 19/03/2024	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 5px;"> </div> </div>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.	

The Project Area also includes areas of non-native and regrowth vegetation that could not be assigned a native vegetation community or broad habitat type due to an absence of required floristic composition or structural elements to be defined as such. These areas contain low habitat values, providing habitat to some of the MNES species that are considered known, likely or with the potential to occur in the Project Area. Due to the low ecological values in these areas, only some MNES species are potentially present in these areas. These areas of regrowth and non-native vegetation communities have been identified and described in Table 2-4 and presented in Figure 2-2.

Table 2-4: Low Ecological Value Land within the Project Area

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>Cleared exotic pasture used for grazing</p> <p>This broad habitat type is the predominate type found throughout the Project Area. The dominant introduced grasses are notably Buffel Grass (<i>Cenchrus ciliaris</i>) and Sabi Grass (<i>Urochloa mossambicus</i>). The Project Area contains 7,924.0 ha of this low ecological value land type.</p> <p>Cleared exotic pasture is unlikely to provide suitable foraging, breeding or refuge resources for MNES species with the exception of occasional and isolated Ooline trees, Fork-tailed Swift (aerial only) and White-throated Needletail (aerial only). These areas of cleared pasture have potential to be used occasionally by Koalas as they move across the ground, however the value of these cleared areas for dispersing animals is reduced due to the lack of suitable shelter trees used as refuge by dispersing individuals.</p> <p>Cleared exotic pastures are unlikely to provide adequate habitat for MNES species to occur, due to the dominance of exotic pasture grasses, driving species out of the area. MNES are unlikely to occur where exotic flora is abundant.</p> <p>Cleared exotic pastures are unlikely to provide adequate habitat for threatened snails (e.g., Dulacca Woodland Snail) as these species require both an overstorey of trees and shrubs and on-ground timber cover for survival and egg-laying, as well as to maintain high levels of relative humidity at the substrate level. Cleared exotic pastures used for grazing are unlikely to provide an adequate overstorey of trees and shrubs required for the species survival.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ Ooline ■ Koala (dispersal habitat only) ■ White-throated Needletail (aerial only)
<p>Irrigated pastures and cropping.</p> <p>This broad habitat type features all irrigated pastures and cropping that are primarily used for agricultural purposes. The Project Area contains 554.4 ha of this low ecological value land type.</p> <p>These pastures are predominantly located in the north-eastern portion of the Project Area, as well as one defined area in the centre of the Project Area. These areas are subject to continued modification and management for agricultural purposes, including planting with pasture grasses and crops that are irrigated. This includes areas that are currently irrigated with centre-pivots and areas of cropping land that area actively managed for crop production.</p> <p>Irrigated pastures and cropping areas are unlikely to provide suitable foraging, breeding or refuge resources for MNES species due to land disturbance and habitat clearing for grazing and agriculture. Disturbance by grazing and livestock are unlikely to allow MNES fauna to occupy the area. Additionally, cleared pastures for irrigation and cropping do not contain suitable habitat trees, shrub layers, adequate ground cover with native flora, or microhabitat to enable foraging, breeding or</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat only)

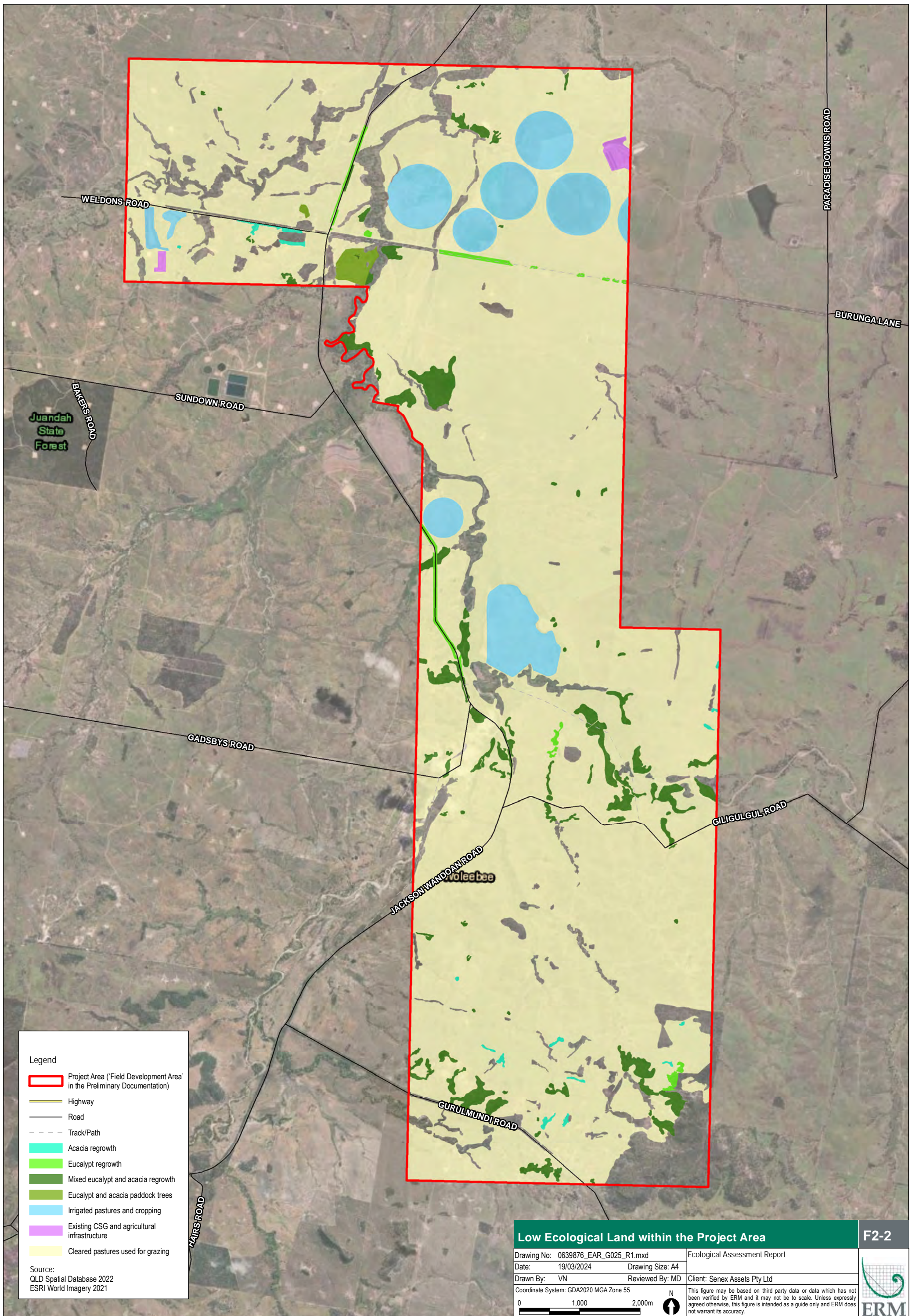
Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>refuge habitats. Despite this, Fork-tailed Swift and White-throated Needletail have the potential to fly over cleared pastures, however it is unlikely these species will land and use these pastures for foraging or roosting as they are both aerial foraging species who may occasionally fly over the Project Area.</p> <p>The value of these areas for dispersing Koalas is recognised, however they are limited due to the absence of any trees that could be used as shelter by Koalas when they move across the ground. Some of the larger centre-pivot irrigated areas are 1 km across, so there is a potential that a Koala could cross these areas during dispersal.</p>	
<p>Acacia regrowth</p> <p>The Project Area contains 14.5 ha of this low ecological value land type.</p> <p>Sapling or young juvenile Acacia regrowth vegetation that does not provide refuge, breeding or forage resource for threatened species and this therefore not considered to be habitat critical to the survival of any MNES species, or constitute any MNES TEC. An immature tree is any native woody vegetation (other than a mature tree or habitat tree) that generally 2-4 m in height.</p> <p>Immature trees do not contain hollows used for refuge or breeding for MNES species. Hollows occur in old growth trees (typically 100 years or more of growth), therefore, immature trees do not contain the valuable hollows for MNES species such as Greater Glider and Corben’s long-eared bat that have a reliance on hollows for breeding and daytime roosts. Additionally, to be considered suitable habitat for hollow-breeding birds and arboreal mammals, an abundance of hollow-bearing trees are required per hectare, and as hollows do not form in immature trees, it is highly unlikely this habitat type sustains breeding, foraging or refuge habitat for arboreal mammals.</p> <p>Immature Acacia regrowth does not contain sufficient canopy cover, shrub layer or ground cover suitable as habitat for MNES species. Acacia regrowth is unlikely to provide foraging habitat for Greater Glider (southern and central) and Koala, as both species have a strong preference for Eucalypt species.</p> <p>When within 100 m of Southern Squatter Pigeon breeding and foraging habitat, patches of this Acacia regrowth area provides dispersal habitat; however, none of the current areas of Acacia regrowth are currently within 100 m of the Southern Squatter Pigeon breeding and foraging habitat.</p> <p>The Acacia regrowth provides habitat for the Glossy black-cockatoo as the species exclusively feeds on sheoak seeds (<i>Allocasuarina</i> spp. and <i>Casuarina</i> spp.). Although these areas are dominated by Acacia regrowth, these areas still have the potential to contain foraging trees, and as such, there may be marginal foraging habitat for Glossy black-cockatoo within Acacia regrowth.</p> <p>The Acacia regrowth provides potential habitat for the Diamond firetail as the species forages on grass seeds, leaves and insects within areas of high grass cover. The species is known to forage on both native and exotic grass species. The grass layer of this habitat types is dominated by exotic grasses, and as such, the species may utilise this area for foraging.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat) ■ Glossy Black-cockatoo ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Grey Snake ■ Southern Squatter Pigeon (dispersal habitat only when within 100 m of mapped breeding and foraging habitat)

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>The Acacia regrowth may also provide habitat for the Dulacca woodland snail. This species can inhabit Acacia regrowth where abundant leaf litter, logs, woody debris, and other suitable microhabitat are present.</p> <p>Acacia regrowth may provide habitat for the Grey Snake. The mapped Acacia regrowth is slightly intersected by or borders small gullies (albeit few and not in all Acacia regrowth areas) which may provide suitable habitat for the Grey Snake where regrowth is near small gullies and floodplains are present. There is potential for cracking clay soils which may provide suitable habitat for the Grey Snake.</p> <p>Areas of Acacia regrowth have an absence of eucalypt trees that provide foraging and breeding habitat for Koala. This habitat type has the potential to provide dispersal opportunities for Koala, given the species can move along the ground. The value of these areas of immature Acacia regrowth in the Project Area are limited, however, given the young age and low height of the shrubs and trees in these areas providing limited to no opportunities for shelter and roost trees used by dispersing animals.</p>	
<p>Eucalypt regrowth</p> <p>The Project Area contains 35.6 ha of this low ecological value land type.</p> <p>Sapling or young juvenile Eucalypt regrowth vegetation that does not provide refuge, breeding or forage resource for threatened species and this therefore not considered to be habitat critical to the survival of any MNES species, or constitute any MNES TEC. An immature tree is any native woody vegetation (other than a mature tree or habitat tree) that is two meters or more in height.</p> <p>Immature trees do not contain hollows used for refuge or breeding for MNES species. Hollows occur in old growth trees (typically 100 years or more of growth), therefore, immature trees do not contain the valuable hollows for MNES species such as Greater Glider and Corben’s long-eared bat. Additionally, to be considered suitable habitat for hollow-breeding birds and arboreal mammals, an abundance of hollow-bearing trees are required per hectare, and as hollows do not form in immature trees, it is highly unlikely this habitat type sustains breeding, foraging or refuge habitat for arboreal mammals.</p> <p>Eucalypt regrowth provides habitat Glossy black-cockatoo as the species feeds exclusively on sheoak seeds (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>). Given these areas are dominated by <i>Eucalyptus spp.</i>, there is still a chance of <i>Allocasuarina spp.</i> and <i>Casuarina spp.</i> presence within this habitat type, and as such, Eucalypt regrowth may provide marginal foraging habitat for the species.</p> <p>The Eucalypt regrowth provides potential habitat for the Diamond firetail as the species forages on grass seeds, leaves and insects within areas of high grass cover. The species is known to forage on both native and exotic grass species. The grass layer of this habitat types is dominated by exotic grasses, and as such, the species may utilise this area for foraging.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat) ■ Glossy Black-cockatoo (foraging habitat) ■ Diamond Firetail (foraging habitat) ■ Dulacca Woodland Snail ■ Grey Snake ■ Southern Squatter Pigeon (dispersal habitat only when within 100m of mapped breeding and foraging habitat)

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>Eucalypt regrowth may also provide habitat for the Dulacca woodland snail. This species can inhabit ironbark (<i>Eucalyptus spp.</i>) and gum-topped box (<i>Eucalyptus woollsiana</i>) regrowth where abundant leaf litter, logs, woody debris, and other suitable microhabitat are present. As a conservative approach, Acacia woodland is mapped as Dulacca woodland snail habitat as the presence/absence of microhabitat (leaf litter and woody debris) is not confirmed.</p> <p>Eucalypt regrowth may provide habitat for the grey snake. The mapped Eucalypt regrowth is slightly intersected by or borders small gullies (albeit few and not in all Acacia regrowth areas) which may provide suitable habitat for the species where regrowth is near small gullies and floodplains are present.</p> <p>When within 100 m of Southern Squatter Pigeon breeding and foraging habitat, patches of Eucalypt regrowth area provides dispersal habitat.</p> <p>Immature Eucalypt regrowth does not contain sufficient canopy cover, shrub layer or ground cover suitable as habitat for MNES species. Furthermore, reptiles are unlikely to utilise immature regrowth vegetation as these species require dense ground vegetation, large hollow logs and fallen trees for refuge.</p> <p>These areas of young eucalypt regrowth do not form an intact vegetation community that can be defined as an open forest or woodland, which is used by Koalas as foraging and breeding habitats. The eucalypt trees in these areas are young and provide limited value for koala foraging. They also provide limited shelter and roosting opportunities for dispersing individuals due to the generally low tree heights.</p>	
<p>Mixed acacia and eucalypt regrowth</p> <p>The Project Area contains 280.1 ha of this low ecological value land type.</p> <p>A combination of immature Acacia regrowth and immature Eucalypt regrowth as described above. These areas also lack the size class structure and age to be classified as open forest or woodland communities, or occur in very narrow linear strips of regrowth and disturbed vegetation in road corridors or easements. Where this vegetation type occurs in roadside vegetation, they are in narrow strips ranging from 15-30m in width, and are subject to edge effects associated with altered light, nutrient and grazing regimes, limiting the development of these strips into an intact and structurally complex habitat type.</p> <p>As these areas have been subject to historical and current disturbance from clearing for roads or agricultural land uses, they lack the large, mature eucalypt trees that form hollows to support those MNES species that require these features for breeding and roosting such as greater glider and Corben’s long-eared bat. Habitat complexity in the shrub and ground layers are also very low, with minimal shelter, foraging and breeding opportunities for woodland birds and reptiles. In some locations the ground layer contains no coarse woody debris and is subject to disturbance from exotic grass cover and cattle grazing.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat) ■ Glossy Black-cockatoo (foraging habitat) ■ Diamond Firetail (foraging habitat) ■ Dulacca Woodland Snail ■ Grey Snake ■ Southern Squatter Pigeon (dispersal habitat only when within 100m of

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>There is some value in areas of mixed acacia and eucalypt regrowth for dispersing koalas, with shelter opportunities provided for individuals as they disperse across the landscape.</p> <p>Mixed acacia and eucalypt regrowth provides habitat for Glossy black-cockatoo as the species exclusively feeds on sheoak seeds (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>). Given these areas are dominated by regrowth <i>Acacia spp.</i> and <i>Eucalyptus spp.</i>, there is still a chance of <i>Allocasuarina spp.</i> and <i>Casuarina spp.</i> presence within this habitat type, and as such, mixed regrowth may provide marginal foraging habitat for the species.</p> <p>The Acacia regrowth provides potential habitat for the Diamond firetail as the species forages on grass seeds, leaves and insects within areas of high grass cover. The species is known to forage on both native and exotic grass species. The grass layer of this habitat types is dominated by exotic grasses, and as such, the species may utilise this area for foraging.</p> <p>Mixed acacia and eucalypt regrowth may provide habitat for the Dulacca woodland snail. The species can inhabit Brigalow regrowth where abundant leaf litter, logs, woody debris, and other suitable microhabitat are present. As a conservative approach, mixed regrowth is mapped as Dulacca woodland snail habitat as the presence/absence of microhabitat (leaf litter and woody debris) is not confirmed.</p> <p>Mixed Acacia and Eucalypt regrowth does not contain suitable ephemeral wetland environments for the grey snake, however Brigalow regrowth within the Project Area does occur on floodplains. Acacia and Eucalypt regrowth is intersected by, and/or borders small gullies (albeit few and not in all Acacia and Eucalypt regrowth areas) which may provide suitable habitat for the species where regrowth is near small gullies and floodplains are present. There is potential for cracking clay soils which may provide suitable habitat for the grey snake.</p> <p>When within 100 m of Southern Squatter Pigeon breeding and foraging habitat, patches of this mixed Acacia and Eucalypt regrowth area provides dispersal habitat.</p>	<p>mapped breeding and foraging habitat)</p>
<p>Eucalypt and acacia paddock trees</p> <p>The Project Area contains 30.9 ha of this low ecological value land type.</p> <p>These areas are defined by areas of isolated, scattered and small groups of paddock trees, with a combination of mature eucalypts and <i>Acacia harpophylla</i> (Brigalow) trees with separation between each tree (or small group of 2-3 trees) ranging from 40-90 m. The shrub layer is completely absent and managed in these areas through continued grazing and agricultural practices and the ground layer is composed of exotic pasture grasses.</p> <p>The ability for species that rely on hollows, such as Greater Glider and Corben's long-eared bat, to utilise these areas is restricted due to the separation distance between adjacent remnant habits and the paddock trees being larger than the glide</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat) ■ Glossy Black-cockatoo (foraging habitat) ■ Diamond Firetail (roosting habitat) ■ Dulacca Woodland Snail ■ Grey Snake

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>distance for this species. Habitat values for birds, including hollow-dependent species is also limited due to the lack of foraging habitat and complexity in the shrub and ground layers providing suitable resources for feeding and shelter. Coarse woody debris, large logs and rocks are also absent from these areas, providing no habitat for listed threatened reptiles.</p> <p>Additionally, it is unlikely that eucalypt and acacia paddock trees to provide habitat for Squatter pigeon, given the disconnected nature of the vegetation along with distance to waterbodies.</p> <p>Koalas may traverse this habitat type, during dispersal across the ground, with paddocks trees potentially providing shelter or daytime roosts. These areas have been classified as dispersal habitat for Koalas, however as the isolated paddock trees do not constitute a eucalypt open forest or woodland they do not provide the foraging and breeding resources for this species.</p> <p>Eucalypt and Acacia paddock trees provides habitat for the Glossy black-cockatoo as the species exclusively feeds on sheoak seeds (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>). Whilst this habitat type is dominated by <i>Eucalyptus spp.</i> and <i>Acacia spp.</i> paddock trees, the presence of <i>Allocasuarina spp.</i> and <i>Casuarina spp.</i> cannot be ruled out. Therefore, Eucalypt and Acacia paddock trees may provide potential foraging habitat for Glossy black-cockatoo.</p> <p>Eucalypt and acacia paddock trees potentially provides roosting habitat in the form of nests in trees for the Diamond firetail.</p> <p>Eucalypt and acacia paddock trees may provide habitat for the Dulacca woodland snail. This species can inhabit cleared paddocks where suitable logs, woody debris or other suitable microhabitat features remain. As microhabitat presence/absence within this habitat type cannot be confirmed, paddock trees are mapped as Dulacca woodland snail habitat as a conservative approach.</p> <p>Eucalypt and acacia paddock trees may provide habitat for the grey snake where habitat borders a small gully.</p> <p>When within 100 m of Southern Squatter Pigeon breeding and foraging habitat, patches of this Eucalypt and Acacia paddock trees provides dispersal habitat.</p>	<ul style="list-style-type: none"> ■ Southern Squatter Pigeon (dispersal habitat only when within 100m of mapped breeding and foraging habitat)
<p>Existing CSG and Agricultural Infrastructure</p> <p>The Project Area contains 22.8 ha of this low ecological value land type.</p> <p>This includes existing CSG and agricultural infrastructure. These areas are not considered as likely to contain threatened species as they are existing infrastructure areas with no natural features.</p>	<p>Nil</p>



Legend

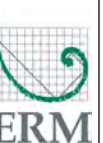
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Highway
- Road
- Track/Path
- Acacia regrowth
- Eucalypt regrowth
- Mixed eucalypt and acacia regrowth
- Eucalypt and acacia paddock trees
- Irrigated pastures and cropping
- Existing CSG and agricultural infrastructure
- Cleared pastures used for grazing

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Low Ecological Land within the Project Area

F2-2

Drawing No: 0639876_EAR_G025_R1.mxd	Ecological Assessment Report	
Date: 19/03/2024	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		



2.2 Threatened Ecological Communities

The desktop review identified the potential occurrence of five TECs listed under the EPBC Act in the Project Area, including:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) - Endangered;
- Coolibah – Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions - Endangered;
- Poplar box grassy woodland on alluvial plains - Endangered;
- Semi-evergreen vine thickets (SEVT) of the Brigalow Belt (North and South) and Nandewar Bioregions - Endangered; and
- Weeping Myall woodlands - Endangered.

Following ground-truthing of vegetation mapping during field surveys, the presence of two TECs within the Project Area has been confirmed, being Brigalow TEC and Poplar Box TEC. The remaining three TECs are not present within the Project Area.

The extent of Brigalow TEC and Poplar Box TEC is considerably smaller than the total mapped extent of the component RE. This is because smaller areas of retained REs 11.3.1, 11.9.5 and 11.9.5a (Brigalow TEC) and RE 11.3.2 (Poplar Box TEC) did not meet TEC size and/or condition criteria (patch size too small, ground stratum was dominated by exotic weeds and/or patch was not dominated by relevant tree species).

A brief description of the confirmed TECs are listed in Table 2-5, together with the constituent REs which are further described and defined in Section 2.2. The following Sections provide further supporting information for each confirmed TEC.

Table 2-5: Description and Ground-truthed Extent of TEC within the Project Area

TEC Description	EPBC Act Status	RE Codes	Ground-truthed Extent (ha)	Number of Patches (Size Range [ha])	Comment
Brigalow (<i>Acacia harpophylla</i> dominant and codominant)	Endangered	11.9.5, 11.9.5a	95.8 ha	17 (0.14 - 44.93 ha)	14 patches and a total of 56.2 ha (RE 11.3.1, 11.9.5 and 11.9.5a) did not meet TEC condition criteria ¹ .
Poplar Box grassy woodland on alluvial plains ²	Endangered	11.3.2	32.3 ha	10 (0.03 - 9.58 ha)	14 patches (RE 11.3.2) did not meet TEC condition criteria ² .

TEC condition criteria and thresholds found in ¹ DoE (2013); and ² DoEE (2019).

2.2.1 Brigalow TEC

The Brigalow TEC was listed as Endangered under the EPBC Act on 4 April 2001 (Threatened Species Scientific Committee [TSSC], 2001a). This community occurs within Queensland and New South Wales and is characterised by *Acacia harpophylla* being either dominant in the tree layer, or co-dominant with other species – notably *Casuarina cristata*, other species of *Acacia*, or species of *Eucalyptus* (Butler, 2007). In QLD, Brigalow TEC comprises of 16 REs (DoE, 2013).

Within the Project Area, 17 patches of Brigalow TEC were detected in REs 11.9.5 and 11.9.5a, covering a total area of 95.8 ha. This included 13 ha of regrowth and 82.8 ha of remnant vegetation. An example of a remnant patch of Brigalow TEC within the Project Area is shown in Photograph 2-1. An additional 14 patches of Brigalow vegetation (RE 11.3.1, 11.9.5 and 11.9.5a; totalling 56.2 ha) did not meet the criteria for recognition as a TEC as:

- *A. harpophylla* was absent or subdominant; and/or
- The was patch less than 0.5 ha in size (including areas that extended beyond the Project Area boundary); and/or
- Exotic perennial plants comprised over 50% of total vegetation cover within the patch.

TEC mapping is presented on Figure 2-3.

2.2.2 Poplar Box Grassy Woodland TEC

Poplar Box Grassy Woodland on Alluvial Plains TEC was listed as Endangered under the EPBC Act on 4 July 2019 (DoEE, 2019). This community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* and understorey mostly of grasses and other herbs, mostly occurring in gently undulating to flat landscapes and occasionally on gentle slopes on a wide range of soil types of alluvial and depositional origin (Webb et al. 1980). In QLD, Poplar Box TEC comprises of five REs (11.3.2, 11.3.17, 11.4.7, 11.4.12 and 12.3.10) (DEE, 2019).

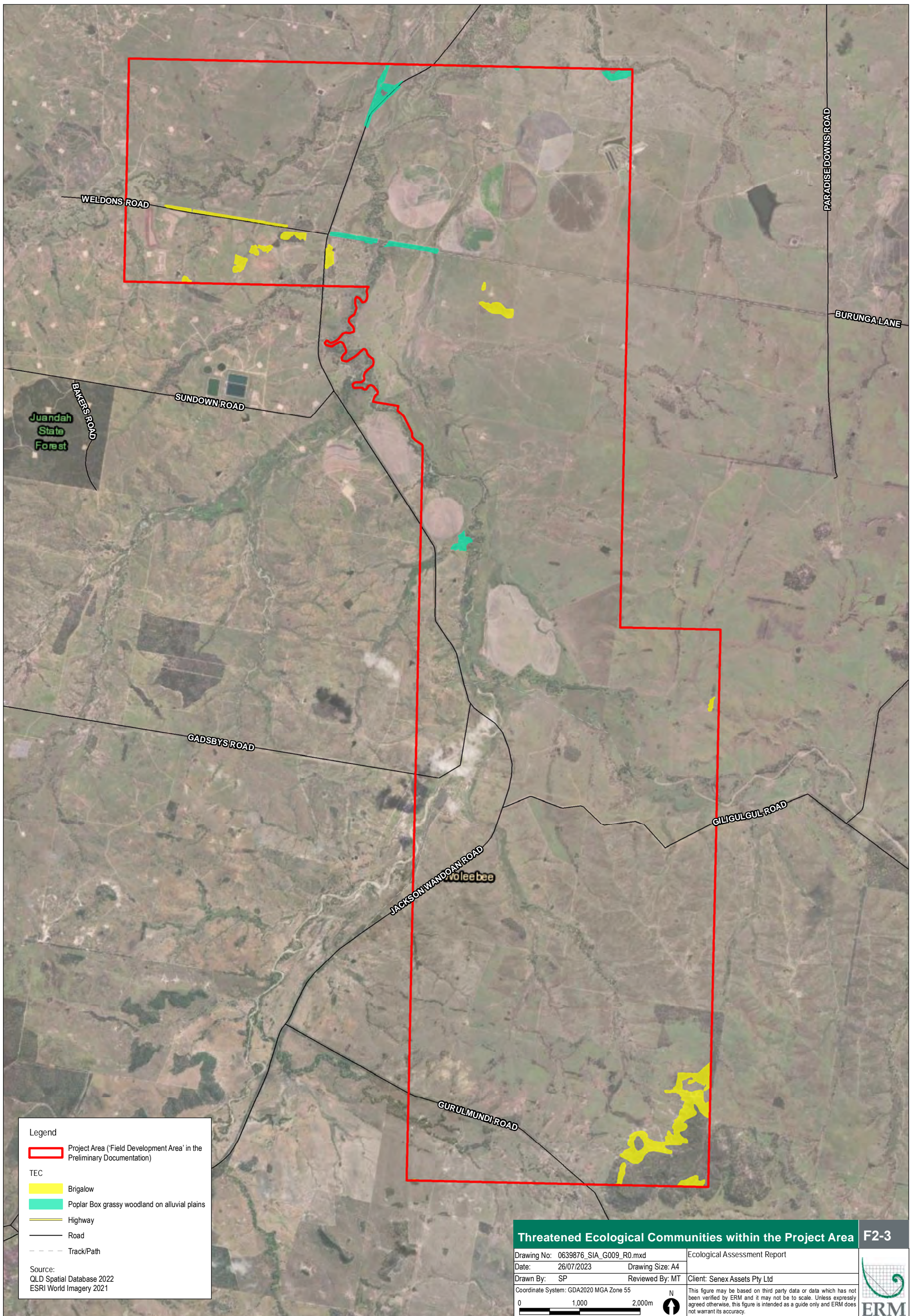
Within the Project Area, ten patches of Poplar Box TEC were detected in RE 11.3.2, covering a total area of 32.3 ha, with an example of this community shown in Photograph 2-2. Three of these patches were assessed as Category B (Good Quality) vegetation and seven patches were assessed as Category C (Moderate Quality) vegetation, all occurring on floodplains in the north, with some patches extending beyond the Project Area boundaries. An additional 15 patches of regrowth and remnant Poplar Box woodland on alluvial plains (RE 11.3.2) was assessed and did not meet the criteria for recognition as TEC (smaller than 5 ha (including any portions that extended beyond the Project Area boundary) and/or the ground stratum was dominated by exotic weeds) Appendix B). TEC mapping is presented on Figure 2-3.



Photograph 2-1: Example Brigalow TEC within Project Area



Photograph 2-2: Example Poplar Box Woodland TEC within Project Area



Legend
 Project Area ('Field Development Area' in the Preliminary Documentation)

- TEC
- Brigalow
 - Poplar Box grassy woodland on alluvial plains
 - Highway
 - Road
 - Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Threatened Ecological Communities within the Project Area		F2-3
Drawing No: 0639876_SIA_G009_R0.mxd	Ecological Assessment Report	
Date: 26/07/2023	Drawing Size: A4	
Drawn By: SP	Reviewed By: MT	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; gap: 10px;"> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="width: 100px; border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="width: 100px; border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="width: 100px; border-bottom: 1px solid black;"></div> </div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">0</div> <div style="margin-bottom: 5px;">1,000</div> <div style="margin-bottom: 5px;">2,000m</div> </div> <div style="text-align: center;"> <div style="display: flex; align-items: center; gap: 5px;"> N <div style="width: 10px; height: 10px; border: 1px solid black; border-radius: 50%; display: flex; align-items: center; justify-content: center;"> ↑ </div> </div> </div> </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>	

2.3 Terrestrial Listed Threatened Flora Species

There were 10 threatened flora species identified by desktop searches as having the potential to occur within 10 km of the Project Area. The field surveys recorded 124 flora species, including one EPBC Act listed threatened terrestrial flora species, Ooline (*Cadellia pentastylis*), within the Project Area. Further information on Ooline and its associated habitat within the Project Area is provided in Section 2.3.1.1 and mapped in Figure 2-4.

Based on the likelihood of occurrence assessment using desktop and field data, no additional species were considered known or likely to occur within the Project Area. Two species were considered to have the potential to occur within the Project Area. Further information on these potentially occurring species can be found in Section 2.3.1.2 and mapped in Figure 2-5.

2.3.1.1 Ooline

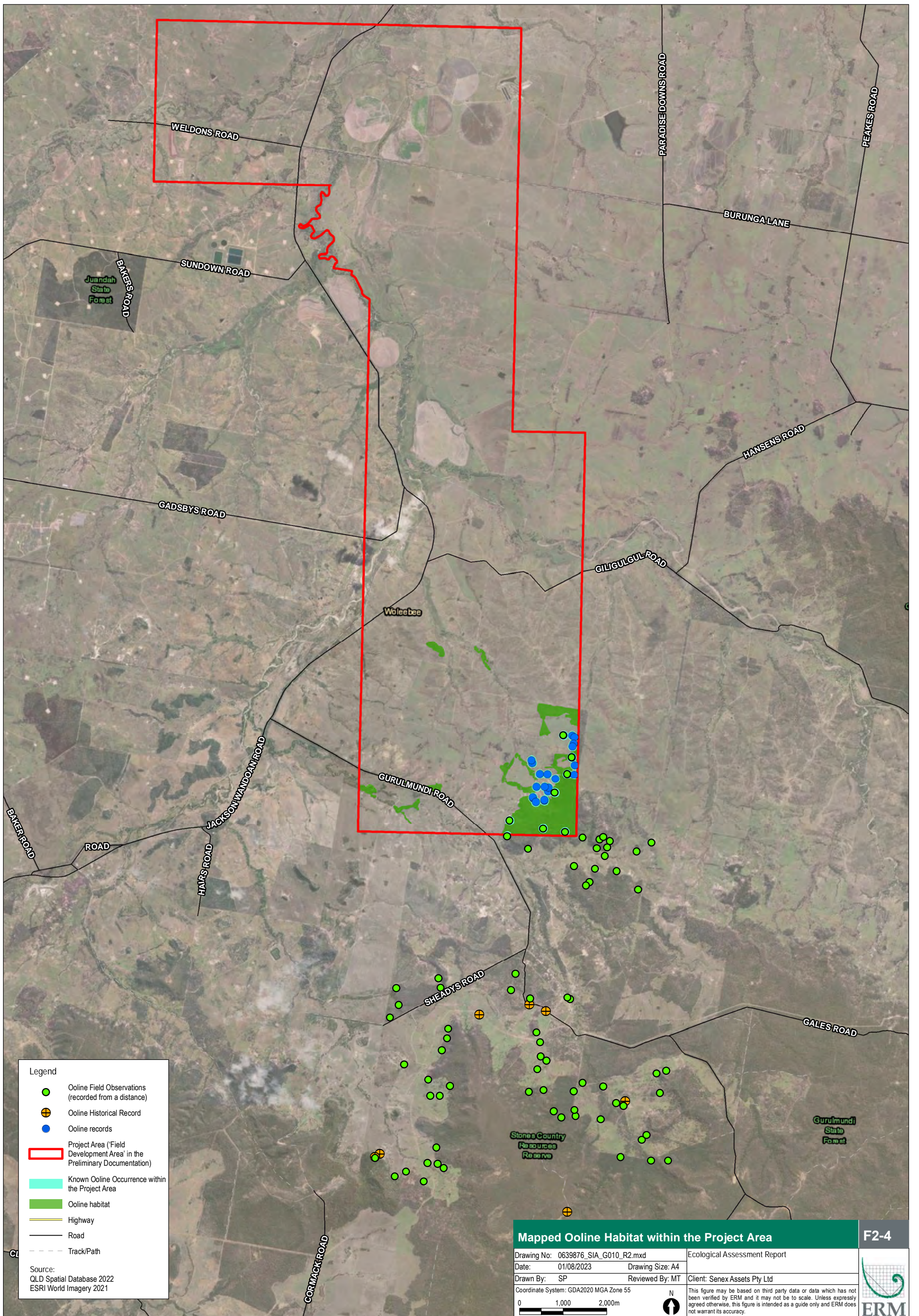
Ooline is listed as Vulnerable under the EPBC Act and is known to occur in the Project Area from field survey observations (Appendix A). This species grows on undulating plains, valley slopes, hillsides and scarps, often in association with Brigalow and SEVT communities (DEWHA, 2008a).

Ooline has a total of 118.7 ha of mapped habitat within the Project Area. During field surveys, Ooline was observed abundantly in the far south-eastern part of the Project Area in Brigalow woodland. In addition, the desktop searches showed four additional records within the Project Area and another six within the 10 km buffer (Appendix A). An example stand of this species is shown on Photograph 2-3 and habitat mapped on Figure 2-4.

Ooline habitat consists of relatively narrow remnant and regrowth patches in the far south of the Project Area. It is inclusive of all broad habitat types excluding those Eucalypt and Callitris woodlands and Acacia woodlands dominated by Brigalow (*Acacia harpophylla*). Areas of potential occurrence for Ooline has also been mapped as some portions of cleared areas.



Photograph 2-3: Example Stand of Ooline in Areas of Exotic Pasture



Legend

- Ooline Field Observations (recorded from a distance)
- ⊕ Ooline Historical Record
- Ooline records
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Known Ooline Occurrence within the Project Area
- Ooline habitat
- Highway
- Road
- Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Mapped Ooline Habitat within the Project Area		F2-4
Drawing No: 0639876_SIA_G010_R2.mxd	Ecological Assessment Report	
Date: 01/08/2023	Drawing Size: A4	
Drawn By: SP	Reviewed By: MT	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> 0 1,000 2,000m </div>	N 	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>

2.3.1.2 Listed Threatened Terrestrial Flora Species with Potential to Occur

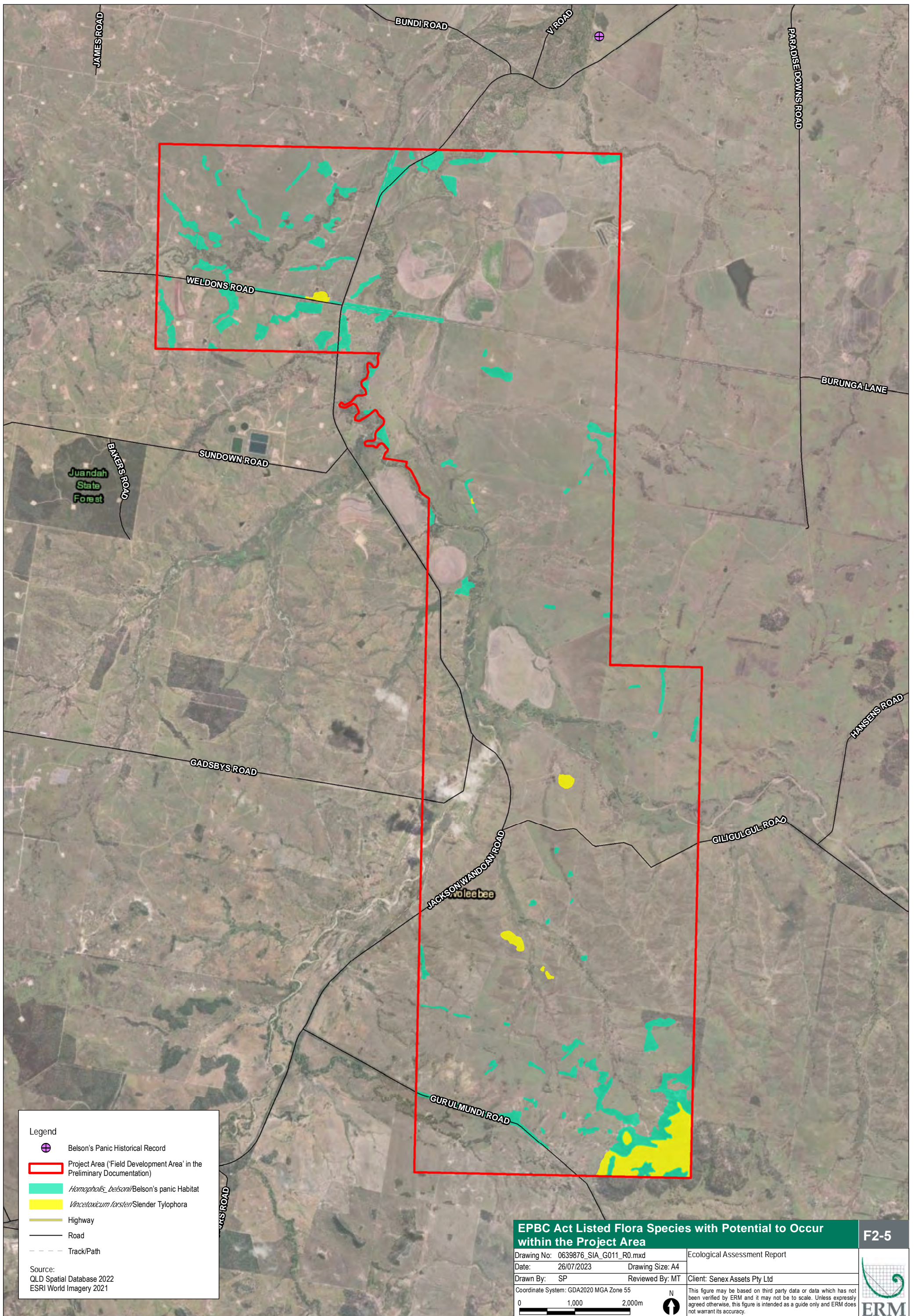
Two listed threatened terrestrial flora species, Belson's Panic (*Homopholis belsonii*) and Slender Tylophora (*Vincetoxicum forsteri*), have been assessed as having the potential to occur within the Project Area (Appendix A). In essence, because part of this species' distributions overlaps the Project Area and suitable habitat is present within the Project Area, their presence cannot be ruled out. This is despite no signs or observations of these species within the Project Area during field surveys using survey techniques aligned with the relevant survey guidelines.

Belson's Panic and Slender Tylophora are listed as Vulnerable and Endangered under the EPBC Act, respectively.

Within the Project Area, potential mapped habitat for Belson's Panic totals 366.3 ha and includes:

- Eucalypt dominated woodlands mainly of *Eucalyptus crebra*, *E. populnea* and *E. melanophloia*; and
- Acacia woodlands dominated by Brigalow (*Acacia harpophylla*).

Potential Slender Tylophora (*Tylophora linearis*) mapped habitat within the Project Area totals 122.7 ha and includes Eucalypt dominated woodlands mainly of *E. crebra*, and *E. melanophloia*. In accordance with the precautionary principle, 'potential habitat' for Belson's Panic and Slender Tylophora has been mapped (Figure 2-5).



Legend

- Belson's Panic Historical Record
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Homopholis belsoni*/Belson's panic Habitat
- Vincetoxicum forsteri*/Slender Tylophora
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

EPBC Act Listed Flora Species with Potential to Occur within the Project Area		F2-5
Drawing No: 0639876_SIA_G011_R0.mxd		Ecological Assessment Report
Date: 26/07/2023	Drawing Size: A4	
Drawn By: SP	Reviewed By: MT	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
0 1,000 2,000m		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

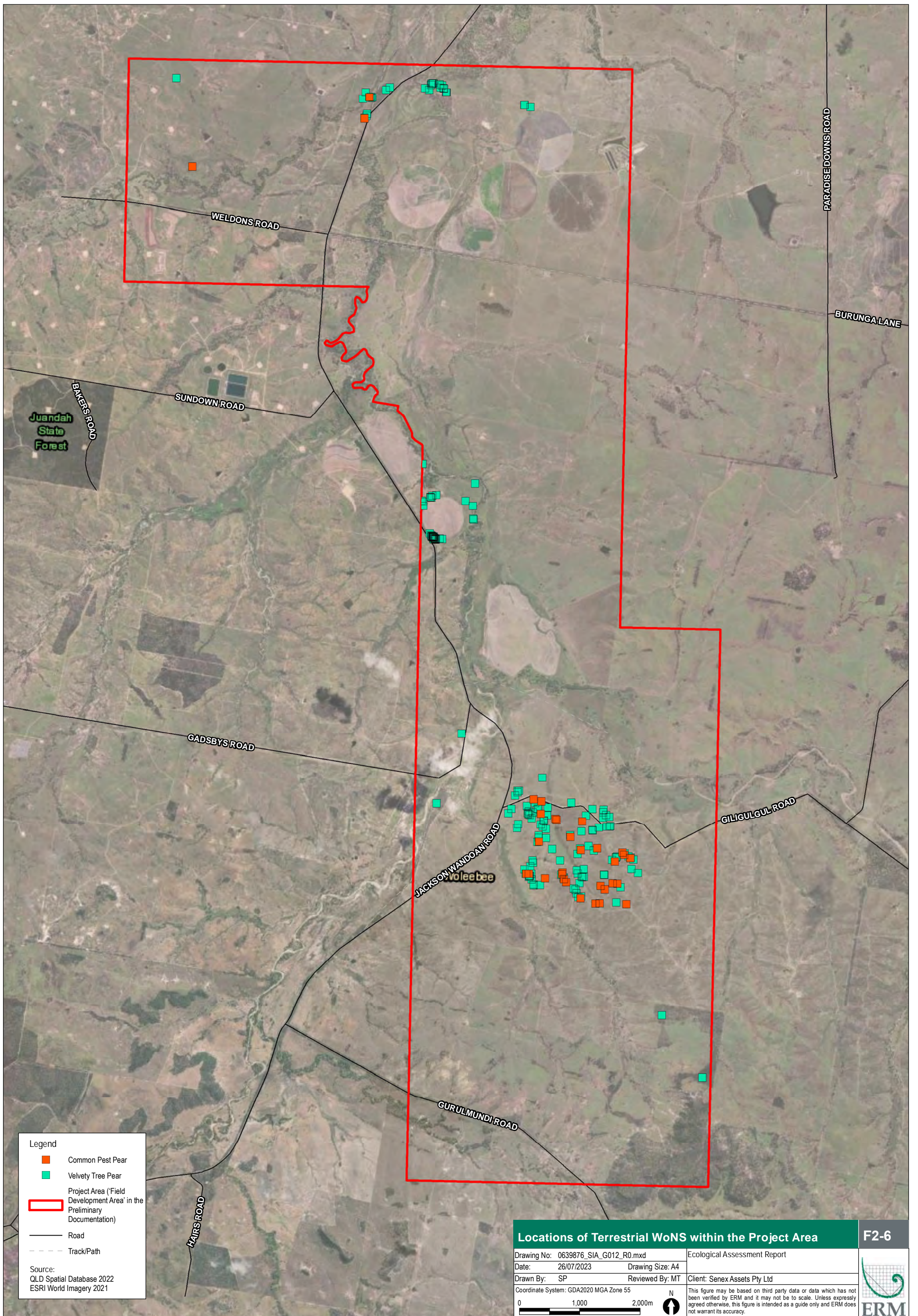
2.3.1.3 Weeds of National Significance

Desktop searches of the Queensland Government WildNet database (DES, 2022a) found five species of WoNS recorded within 10 km of the Project Area (the 'adjoining areas'). These species and WoNS detected during field surveys are given in Table 2-6. Locations of WoNS detected within the Project Area are shown in Figure 2-6.

Table 2-6: Terrestrial Weeds of National Significance Relevant to the Project Area.

Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments*
<i>Parthenium hysterophorus</i>	Parthenium Weed	WoNS, Cat. 3 Restricted Matter	■ Potentially occurring within the Project Area. Previously recorded within the locality.
<i>Senecio madagascariensis</i>	Fireweed	WoNS, Cat. 3 Restricted Matter	■ Potentially occurring within the Project Area. Previously recorded within the adjoining areas (DES, 2022a).
<i>Anredera cordifolia</i>	Madeira Vine	WoNS, Cat. 3 Restricted Matter	■ Potentially occurring within the Project Area. Previously recorded within the adjoining areas (DES, 2022a).
<i>Opuntia aurantiaca</i>	Tiger Pear	WoNS, Cat. 3 Restricted Matter	■ Detected during field surveys at moderate densities in Brigalow woodland. The closest records in ALA (2022) are over 45 km away, around Yuleba North, Barakula and Taroom. No previous records in WildNet from the Project Area (DES, 2022a).
<i>Opuntia stricta</i>	Common Pest Pear	WoNS, Cat. 3 Restricted Matter	■ Previously recorded within the adjoining areas (DES, 2022a). Detected in field surveys throughout the Project Area at low densities.
<i>Opuntia tomentosa</i>	Velvety Tree Pear	WoNS, Cat. 3 Restricted Matter	■ Previously recorded within the adjoining areas (DES, 2022a). Detected in field surveys throughout the Project Area at low densities.

*Information sourced from BOOBOOK (2022) Appendix B



Legend

- Common Pest Pear
- Velvety Tree Pear
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Road
- - - Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Locations of Terrestrial WoNS within the Project Area		F2-6
Drawing No: 0639876_SIA_G012_R0.mxd	Ecological Assessment Report	
Date: 26/07/2023	Drawing Size: A4	
Drawn By: SP	Reviewed By: MT	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

2.4 Aquatic Listed Threatened Flora Species

A total of four floating attached macrophyte species and 15 emergent macrophyte species were recorded across all sites. No listed aquatic flora species were recorded during field surveys or considered likely to occur in the Project Area. See likelihood of occurrence (Appendix A).

2.5 Terrestrial Listed Threatened Fauna Species

There were 28 threatened fauna species, 11 migratory species and 16 marine species threatened flora species identified by desktop searches as having the potential to occur within 10 km of the Project Area. a full likelihood of occurrence is shown in Appendix A.

Of these, five EPBC Act listed threatened species (Koala, Greater Glider, Glossy Black-cockatoo, Dulacca Woodland Snail and White-throated Needletail) are considered known or likely to occur within the Project Area. A summary of listed threatened species that are known or likely to occur and their associated habitat within the Project Area is provided in Section 2.5.1 to 2.5.5.

2.5.1 Koala

The Koala is currently listed as Endangered under the EPBC Act, as of the 12th of February 2022. The Koala is generally found in temperate to tropical forests as well as woodlands and semi-arid communities dominated by eucalyptus species (Martin and Handasyde, 1999). The species can be found in habitat broadly defined as woodlands and open forests, as long as food trees are present (DoE, 2022). The Koala has one of the broadest distributions of threatened terrestrial species under the EPBC Act with a range extending from north-eastern Queensland to the south-east corner of Southern Australia. The biological species distribution is widespread in coastal and inland areas that extends over approximately one million square kilometres (Martin & Handasyde, 1999).

Under the revised *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022c), released on 12th February 2022, habitat for the koala is described as:

Koala habitat includes both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.

Habitat critical to the survival of the species is defined as those that the species relies on to avoid or halt decline and promote the recovery of the species. Under the EPBC Act, the following factors are considered when identifying habitat that is critical to the survival of the species:

- (a) *Whether the habitat is used during periods of stress (examples: flood, drought or fire);*
- (b) *whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);*
- (c) *the extent to which the habitat is used by important populations;*
- (d) *whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;*
- (e) *whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;*
- (f) *whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation;*

(g) *any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.*

In Queensland, Koalas are widespread, however, they can occur in patchy and low-distribution populations. Across Queensland, Koalas typically inhabit moist coastal forests, subhumid woodlands and eucalypt woodlands located adjacent to a permanent water source (DAWE, 2022c). Additionally, Koalas are known to occur within urban and rural landscapes, utilising regrowth and remnant eucalypt dominated vegetation communities for foraging and breeding resources.

Targeted searches for the species were conducted in suitable habitat throughout the Project Area in 2022. Despite field surveys specifically targeting Koalas through faecal pellet searches and spotlighting, no direct sightings were recorded. However, indirect potential evidence of Koala occurrence within the Project Area was recorded through signs of scratch marks on riparian Queensland Blue Gum trees in several locations along Wandoan Creek, Woleebee Creek and a tributary of Hellhole Creek. Whilst potentially being caused by Koala, there is always some uncertainty that they were actually caused by Koala when relying on scratch marks as a method of species observation.

No faecal pellets were observed during targeted surveys, with active searches completed for pellets at each habitat assessment points. Additionally, a review of the historical species records presented sparse records from 1980s and 1990s only located within 12 km of the Project Area. There is no evidence of recent, direct Koala sightings in the Project Area or surrounds (10 km buffer) within the last 25 years. Using this information, it is concluded that there is a general absence of Koalas in the Project Area, and it is considered that Koala occurrence in the Project Area is very rare.

Due to the indirect method of recording observations of Koala in the form of scratch marks in the Project Area (Photograph 3-4) that could potentially be caused by Koala, it has been conservatively concluded that habitat critical to the survival of the species does occur within the Project Area, with Koala habitat classified as either **foraging and breeding habitat** or **dispersal habitat**. Habitat has been classified and mapped based on recent habitat guidance for the species (Youngentob, et al, 2022). Within the Project Area, foraging and breeding habitat has been mapped in areas of remnant and regrowth open eucalypt forests and woodland that are dominated by eucalypt food trees or contain occasional eucalyptus (e.g., *E. tereticornis*, *E. populnea*, *E. crebra*, *E. longirostrata*, *E. melanophloia*, *E. exserta* and *Corymbia citriodora* subsp. *variegata*). Within the Project Area, the following areas of field verified regrowth and remnant vegetation have been classified and mapped as Koala foraging and breeding habitat:

- Callitris and Eucalypt dominated woodlands;
- Eucalypt dominated woodlands;
- Riparian and wetland Eucalypt woodlands;
- Eucalypt open forest; and
- Regrowth eucalypt woodland.

Dispersal habitat for Koalas encompasses the broader landscape of the Project Area that does not contain eucalypt woodlands or open forests. Within the Project Area, Koala dispersal habitat is comprised of generally cleared exotic grasslands and Acacia woodlands dominated by Brigalow (*Acacia harpophylla*), with some isolated or scattered trees. The Project Area comprises of 698.5 ha of koala foraging and breeding habitat, and 9,072.6 ha of dispersal habitat. This habitat mapping method and the corresponding three potential habitat types of foraging and breeding, dispersal, and non-koala habitat, as well as the hectares for each, are provided in Table 2-7.

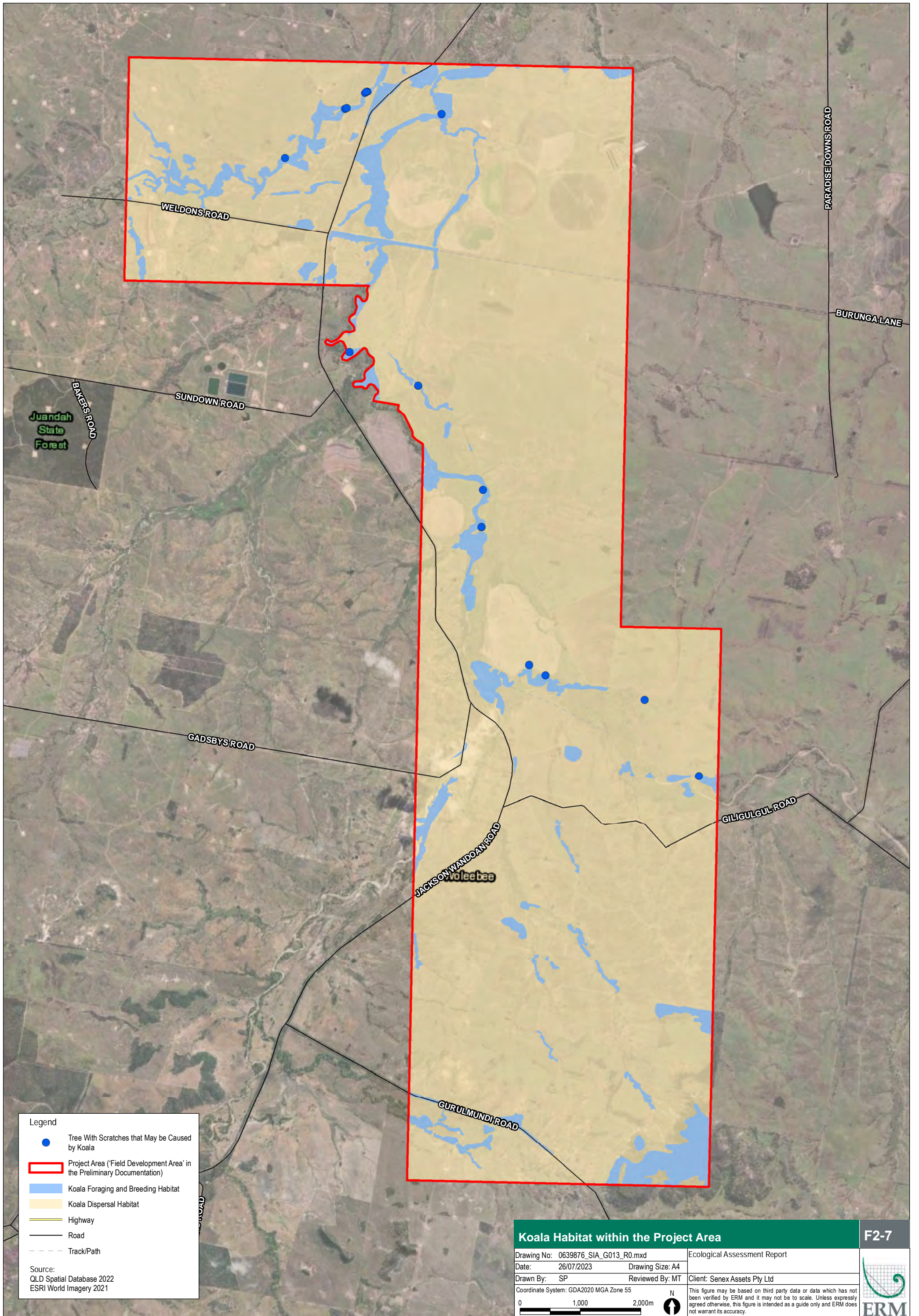


Photograph 2-4: Characteristic Koala Scratch Marks on a Queensland Blue Gum Tree

Table 2-7: Koala Habitat Types within the Project Area

	Potential Foraging and Breeding Habitat	Potential Dispersal Habitat	Potential Non-koala Habitat
Description	<ul style="list-style-type: none"> ■ Any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. ■ This includes remnant and regrowth vegetation. 	<ul style="list-style-type: none"> ■ Part of the broader landscape that includes grass/bare ground, rural land-uses, dwellings/towns, buildings, farm dams, sealed or unsealed roads and existing rail infrastructure. ■ Contains isolated or scattered foraging or shelter trees. ■ Contains vegetation generally not used frequently for foraging and breeding purposes by the species. 	<ul style="list-style-type: none"> ■ Not suitable habitat includes barriers defined in the DCCEE Guidelines (natural or artificial) that prevent the movement of koalas, such as mountain ranges, water bodies or treeless areas that are greater than 2 km wide.
Presence within the Project Area	<p>Regrowth and remnant vegetation of:</p> <ul style="list-style-type: none"> ■ Callitris and Eucalypt dominated woodlands; ■ Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i> ■ Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>; ■ Eucalypt open forest dominated by <i>E. populnea</i>; and ■ Open regrowth eucalypt woodland vegetation. 	<ul style="list-style-type: none"> ■ Cleared areas with occasional regrowth eucalypt woodlands along drainage lines. ■ Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). 	<ul style="list-style-type: none"> ■ Potential non-habitat presents in the Project Area as waterways and treeless areas greater than 2 km wide.
Total in the Project Area	<ul style="list-style-type: none"> ■ 698.5 ha foraging and breeding habitat 	<ul style="list-style-type: none"> ■ 9,072.6 ha dispersal habitat 	<ul style="list-style-type: none"> ■ 0 ha non-koala habitat

Records for where potential evidence of this species has been located in the Project Area, as well as the Koala habitat mapping for foraging and breeding habitat, and dispersal habitat, is shown on Figure 2-7.



Legend

- Tree With Scratches that May be Caused by Koala
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Koala Foraging and Breeding Habitat
- Koala Dispersal Habitat
- Highway
- Road
- Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Koala Habitat within the Project Area		F2-7
Drawing No: 0639876_SIA_G013_R0.mxd	Ecological Assessment Report	
Date: 26/07/2023	Drawing Size: A4	
Drawn By: SP	Reviewed By: MT	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 5px;"> </div> </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>	

2.5.2 Greater Glider

The Greater Glider (southern and central) was upgraded from a listing of 'Vulnerable' to 'Endangered' under the EPBC Act, on the 5th July 2022. This species has been concluded as known to occur within the Project Area as the species was detected during spotlighting surveys of riparian woodland along Wandoan Creek and along Woleebee Creek, as shown on Photograph 2-5 (BOOBOOK, 2022). The Greater Glider (southern and central) is eastern Australia's largest gliding possum, with a head and body length of 35-46 cm and a long furry tail measuring 45 – 60 cm (DCCEEW, 2022a). Their colouration is variable and can include dark grey, brown or cream, with a whitish or paler underside (Van Dyck et al. 2013). The Greater Glider (southern and central) occurs from Victoria, north to the Atherton Tablelands in Queensland.

The Project Area occurs within the distribution for the Greater Glider (southern and central). It is noted in the Conservation Advice, that it is likely that two separate taxa exist, to the level of subspecies in this area. However, it is noted that until such ambiguity is resolved, the listed entity will be referred to as *Petauroides volans* (DCCEEW, 2022a).

Greater Glider habitat consists of tall, Eucalypt forests with mature hollow-bearing trees (Eyre, 2004). Eyre et al. (2022a) has listed habitat for the species that are REs with confirmed Greater Glider records and contain habitat attributes such as live and dead hollowing bearing denning trees, feed and large trees and habitat connectivity. Habitat critical to survival for the Greater Glider has been defined in the species conservation advice (DECCEW, 2022a).

High quality habitat for the Greater Glider (southern and central) is represented by remnant vegetation, particularly large patches, where the canopy is dominated by eucalypt species and there is an abundance of hollow bearing trees, particularly trees with multiple hollows. They are known to prefer hollows in live trees, particularly those high up in the tree trunk. Areas without a dominance of eucalypt species or where hollow bearing trees are absent are not considered suitable habitat.

The most recent Greater Glider (southern and central) conservation advice (DCCEEW, 2022a) notes that the species home ranges approximate to 1 – 4 ha and requires 4 to 20 different dens to be considered suitable denning habitat. Additionally, the 'Guide to Greater glider habitat in Queensland' (Eyre et al., 2022), informs that the Greater Glider (southern and central) is estimated to require a minimum of 2 – 4 live denning trees for every 2 ha of suitable forest habitat. Greater Glider (southern and central) densities in southern Queensland have been identified as sensitive to a proportion of cleared land within a 1 km radius (Eyre 2006).

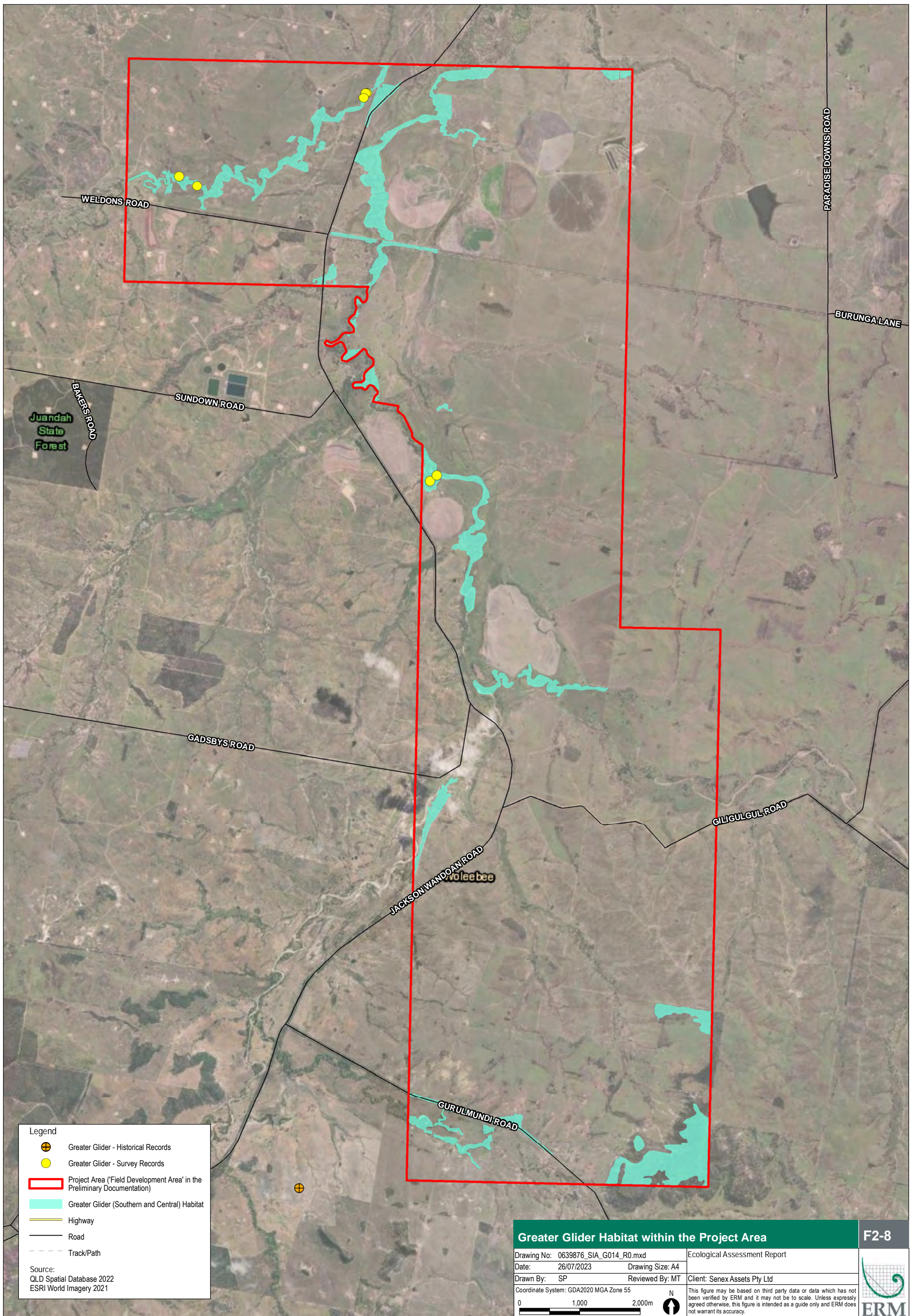
Greater Glider habitat within the Project Area aligns with the conservation advice description of "*large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species*". Suitable Greater Glider foraging habitat has been identified within the Project Area based on ground-truthing of habitats listed in Eyre et al. (2022), as well as the identification of habitat attributes for the species such as mature hollow bearing trees. Therefore, Greater Glider habitat within the Project Area is considered habitat critical to survival of the species.

Seven Greater Gliders were recorded during the field surveys. Individuals were detected within Queensland Blue Gum (*Eucalyptus tereticornis*) woodland in the north of the Project Area, in remnant riparian vegetation along Wandoan and Woleebee Creeks (refer to Photo 2-5); the species was recorded during spotlighting activities.

The total amount of Greater Glider foraging habitat within the Project Area is 528 ha and is shown on Figure 2-8. The mapped Greater Glider foraging habitat includes all remnant vegetation of most broad terrestrial broad habitat types particularly those dominated by Eucalypt species wherever large trees with hollows occur in woodland connected with these corridors.



Photograph 2-5: Greater Glider Recorded in Riparian Vegetation Along Woleebee Creek



- Legend**
- Greater Glider - Historical Records
 - Greater Glider - Survey Records
 - Project Area ('Field Development Area' in the Preliminary Documentation)
 - Greater Glider (Southern and Central) Habitat
 - Highway
 - Road
 - Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Greater Glider Habitat within the Project Area		F2-8
Drawing No: 0639876_SIA_G014_R0.mxd	Ecological Assessment Report	
Date: 26/07/2023	Drawing Size: A4	
Drawn By: SP	Reviewed By: MT	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

2.5.3 Glossy Black-cockatoo

Glossy Black-cockatoo (south-eastern subspecies) (*Calyptorhynchus lathami lathami*) is currently listed as Vulnerable under the EPBC Act, effective 10th August 2022. The Glossy Black-cockatoo (south-eastern) The Glossy black-cockatoo (south-eastern) exhibits a dull black plumage, blackish-brown head with variable yellow patches and either bright red panels (adult males) or yellowish-red panels in the tail (females). The Glossy Black-cockatoo (south-eastern) are the smallest of the black-cockatoo species with a body length of approximately 48 cm and weighing approximately 420 grams (DCCEEW, 2022b).

Glossy Black-cockatoo (south-eastern) are widespread from Mitchell (Queensland) through eastern New South Wales and to east Gippsland (Victoria). The species distribution occurs throughout coastal areas and ranges of eastern Australia, with scattered records occurring further inland. Although the species is widespread within this range, sightings are considered uncommon. It was estimated that the extent of species occurrence is 470,000 km² with an area of occupancy for the species being 40,000 km² (Cameron et al., 2021).

Glossy Black-cockatoo (south-eastern) are specialised feeders, relying on the seeds of *Casuarinaceae* (She-oak) trees.

Glossy Black-cockatoo (south-eastern) utilise large hollows in both living and dead eucalyptus trees or stags near water and food sources for nesting (Higgins, 1999; Pavey et al., 2016). Nesting hollows are typically 20 - 25 cm in diameter and located approximately 10 – 20 metres from the ground. The species commonly prefers nesting hollows in close proximity to a water source where it will return to the same nesting hollow over successive seasons (Birdlife Australia, 2022).

Additionally, the species is capable of moving among isolated trees and small habitat patches within fragmented landscapes (Pavey et al., 2016, Holmes 2012). Glossy Black-cockatoo (south-eastern) rove widely across this landscape, with some evidence of seasonal movements following maturation of She-oak fruits (Stock & Wild 2005; Hourigan, 2012; BOOBOOK, unpubl. data).

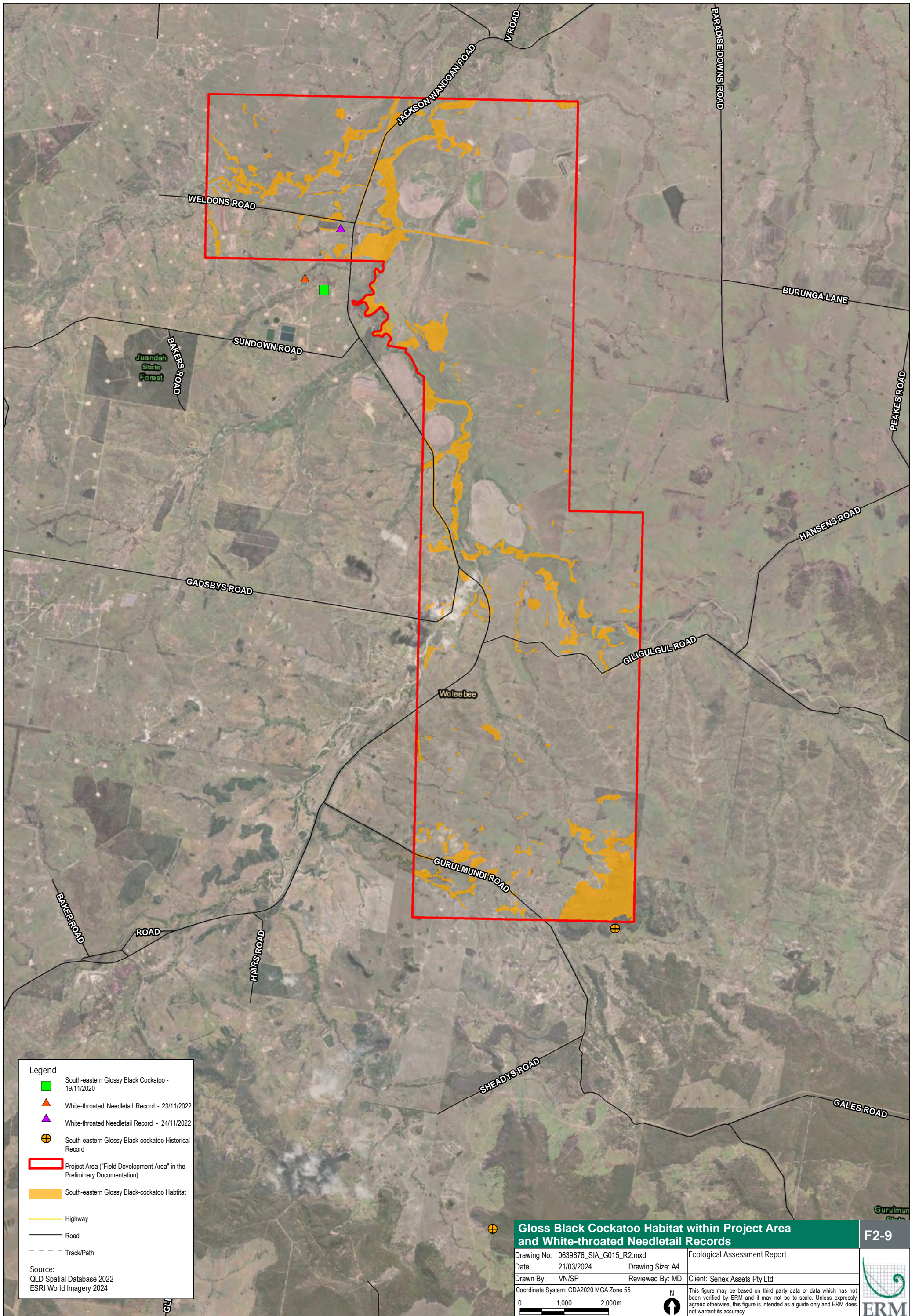
The Glossy Black-cockatoo (south-eastern) feeds on any of the nine species of She-oak (*Allocasuarina spp.* and *Casuarina spp.*), however is known to prefer Black She-oak (*A. littoralis*) and Forest She-oak (*A. torulosa*) within south-east Queensland (DCCEEW, 2022b). Species preference and She-oak species availability varies depending on the region. Higgins 1999 confirmed Glossy Black-cockatoo (south-eastern) will feed on only one or two species of She-oak in a region. Field surveys were conducted in 2022, confirming the presence and abundance of *Casuarinaceae* food trees within the Project Area. Identified food trees within the Project Area included Belah (*Casuarina cristata*) throughout the Project Area, and Bull Oak (*Allocasuarina luehmannii*) in scattered woodland patches on sandy soils. No evidence of feeding (chewed cones) was observed during field surveys. However, this species has previously been recorded within the Project Area (BOOBOOK, 2021a).

Glossy Black-cockatoo (south-eastern) are hollow nesters, utilising both living and dead eucalyptus trees. Suitable nest hollows for the species are 15 cm in entrance diameter and approximately 1 m deep. Field surveys of the Project Area identified the presence of potential nest trees to occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the Project Area, however the species was not directly recorded during field surveys.

The total amount of Glossy Black-cockatoo habitat within the Project Area is 1,003 ha and is shown on Figure 2-9. The mapped Glossy Black-cockatoo habitat includes all remnant and regrowth vegetation of most broad terrestrial habitat types particularly those dominated by Eucalypt species with large hollow bearing trees, along with remnant and regrowth RE with potential feed trees (*Casuarinaceae spp.*).

A number of low ecological value areas provide potential habitat for the South-eastern Glossy Black-Cockatoo. Potential foraging habitat is located within acacia regrowth, eucalypt regrowth, mixed acacia and eucalypt regrowth and eucalypt and acacia paddock trees as the species exclusively feeds on sheoak seeds (*Allocasuarina spp.* and *Casuarina spp.*). Whilst these habitat types are

dominated by *Eucalyptus spp.* and *Acacia spp.* paddock trees, the presence of *Allocasuarina spp.* and *Casuarina spp.* cannot be ruled out. Therefore, areas mapped as 'Eucalypt and Acacia paddock trees' may provide potential foraging habitat for glossy black-cockatoo.



- Legend**
- South-eastern Glossy Black Cockatoo - 19/11/2020
 - ▲ White-throated Needletail Record - 23/11/2022
 - ▲ White-throated Needletail Record - 24/11/2022
 - ⊕ South-eastern Glossy Black-cockatoo Historical Record
 - Project Area ("Field Development Area" in the Preliminary Documentation)
 - South-eastern Glossy Black-cockatoo Habitat
 - Highway
 - Road
 - Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2024

Gloss Black Cockatoo Habitat within Project Area and White-throated Needletail Records		F2-9
Drawing No: 0639876_SIA_G015_R2.mxd		Ecological Assessment Report
Date: 21/03/2024	Drawn By: VN/SP	Reviewed By: MD
Client: Senex Assets Pty Ltd		
Coordinate System: GDA2020 MGA Zone 55		
0 1,000 2,000m		
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

2.5.4 *Dulacca Woodland Snail*

The Dulacca Woodland Snail was listed as Endangered under the EPBC Act on the 7th of December 2016 (TSSC, 2016). The Dulacca Woodland Snail (*Adclarkia dulacca*) is currently listed as Endangered under the EPBC Act, effective 7 December 2016 (TSSC, 2016a). The Dulacca Woodland Snail is a medium-sized snail, with a shell diameter of 17 mm on average which is slightly flattened, pale green-brown in colouration and features a brown band above the periphery of spirals on its shell (Stanisic et al., 2010). The animal itself is orange-brown. The species is endemic to south-east Queensland, only occurring in small, isolated populations from Miles to Dulacca and south to Meandarra (Stanisic, 2011 cited in TSSC, 2016a). The mobility of this species is limited, however, it can move between areas of suitable microhabitat (TSSC, 2016a) if the prevailing conditions are suitable for it to do so.

The likelihood of occurrence has concluded this species as likely to occur within the Project Area due to the presence of suitable habitat and previous records within the Project Area (Appendix B).

The Dulacca Woodland Snail inhabits vine thicket, Brigalow (*Acacia harpophylla*) woodland/open forest, ironbark (*Eucalyptus spp.*) woodland, Lancewood (*Acacia shirleyi*) woodland and Gum-topped Box (*E. woollsiana*) woodland (TSSC, 2016). It is largely confined to the Dulacca Downs subregion where it is found in a highly fragmented landscape, living in patches or strips of habitat retained on roadsides, shade lines and/or ridges (Stanisic et al., 2010; ALA, 2022). The Dulacca Woodland Snail is also able to exist in areas of Brigalow regrowth and even in cleared paddocks but only where logs, woody debris or other suitable microhabitat sites remain (TSSC, 2016).

The Project Area includes several small patches of suitable habitat for the Dulacca Woodland Snail (Brigalow woodlands), and the species has previously been collected from an area of REs 11.9.5a and 11.7.2 in the south of the Project Area (ALA, 2022). Using the information gathered from the species conservation advice and field assessments, habitat for the Dulacca Woodland Snail within the Project Area encompasses 666.3 ha, consisting of:

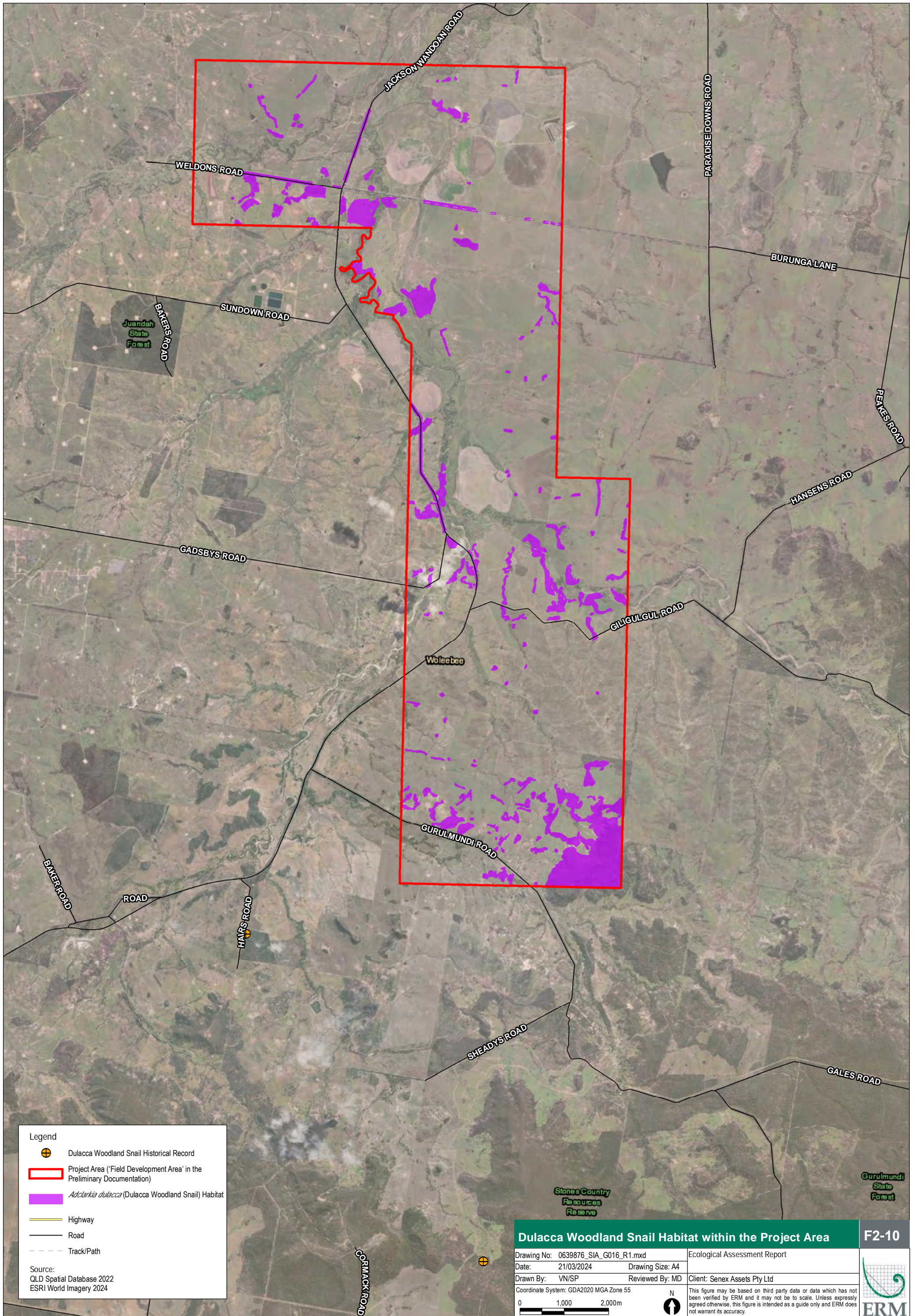
- Acacia woodlands dominated by Brigalow (*Acacia harpophylla*); and
- Eucalypt dominated woodlands mainly with *Eucalyptus crebra* and *E. populnea*.

Additionally, the species has the potential to occur in low ecological value areas consisting of:







- Acacia regrowth;
- Eucalypt regrowth;
- Mixed acacia and eucalypt regrowth; and
- Eucalypt and acacia paddock trees.

The species can inhabit areas including Brigalow regrowth, ironbark and gum-topped box regrowth and cleared habitat where abundant or suitable leaf litter, logs, woody debris, and other suitable microhabitat are present. As a conservative approach, these low ecological value habitat types have been mapped as Dulacca woodland snail habitat as the presence/absence of microhabitat (leaf litter and woody debris) is not confirmed.


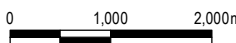
This habitat is presented on Figure 2-10.



Legend

-  Dulacca Woodland Snail Historical Record
-  Project Area ('Field Development Area' in the Preliminary Documentation)
-  *Adiantum dulaccae* (Dulacca Woodland Snail) Habitat
-  Highway
-  Road
-  Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2024

Dulacca Woodland Snail Habitat within the Project Area		F2-10
Drawing No: 0639876_SIA_G016_R1.mxd		Ecological Assessment Report
Date: 21/03/2024	Drawing Size: A4	
Drawn By: VN/SP	Reviewed By: MD	
Coordinate System: GDA2020 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
		

2.5.5 *White-throated Needletail*

The White-throated Needletail was listed as Vulnerable under the EPBC Act on the 4th July 2019. This species has been concluded as known to occur within the Project Area as the species was observed as a flock of eight birds flying low near Weldon's Road in subsequent Senex surveys on 24 November 2022 (Cunningham, M pers. comm.). It is likely to occur within the Project Area annually (September-April), following storm fronts, as a transient aerial flyover visitor only (Appendix B).

The White-throated Needletail is predominantly aerial when on migration in Australia (September to April), occasionally stopping to roost in large patches of rainforest, woody vegetation and open Eucalypt forests consisting of dense foliage and hollows (Coventry, 1989; Higgins, 1999), generally associated with elevated areas.

Whilst occasional aerial observations have been made for this species, the Project Area is unlikely to contain important foraging habitat for the species. Additionally, no threshold area for important habitat for this species can be determined at present and has not been identified in the species conservation advice (TSSC, 2019).

White-throated Needletail are likely to only fly aurally over the Project Area in occasional flocks during the migratory period, being September to April, following storm fronts. The Project Area does not contain rainforests or elevated open forests with dense foliage that could be used for occasional roosting by the species. While potential flights over the Project Area may occur from time to time, only elevated areas are regarded as roosting habitat. Thus, potential habitat has not been mapped for this species, and so no subsequent impact area has been calculated.

2.5.6 *Listed Threatened Terrestrial Fauna Species with Potential to Occur*

A total of fourteen EPBC Act listed threatened terrestrial fauna species have been assessed as having the potential to occur within the Project Area as a result of the likelihood of occurrence presented in Appendix A. In essence, because part of these species' distributions overlaps with the Project Area, their presence cannot be ruled out. This is despite no signs or observations of these species within the Project Area during field surveys using survey techniques aligned with survey guidelines.

In accordance with the precautionary principle, 'potential habitat' for the nine species has been mapped and shown in Figure 2-11 for bird species (Southern Squatter Pigeon, Australian painted Snipe and Diamond Firetail), Figure 2-12 for bird species (Brown Treecreeper, Southern Whiteface and Painted Honeyeater), Figure 2-13 for mammal species and Figure 2-14 for reptiles.

Table 2-8 lists all EPBC Act listed threatened terrestrial species that have been assessed as having the potential to occur within the Project Area and describes the potential habitat that has been mapped for each species. Additional detail on the habitat present within the Project Area is provided in the Ecological Assessment Report (ERM 2023).

Table 2-8: EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area

Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
Birds			
<i>Rostratula australis</i>	Australian Painted Snipe	E, Mi	<ul style="list-style-type: none"> 69.7 ha of potential habitat is present within the Project Area. Potential habitat includes small areas of ephemeral wetland habitat within the Project Area; however these may only periodically provide temporary refuges for this species. These areas correspond with riparian with riparian woodlands. This aligns with the broad habitat type of Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper	V	<ul style="list-style-type: none"> 272.1 ha of potential habitat is present within the Project Area. Potential habitat includes dry open eucalypt forests and woodlands with an open, grassy understorey and fallen timber. These areas should be subjected to a form of ongoing disturbance (i.e., historically Indigenous burning practices) to be favourable for the species.
<i>Stagonopleura guttata</i>	Diamond Firetail	V	<ul style="list-style-type: none"> 1287.4 ha of potential habitat is present within the Project Area. Potential habitat includes grassy understoreys of open woodlands dominated by Eucalypt spp., Acacia spp., and/or Casuarina spp. Eucalyptus and Acacia woodlands and forests, occurs throughout the Project Area. Additionally, a number of low ecological value habitat types including acacia regrowth, eucalypt regrowth, mixed acacia and eucalypt regrowth and eucalypt and acacia paddock trees, only where there is high grass cover or dense shrub cover have the potential to provide foraging habitat for the species. The presence of isolated paddock trees in areas of cleared, managed or low grass and shrub cover are unlikely to provide habitat for Diamond Firetail.
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V	<ul style="list-style-type: none"> 938.5 ha of potential habitat is present within the Project Area. Potential habitat includes a wide range of open woodlands and shrubland environments dominated by Acacia spp. and Eucalyptus spp., particularly where understorey of grasses and/or shrubs are present. Almost all woodland habitats present within the Project

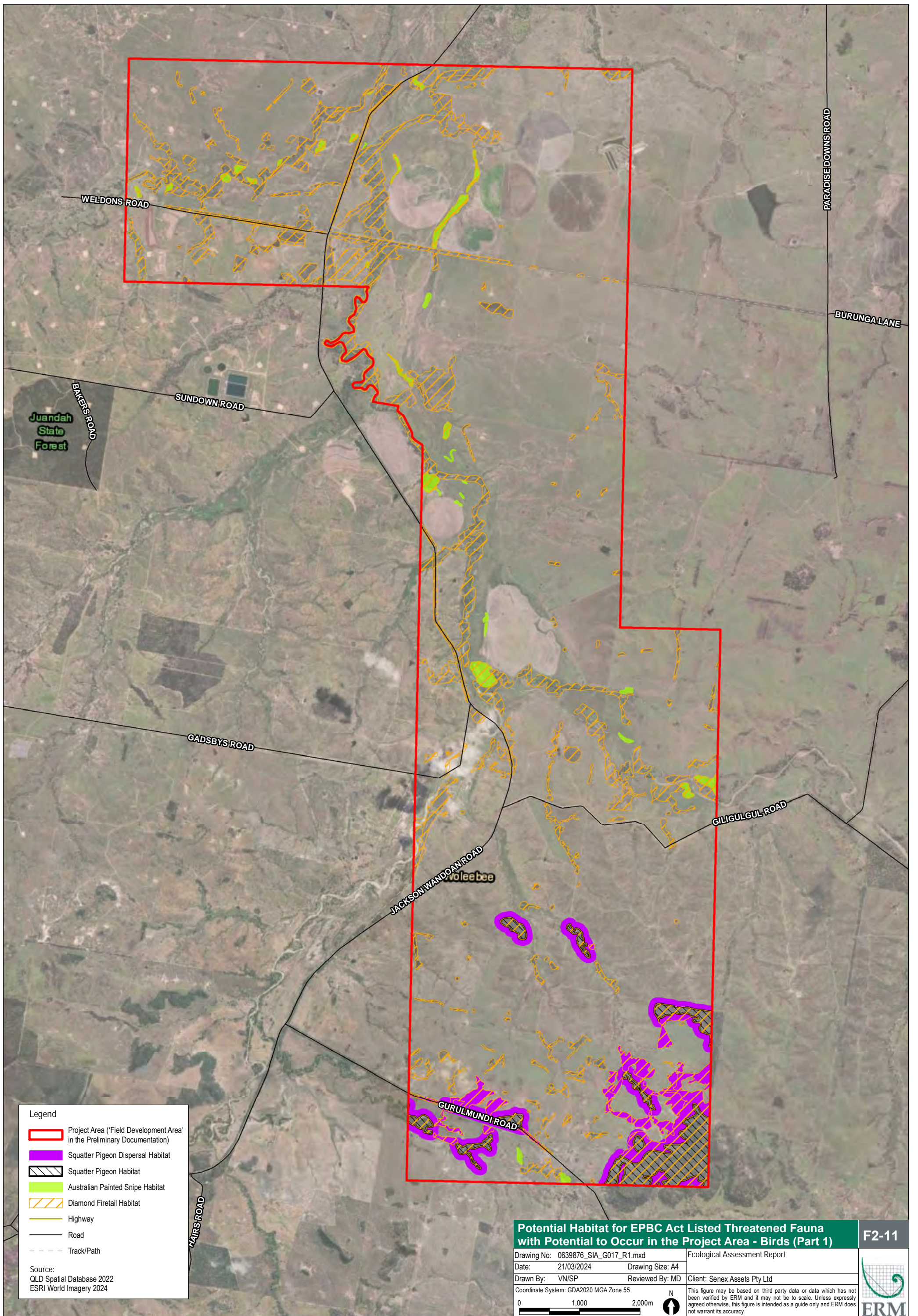
Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
			Area are considered suitable habitat for the Southern Whiteface.
<i>Grantiella picta</i>	Painted Honeyeater	V	<ul style="list-style-type: none"> 272.1 ha of potential habitat is present within the Project Area. Potential habitat comprises remnant and regrowth communities with abundant Acacia and Casuarina hosts of Mistletoes. Potential habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest, more specifically with a multilayered shrubby understorey which the species prefers. This is made up of broad habitat type Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>.
<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subspecies)	V	<ul style="list-style-type: none"> 164.3 ha of breeding and foraging habitat, and 316 ha of dispersal habitat (up to 2.1 ha of dispersal habitat to be cleared) is present within the Project Area. Potential habitat remains in the southern part of the Project Area (south of Giligulgul road) in grassy woodland with open areas for foraging.
Mammals			
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	<ul style="list-style-type: none"> 259.6 ha of potential habitat is present within the Project Area. Potential habitat is made up of all broad habitat types excluding the cleared exotic pasture and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.
<i>Dasyurus hallucatus</i>	Northern Quoll	E	<ul style="list-style-type: none"> 226.7 ha of potential habitat is present within the Project Area. Potential habitat comprises contiguous areas of remnant and regrowth woodland and forest within 5 km of cliffs and rocky scarps and connected to these refuges by continuous native vegetation. This includes all broad habitat types excluding cleared exotic pasture.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern subspecies)	V	<ul style="list-style-type: none"> 145.8 ha of potential habitat is present within the Project Area. Potential habitat is comprised of large contiguous areas of remnant only Eucalypt woodland and open forests, including some riparian dominated woodlands. This is because the species requires large hollow-

Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
			bearing trees for dens and preferred feed tree species (selected Eucalypts).
Reptiles			
<i>Delma torquata</i>	Collared Delma	V	<ul style="list-style-type: none"> 259.7 ha of potential habitat is present within the Project Area. Potential habitat comprises large logs, rocky outcrops and abundant woody debris occurs in the large contiguous area of forest and woodland associated with the escarpment and plateau in the south-eastern corner of the Project Area. This includes all broad habitat types with the above microhabitat features, excluding cleared exotic pasture.
<i>Furina dunmali</i>	Dunmall's Snake	V	<ul style="list-style-type: none"> 259.7 ha of potential habitat is present within the Project Area. Potential habitat comprises large logs, rocky outcrops and abundant woody debris occurs in the large contiguous area of forest and woodland associated with the escarpment and plateau in the south-eastern corner of the Project Area. This includes all broad habitat types with the above microhabitat features, excluding cleared exotic pasture.
<i>Hemiaspis damelii</i>	Grey Snake	E	<ul style="list-style-type: none"> 431.2 ha of potential habitat is present within the Project Area. Potential habitat includes Brigalow (<i>Acacia harpophylla</i>) and Belah (<i>Casuarina cristata</i>) woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies. Both woodlands were observed within the Project Area, along with suitable ephemeral wetlands. Additionally, a number of low ecological value habitat types including acacia regrowth, eucalypt regrowth, mixed acacia and eucalypt regrowth and eucalypt and acacia paddock trees have the potential to provide foraging habitat for the species. These areas are slightly intersected or bordered by small gullies which may provide suitable habitat for the species where regrowth is near small gullies and floodplains.
<i>Egernia rugosa</i>	Yakka Skink	V	<ul style="list-style-type: none"> 228 ha of potential habitat is present within the Project Area. Potential habitat is comprised of larger contiguous areas of remnant and regrowth woodland and open forest. The species requires loamy soils with large logs, accumulations of woody debris and/or rocky

Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
			outcrops. This includes all broad habitat types with the above microhabitat features, excluding cleared exotic pasture and riparian Eucalypt woodlands.
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	V	<ul style="list-style-type: none"> ■ 209.6 ha of potential habitat is present within the Project Area. ■ Potential habitat includes woodlands generally supported by clay-loam soils, including grassy White Box woodlands, open woodlands and River Red Gum–Coolibah-Bimble Box woodlands. Limited areas of potential Five-clawed Worm-skink habitat are present within the Project Area.

Status listing per EPBC: E = Endangered; V= Vulnerable; Mi =Migratory.

For the full reasoning for the potential outcomes for such species, refer to Appendix A.

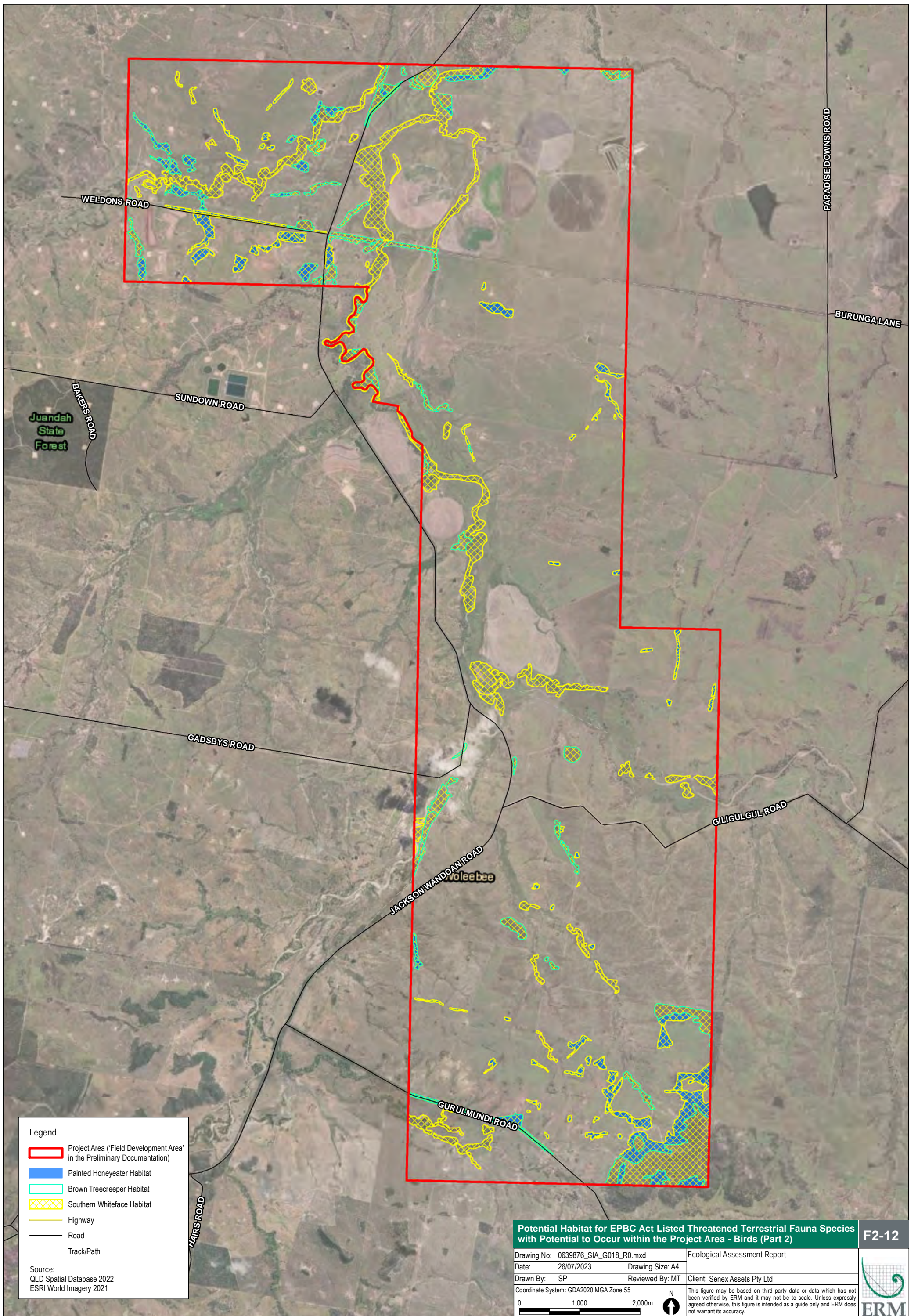


Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Squatter Pigeon Dispersal Habitat
- Squatter Pigeon Habitat
- Australian Painted Snipe Habitat
- Diamond Firetail Habitat
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2024

Potential Habitat for EPBC Act Listed Threatened Fauna with Potential to Occur in the Project Area - Birds (Part 1)		F2-11
Drawing No: 0639876_SIA_G017_R1.mxd	Ecological Assessment Report	
Date: 21/03/2024	Drawing Size: A4	
Drawn By: VN/SP	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 10px;"> <div style="text-align: center; font-size: 8px;">N</div> <div style="text-align: center;">↑</div> </div> </div>		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Painted Honeyeater Habitat
- Brown Treecreeper Habitat
- Southern Whiteface Habitat
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Potential Habitat for EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area - Birds (Part 2)

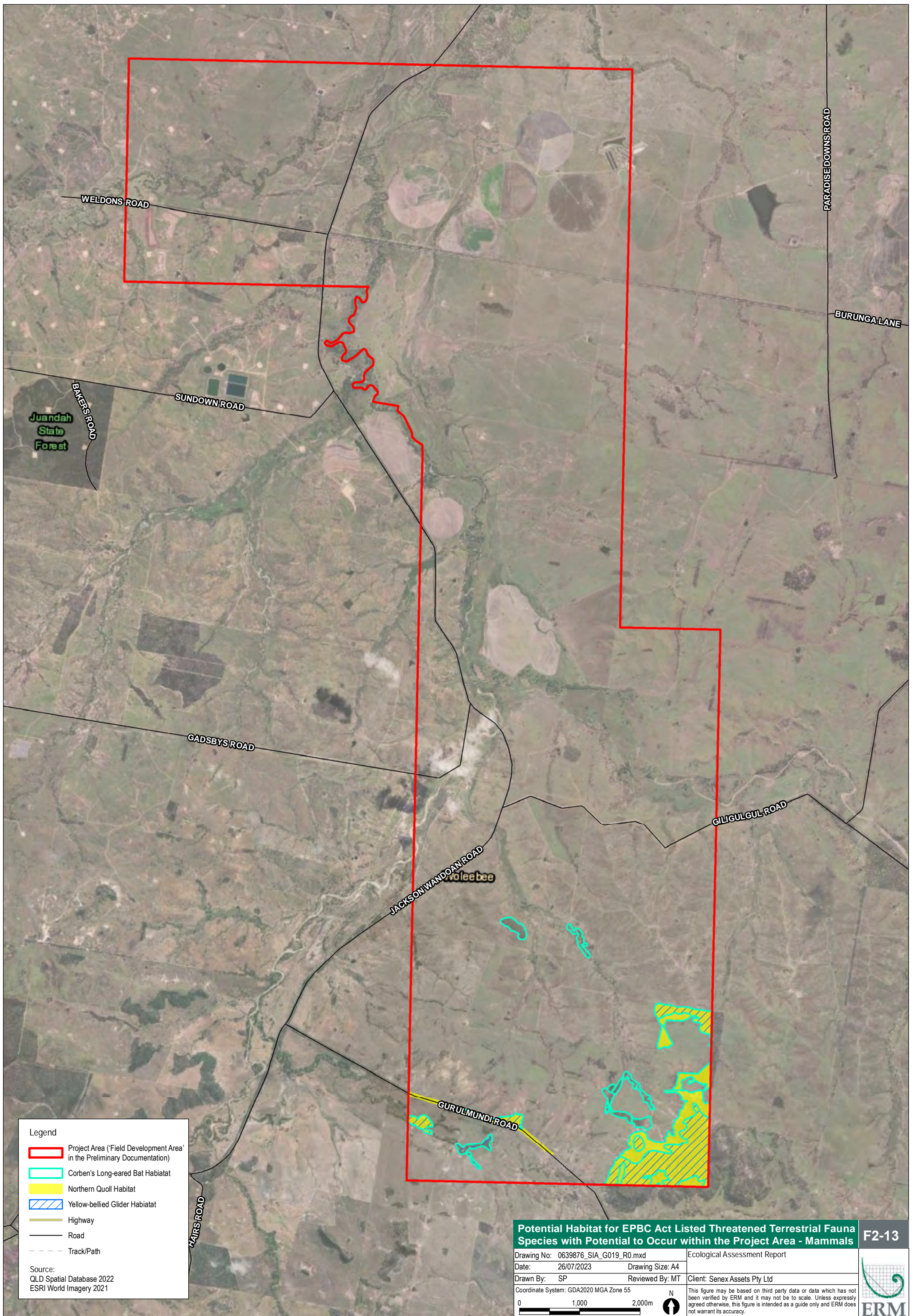
Drawing No: 0639876_SIA_G018_R0.mxd	Ecological Assessment Report
Date: 26/07/2023	Drawing Size: A4
Drawn By: SP	Reviewed By: MT
Client: Senex Assets Pty Ltd	
Coordinate System: GDA2020 MGA Zone 55	

0 1,000 2,000m

N

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

F2-12

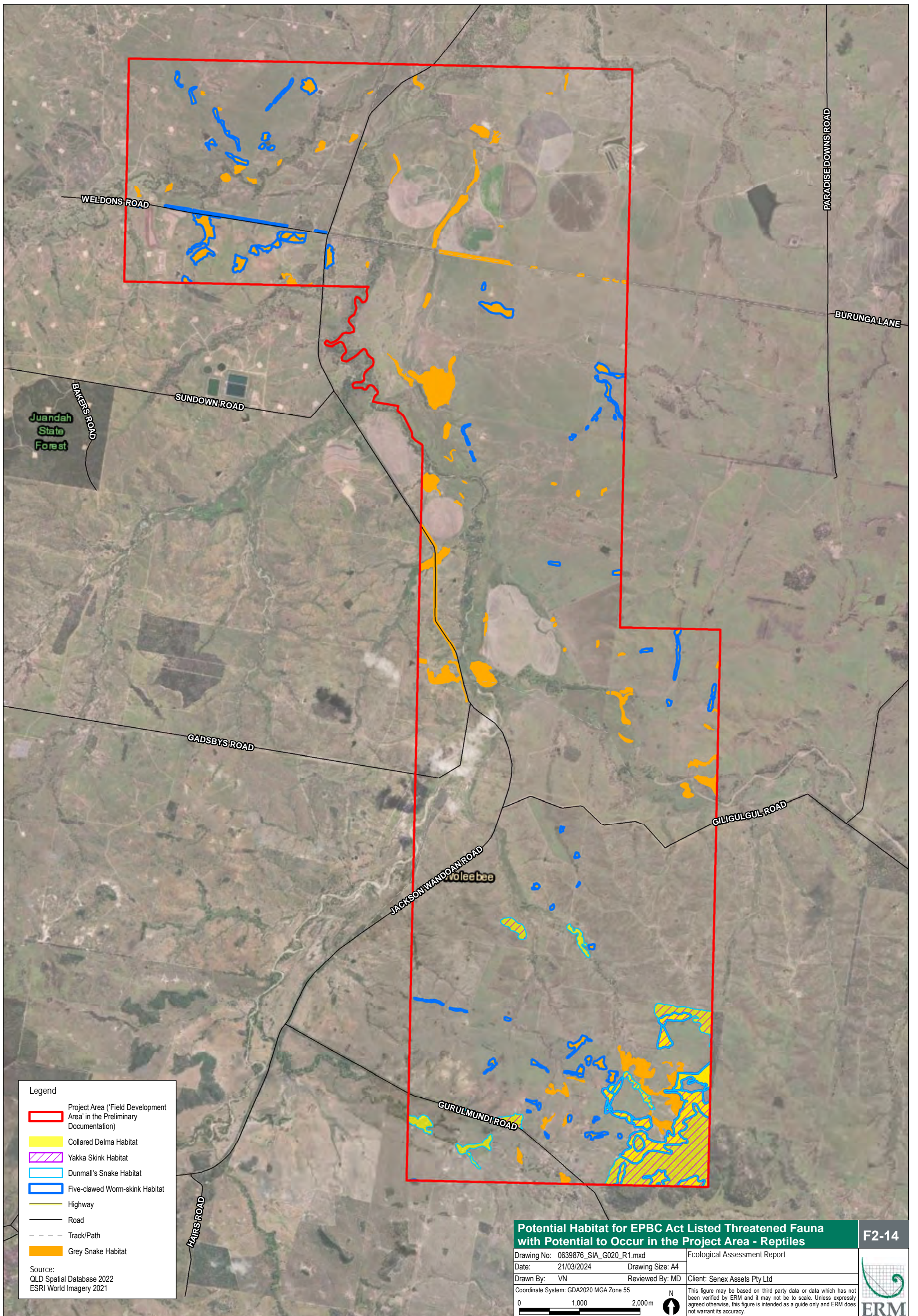


Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Corben's Long-eared Bat Habitat
- Northern Quoll Habitat
- Yellow-bellied Glider Habitat
- Highway
- Road
- Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Potential Habitat for EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area - Mammals		F2-13
Drawing No: 0639876_SIA_G019_R0.mxd		Ecological Assessment Report
Date: 26/07/2023	Drawing Size: A4	
Drawn By: SP	Reviewed By: MT	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0</div> <div style="margin-right: 10px;">1,000</div> <div style="margin-right: 10px;">2,000m</div> <div style="text-align: center;"> <div style="border: 1px solid black; width: 10px; height: 10px; margin: 0 auto;"></div> <div style="font-size: 8px; margin: 0 auto;">N</div> </div> </div>		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Collared Delma Habitat
- Yakka Skink Habitat
- Dunmall's Snake Habitat
- Five-clawed Worm-skink Habitat
- Highway
- Road
- Track/Path
- Grey Snake Habitat

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Potential Habitat for EPBC Act Listed Threatened Fauna with Potential to Occur in the Project Area - Reptiles		F2-14
Drawing No: 0639876_SIA_G020_R1.mxd	Ecological Assessment Report	
Date: 21/03/2024	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 10px;"> <div style="text-align: center; font-size: 8px;">N</div> <div style="text-align: center;">↑</div> </div> </div>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.	

2.6 Aquatic Listed Threatened Fauna Species

A total of 2,192 individual fish from eight species, one species of turtle and three species of frog were recorded. No listed threatened species were identified during the field surveys. Three EPBC Act listed threatened aquatic fauna species were identified in the desktop review to potentially occur in and adjacent to the Project Area, these being:

- White-throated Snapping Turtle (*Elseya albagula*) - Critically Endangered;
- Fitzroy River Turtle (*Rheodytes leukops*) – Vulnerable; and
- Murray Cod (*Maccullochella peelii*) – Vulnerable.

All three species inhabit rivers with a preference for deep, permanent channels. The Project Area lacks rivers and other permanent waterways with deep channels. Only one specimen of Eastern long-necked Turtle (not a listed threatened species) was recorded during aquatic field surveys. This species can move long distances overland between waterholes, particularly after heavy rainfall.

After completing a likelihood of occurrence and the subsequent field surveys, both species were considered unlikely to occur within the Project Area (Appendix A).

2.7 Listed Migratory Species

Two EPBC Act listed migratory species, the White-throated Needletail and Fork-tailed Swift have been considered as known or likely to occur within the Project Area, respectively.

The White-throated Needletail is a largely aerial species when on migration through Australia, only occasionally stopping to roost in Eucalypt forests (Higgins, 1999). As a result, it is considered unlikely there will be a significant impact. It should be noted that this species is also listed as Vulnerable under the EPBC Act, however due to its aerial nature, it is also unlikely to be significantly impacted by Project activities. This species was further described in Section 2.5.5.

The Fork-tailed Swift is almost exclusively aerial and occur mostly over inland plains and sometimes above foothills and coastal areas (Higgins, 1999). The Fork-tailed Swift was not observed during field surveys, and potential foraging habitat was assessed to occur over dry open habitats, where it would likely fly aerially over. Therefore, no habitat mapping was mapped on the ground.

2.7.1 Listed Migratory Species with Potential to Occur

Six listed migratory species have been determined as having the potential to occur within the Project Area (likelihood of occurrence found in Appendix A). There were no signs or observations of the species within the Project Area based on targeted field investigations across the field survey events using survey techniques aligned with survey guidelines, including:

- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (Department of Environment, Water, Heritage and the Arts [DEHWA], 2017);
- Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act (DoE, 2015b); and
- Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (DoEE, 2017).

The potential occurrence conclusion for these species was therefore based off presence of suitable habitat only, and/or the presence of records in the adjoining areas. Potential habitat for these species is largely associated with waterbodies and drainage features (predominately farm dams), that have potential to occasionally be used. Therefore, even though no records for these species occur within the Project Area, they have been conservatively concluded as potentially occurring based on adjoining area records and/or the presence of habitat requirements.

The migratory species that have the potential to occur and their habitat within the Project Area are listed in Table 2-9. These include species that just have the potential to fly aurally overhead, and species, such as the common sandpiper, Latham’s Snipe and Sharp-tailed Sandpiper, that have the potential to stop over within the Project Area in very limited suitable habitat (ephemeral wetlands on drainage lines and farm dams).

Table 2-9: EPBC Act Listed Migratory Species with Potential to Occur within the Project Area

Species Name	Common Name	EPBC Act Status	Potential Habitat within the Project Area*
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi	<ul style="list-style-type: none"> Potential for individuals to occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
<i>Gallinago hardwickii</i>	Latham’s Snipe	Mi	<ul style="list-style-type: none"> Potential for individuals to occur within the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
<i>Cuculus optatus</i>	Oriental Cuckoo	Mi	<ul style="list-style-type: none"> There are limited areas of potential habitat in the form of remnant woodlands and non-remnant patches of native vegetation, within the Project Area.
<i>Rhipidura rufifrons</i>	Rufous Fantail	Mi	<ul style="list-style-type: none"> There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Mi	<ul style="list-style-type: none"> There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.
<i>Calidris acuminata</i>	Sharp-Tailed Sandpiper	Mi	<ul style="list-style-type: none"> Potential for individuals to occur within the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.

Status listing per EPBC: E=Endangered, V=Vulnerable and Mi =Migratory.

For the full reasoning for the likelihood of occurrence conclusions for these species, refer to Appendix A.

*Information on potential habitat sourced from Appendix B (BOOBOOK, 2022)

3. POTENTIAL IMPACTS

The significance of impacts to MNES are determined against the SIG 1.1 (DoE, 2013), assuming the controls and mitigation measures in Section 4 are implemented. Eight MNES were identified as part of the Ecological Assessment to have a potential to be significantly impacted due to known or likely presence within the Project Area. These eight MNES, including two TEC, one listed threatened flora species, five listed threatened fauna species and two migratory species (one of which is also a threatened species), have been assessed against SIG 1.1 criteria. Significant impact assessments were also conducted for listed threatened MNES that were assessed as having the potential to occur in the Project Area. A full assessment against SIG 1.1 criteria is included in Section 5 of this EPBC Ecology SIA.

Impact assessments have been completed for species and species habitat concluded as known and likely to occur within the Project Area.

3.1 Listed Threatened Ecological Communities

Disturbance within areas mapped as being Potential Habitat for TEC within Figure 2-3 will be avoided except where detailed site ecology surveys provide finer scale habitat mapping which confirms that there is in fact no TEC that will be disturbed as part of the Project.

The detailed site ecology surveys and habitat mapping refinement will be undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001].

3.2 Listed Threatened Flora Species

Disturbance within areas mapped as being habitat for Ooline in Figure 2-4 will be avoided. Areas of potential occurrence for Ooline (in previously cleared areas) (Figure 2-4) and areas mapped as potential habitat for potentially present MNES flora species Figure 2-5 (Belson's Panic and Slender Tylophora) will be the subject of pre-clearance ecology surveys (undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001]) to confirm the presence or otherwise of MNES flora species, and if observed individual plants will be avoided.

3.3 Listed Threatened Fauna Species

Senex will avoid any disturbance within areas mapped as:

- Potential Koala foraging and breeding habitat in Figure 2-7;
- Potential Southern Squatter Pigeon breeding and foraging habitat in Figure 2-12; and
- Potential habitat in Figure 2-8 to Figure 2-14 for the other known, likely or potentially present MNES fauna species.

Disturbance within these areas of identified habitat for MNES areas has the potential to occur and not be accounted within the maximum disturbance limits where detailed site ecology surveys (undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001]) provide finer scale habitat mapping which confirms that there is in fact no habitat present within the proposed disturbance location.

Although the placement of wells and gathering provides good flexibility to help avoid habitat areas, it is recognised that in a small number of circumstances, the Project's linear infrastructure may be unable to avoid traversing mapped potential habitat areas due to other constraints (such as cultural heritage sites or artifacts, geological features, landholder/livestock/agricultural requirements and existing or planned landholder, utility or community infrastructure).

Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land), refer to Figure 2-7 and Figure 2-12.

It is noted that impacts within Koala and Southern Squatter Pigeon dispersal habitat will be minimised using the Protocol but will, at times, require the unavoidable disturbance of open areas and removal of individual juvenile and non-juvenile trees and seedlings which are located within a predominantly cleared landscape. It is noted that impacts to dispersal habitat will be largely temporary in terms of RoW will be constructed and then rehabilitated. Application of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] means that individual juvenile and non-juvenile trees and seedlings will be avoided unless unavoidable due to other constraints, e.g., environmental features and values, cultural heritage values, geological features, landholder/livestock/agricultural requirements and existing or planned landholder, utility or community infrastructure).

The main potential impact to ecological values within the Project Area relates to the construction, operation and decommissioning of the wells and associated infrastructure that includes, vegetation clearing activities and other ground disturbance, noise and dust generation, and runoff and erosion potential. Potential impacts from the introduction or spread of pest and weed have potential to occur as a result of these activities in the absence of appropriate mitigation measures.

Activities associated with the Project have the potential to cause both direct and indirect impacts to MNES, with the level of impact depending on the type and location of the activity proposed.

As previously described, the Project activities include the development of up to 151 gas wells and associated well site facilities; gas and water gathering systems for the producing wells; access tracks for operational purposes; brine and produced water storage, including aggregation dam capacity, and produced water/irrigation dams; borrow pits; and ancillary supporting facilities.

Risks to biodiversity values associated with these activities include:

- Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities;
- Introduction and/or spread of weed species;
- Disturbance or displacement to fauna species from foraging or roosting habitat, or breeding places;
- Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials;
- Habitat fragmentation;
- Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects (for example through impeding migration pathways or inhibiting access to refuge areas); and
- Fauna injury during construction activities and movement of machinery/vehicles.

These potential impacts are further described in Table 3-1.

The vast majority of the Project Area is already disturbed (8,844.3 ha of the 9,772 ha area is non-remnant vegetation) and the total maximum disturbance limit will be up to 530 ha and is located to avoid remnant vegetation (potential habitat for listed threatened species).

Table 3-1: Potential Impacts to MNES

Potential Impact	Stage of Development	Relevance to the Project
<p>Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities, leading to disturbance or displacement of fauna species from foraging or roosting habitat, or breeding place.</p>	<p>Construction</p>	<p>Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). The areas of potential habitat for MNES that are known to, likely or potentially occur within the Project Area are:</p> <ul style="list-style-type: none"> ■ Australian Painted Snipe – 69.7 ha; ■ Belson’s Panic – 366.3 ha; ■ Brown Treecreeper (south-eastern) – 272.1 ha; ■ Collared Delma – 259.7 ha; ■ Common Sandpiper – 29.5 ha; ■ Corben’s Long-eared Bat – 259.6 ha; ■ Diamond Firetail – 1,287.4 ha; ■ Dulacca Woodland Snail – 666.3 ha; ■ Dunmall’s Snake – 259.7 ha; ■ Five-clawed Worm-skink – 209.6 ha; ■ Fork-tailed Swift – aerial only (no impacts); ■ Grey Snake – 431.2 ha; ■ Greater Glider (southern and central) – 528 ha; ■ Koala – 698.5 ha foraging and breeding habitat and 9,072.6 ha of dispersal habitat (up to 530 ha of dispersal habitat to be cleared); ■ Latham’s Snipe – 29.5 ha; ■ Northern Quoll – 226.7 ha; ■ Ooline – 118.7 ha habitat (no impact to 118.7 ha of habitat and surveys will be done in all areas of proposed disturbance to enable avoidance to all stands and isolated trees (if present)); ■ Oriental Cuckoo – 896.7 ha; ■ Painted Honeyeater – 272.1 ha; ■ Rufous Fantail – 604.2 ha; ■ Satin Flycatcher – 687.5 ha; ■ Sharp-tailed Sandpiper – 29.5 ha; ■ Slender Tylophora – 122.7 ha; ■ South-eastern Glossy Black-cockatoo – 1,003 ha; ■ Southern Squatter Pigeon – 164.3 ha of breeding and foraging habitat, and 316 ha of dispersal habitat (up to 2.1 ha of dispersal habitat to be cleared); ■ Southern Whiteface – 938.5 ha; ■ White-throated Needletail – aerial only (no impacts);

Potential Impact	Stage of Development	Relevance to the Project
		<ul style="list-style-type: none"> ■ Yakka Skink – 228 ha; and ■ Yellow-bellied Glider (south-eastern) – 145.8 ha. <p>The maximum area to be disturbed represents a small portion of the overall Project Area (4.3%). A maximum of 5.8% of the previously cleared Koala dispersal habitat and 2.1 ha of Southern Squatter Pigeon dispersal habitat will be disturbed. Areas of potential habitat for Ooline will be surveyed and only disturbed after surveys for individual plants have been completed.</p> <p>The final disturbance footprint will avoid impacts to any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat) and further refinements will be made in accordance with the implementation of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001]. This is further discussed in Section 4.</p> <p>The Project is not expected to create a significant impact on a MNES TEC or listed threatened species as the Project will be developed on previously disturbed land, and TECs and potential habitat for MNES listed threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat, will be avoided.</p>
<p>Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials (indirect impacts).</p>	<p>Construction, Operation and Decommissioning</p>	<p>Disturbances from construction, operation, and decommissioning, such as noise and dust, have the potential to negatively impact adjacent vegetation communities and habitats.</p> <p>Noise disturbances have the potential to influence breeding, roosting or foraging behaviour of native fauna. Studies suggest that the consistency of noise is more important than volume, with irregular and unpredictable noise being more disruptive to wildlife (Jones et al. 2015), as may be emitted during construction. For the general native fauna community, individuals may relocate to adjacent areas during times of noise disturbance. It is noted that noise associated with the Project principally relates to well drilling which on average is completed in 3 days per well.</p> <p>Dust generated by vehicle and machinery movements has the potential to smother vegetation directly adjacent to the works and inhibit plant growth and palatability for native fauna. There are measures available to limit dust generation and dispersion.</p> <p>Without suitable mitigation measures, dust deposition resulting from the Project's construction activities has the potential to lead to degradation of fauna habitat. Additionally, reduced vegetation cover can lead to restricted fauna movement between foraging and breeding habitat. Unmanaged dust can lead to the smothering of native vegetation and an increase in invasive flora within the area.</p>

Potential Impact	Stage of Development	Relevance to the Project
		<p>Increased erosion within the Project Area has the potential to lead to the loss of topsoil and soil fertility, in turn reducing native plant species within the area due to reduced optimal soil conditions if not suitably controlled. Erosion can further lead to an increase of invasive plants on disturbed soils or result in a decrease in ecosystem biodiversity.</p> <p>Erosion has the potential to impact aquatic ecosystems with increased sediment runoff, leading to a reduction in habitat quality for aquatic species. Additionally, soil erosion contributes to longer ecosystem recovery times following soil disturbance.</p> <p>The accidental release of hazardous materials (including chemical contaminants, metals, machinery and equipment fluids etc.) could result in air and water pollution, and soil contamination. Such aspects affect wildlife behaviours directly and indirectly. Direct impacts of hazardous materials have the potential to lead to changes in species physiology, behaviour, reproduction and/or survival. The release of chemicals into aquatic environments results in habitat degradation of wetland and river systems, and poor fish health or death.</p> <p>The disturbance footprint will be designed to limit the number of watercourse crossings, and all remnant vegetation will be avoided. The existing aquatic habitat features within the Project Area are generally heavily disturbed drainage features. Given the limited extent, water features relative to the Project Area and the typically dry nature of the area, impacts are expected to be minimal. However, there are measures detailed within the Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLAS-EN-PLN-015] to limit erosion and potential sedimentation during rainfall events that produce runoff and overland flows.</p> <p>The Project is unlikely to degrade species habitat as Senex will implement appropriate erosion and sediment controls, implement robust environmental monitoring, and implement appropriate environmental management measures. The Project will also avoid MNES TECs and potential habitat for MNES listed threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat).</p>

Potential Impact	Stage of Development	Relevance to the Project
<p>Introduction and/or spread of weed species (indirect impacts).</p>	<p>Construction and Operation</p>	<p>The Project Area is predominantly cleared land for agricultural purposes. The production wells will be located in cleared land, avoiding all potential habitat for MNES (except for Koala and Southern Squatter Pigeon dispersal habitat), and with appropriate weed management measures implemented throughout the Project lifecycle, the Project is unlikely to impact the overall structure of the vegetation communities present.</p> <p>Weeds have the potential to increase the frequency and intensity of fires, by degrading the landscape and reducing tree densities. However, the risk of this impact to occur within the Project Area is negligible with the implementation of stringent weed washdown procedures, and the Project Area being predominantly cleared land for agriculture. Therefore, there will be no impact on fire frequency.</p> <p>Uncontrolled transport and operation for construction vehicles and machinery has the potential to introduce invasive weeds to the Project Area, and as such, management measures, including weed seed hygiene will be implemented to minimise these risks. Management measures will be implemented throughout the clearing, construction and operational phases of the Project to minimise the introduction of weed species within the Project Area.</p> <p>The majority of the Project Area and surrounding areas is cleared, pastoral property and introduced flora are common. Three WoNS species were recorded within the Project Area: tiger pear, common pest pear and velvety tree pear. Three additional species are considered potential to occur due to records within the buffered Project Area: parthenium weed, fireweed and madeira vine.</p> <p>Two additional species prescribed as Category 3 restricted matters under the Biosecurity Act, <i>Harrisia Cactus</i> and <i>Mother-of-millions</i>; and three other weeds of management interest, <i>willows cactus</i>, <i>African Lovegrass</i> and <i>Brazilian Nightshade</i>, were detected within the Project Area during field surveys.</p> <p>With the implementation of appropriate weed management measures and monitoring measures, as well as the avoidance of MNES TECs and potential habitat for MNES threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat) the Project is unlikely to cause the introduction and/or spread of weed species within the Project Area.</p>
<p>Fauna injury during construction, operation and decommissioning activities and movement of machinery/vehicles.</p>	<p>Construction, operation and decommissioning</p>	<p>The operation of vehicles and machinery within the Project Area has potential to lead to direct mortality or injury of resident fauna.</p> <p>Peak traffic period will be during the construction period with operational vehicle movements likely to be minimal. It is noted that well pad construction generally involves small crews with</p>

Potential Impact	Stage of Development	Relevance to the Project
		<p>minimal truck movements and drill crews travel to site and stay on site whilst drilling.</p> <p>While many fauna groups are highly mobile (e.g., birds) and are likely to move when machinery and vehicles approach other less mobile groups (e.g. reptile and amphibians) are more vulnerable to this impact.</p> <p>Similarly, there will be trenches excavated during construction and as required for maintenance of underground infrastructure which potentially provide a trapping hazard for some fauna groups (e.g., amphibians, small reptiles, small mammals).</p> <p>During the Project construction, operation and decommissioning there will be an increase in vehicle and machinery traffic throughout the Project Area, although this is considered a temporary impact. The Project will implement effective vehicle management measures (i.e., reduced speed limits, limited traffic during operation etc.) to minimise the risk of fauna injury or mortality from vehicles and machinery. Additionally, the Project will adopt management measures to minimise the risk of trapped fauna within trenches (e.g., egress points and daily inspections of all open excavated trenches). A qualified fauna spotter catcher will conduct a search immediately prior to clearing of woody vegetation for the presence of fauna species. With the appropriate management measures implemented, it is considered unlikely the Project will have a significant impact on fauna through injury and mortality.</p>
Habitat fragmentation.	Construction	<p>The Project Area is located in a largely cleared landscape with limited tracts of vegetation to facilitate ecosystem connectivity. Dispersal opportunities within the remainder of the Project Area are largely restricted to riparian areas, primarily in association with Wandoan and Woleebee Creeks. The cleared, non-remnant areas are considered likely to impede dispersal for most (less common) reptiles, amphibians, small ground mammals and arboreal mammals, with the exception of the koala. The ability for Koalas (and birds) to disperse across the broader landscape will remain during construction, due to phased development in smaller discrete work packs.</p> <p>Well pad size (typically 0.6 ha) and distance between pads and flexibility in their locations as well as flexibility in the alignment of gathering so that gathering right-of ways will cross watercourses perpendicularly. Also, as the majority of the Project Area is made up of previously cleared land, the disturbance footprint will be able to be designed to avoid all vegetated corridors with high dispersal opportunity. Consequently, the Project is unlikely to have a substantial impact on connectivity and fragmentation.</p>
Inhibiting the ability of ecological communities or species to adapt and	Construction and Operation	<p>Climate change is a listed threatening process for many ecological communities and species as the associated increase in temperature increases the potential for bushfires to occur.</p>

Potential Impact	Stage of Development	Relevance to the Project
survive predicted climate change effects.		<p>Additionally, temperature changes limit available habitat through removal of optimal conditions. Potential impacts include impeding migration pathways or inhibiting access to refuge areas for listed species or restricting areas for threatened ecological community succession. The Project is not predicted to exacerbate these potential impacts of climate change as Project infrastructure has been designed to avoid all forested areas, MNES TECs and potential habitat for MNES threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat), including all important fauna movement corridors along Wandoan Creek and Woleebee Creek.</p>
Loss of habitat, or degradation in vegetation quality from impacts associated with changes to groundwater hydrology.	Construction and operation	<p>Groundwater Dependent Ecosystems (GDEs) have been mapped and identified within and adjoining the Project Area. These GDEs occur within the riparian zones of Wandoan Creek and Woleebee Creek and utilise alluvial sources of groundwater. There is a potential for the drilling and gas extraction activities to impact on GDEs during construction and operation phases.</p> <p>Reaches of Woleebee Creek within the PL 209 area were assessed during the Senex field verification program in June/July 2018 (KCB, 2018). The assessment was conducted during the dry season and no flow was observed within the area surveyed. Pools of water were encountered in the lower reaches of Woleebee Creek which were considered to be rainfall derived surface water, based on their non-clear appearance and field water quality (547 µS/cm). The field verification identified that there is unlikely to be significant baseflow provided to this creek, however it is likely that during some periods, groundwater levels in the alluvium will rise into the sandy base of the creek. The field verification also concluded that based on the difference between the alluvial groundwater and surface water major ion chemistry signatures, and groundwater chemistry signatures from the Surat Basin units, groundwater within the alluvium is not considered to be sourced by the underlying Surat Basin unit (Westbourne Formation or Springbok Formation). Nonetheless, Senex have committed to ongoing monitoring of groundwater as there remains a level of uncertainty about connectivity between the alluvium and the Springbok Formation close to the northern boundary of the Project.).</p> <p>Terrestrial GDEs mapped in the vicinity of the Project Area (DES, 2018) are also considered to source groundwater from the shallow alluvium, rather than the underlying Surat Basin units. KCB (2024) have used the source-pathway-receptor conceptualisation to describe how there is no pathway for predicted groundwater drawdown to affect potential GDE receptors. More broadly, it has been found that no significant impacts to GDEs are likely to occur as a result of the Project (KCB, 2024).</p>

4. MITIGATION AND MANAGEMENT MEASURES

Senex will implement the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] for the Project. The Protocol guides infrastructure siting that considers biodiversity values and environmental constraints when selecting preferential locations, aligning with planning principles to avoid, minimise, mitigate and then manage potential environmental impacts.

The Project will avoid direct disturbance to TEC and other remnant vegetation (which represents the majority of habitat for threatened and migratory species). Up to 12 months prior to undertaking activities that result in significant disturbance to any land, an ecological survey to confirm on-ground biodiversity values will be undertaken by a suitably qualified person.

Other measures to be implemented will include:

- Atlas Stage 3 Gas Project Significant Species Management Plan;
- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001];
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017];
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-0013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-0014];
- No-go' areas will be GPS located and clearly marked e.g., with signage, bunting, flagging tape;
- Restricting access tracks to only low-level traffic with restricted speed;
- Erosion and sediment control measures;
- Dust management; and
- Appropriate storage and handling of fuel, oil and chemicals and appropriate spill response equipment.

These mitigation measures, relevant to each of the potential impacts, are further described in Table 4-1.

Table 4-1: Management and Mitigation Measures

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities, leading to disturbance or displacement to fauna species from foraging or roosting habitat, or breeding place.	Construction	<ul style="list-style-type: none"> ■ The Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] development will be implemented. ■ There will be no clearing of any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat. ■ Vegetation will not be cleared unless authorised under a Senex Access to Work permit. The Access to Work permit will be approved prior to any vegetation clearance or disturbance occurring. ■ All infrastructure will be located preferentially in pre-disturbed areas of land.

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
		<ul style="list-style-type: none"> ■ Where the gathering infrastructure crosses Woleebee Creek within PL 1037, the pipeline will be constructed using horizontal directional drilling method to avoid the requirement to clear woody vegetation and habitats in these areas. ■ Targeted surveys will be undertaken for threatened flora species Belson's Panic, Ooline and Slender Tylophora, to ensure that direct and indirect impacts are avoided, or in the case of Belson's Panic (a grass known to recolonise in cleared or highly disturbed areas (Menkins, 1998)) avoided, relocated or reinstated. ■ Habitat assessment will be undertaken for threatened fauna where infrastructure is proposed, and habitat has the potential to occur. ■ Maximum RoW width will not exceed 18 m for gathering (and 24 m for trunklines). ■ To prevent unnecessary land and vegetation disturbance, vehicles and equipment will be retained within the approved work zone. ■ 'No-go' areas will be GPS located and clearly marked e.g., with signage, bunting, flagging tape. ■ Reinstatement of areas which are not required for ongoing operational purposes. ■ A qualified fauna spotter-catcher will conduct a search immediately prior to clearing of woody vegetation for the presence of fauna species. Where fauna is detected, the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts on that fauna as a result of clearing.
<p>Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials (indirect impacts)</p>	<p>Construction and Operation</p>	<ul style="list-style-type: none"> ■ The Senex Queensland Fauna Stock Management Procedure will be implemented. ■ Staff and contractors will be made aware through general site induction and training of the potential to generate dust emissions and mitigation and management measures that shall be implemented. ■ Vehicles, plant and machinery will comply with site-specific speed limits to minimise dust generation. ■ Dust suppression will be used where deemed to be appropriate. ■ Erosion and sediment control to be managed in accordance with Senex's Queensland Erosion and Sediment Control Plan and Contractor's erosion and sediment control procedures. ■ Appropriate erosion and sediment control measures are to be installed at watercourse crossing points to adequately stabilise to prevent erosion and as per the Queensland Erosion and Sediment Control Procedure [SENEX-QLDS-EN-PRC-003].

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
		<ul style="list-style-type: none"> ■ RoW construction period in waterways will be undertaken in accordance with the timeframes of applicable waterway barrier works permits. ■ Construction activities will not interfere or block natural drainage e.g., disturbing channel contours.
Habitat fragmentation	Construction	<ul style="list-style-type: none"> ■ Infrastructure will be located preferentially avoiding, then minimising, isolating, fragmenting, edge effects or dissecting tracts of native vegetation. ■ Pipeline infrastructure will maximize co-location. ■ RoW widths in native vegetation and waterway crossings will be minimised. ■ Gathering lines are all below ground. ■ No felled vegetation windrows to be more than 50 m. ■ RoWs rehabilitated to 6 m wide access track post construction (within 6 months of cessation) and all rehabilitated at end of project (unless landholder requests it to be retained for ongoing use purposes).
Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects (for example through impeding migration pathways or inhibiting access to refuge areas)	Construction and Operation	<ul style="list-style-type: none"> ■ All infrastructure will be located preferentially in pre-disturbed areas of land. ■ The Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] will be implemented to minimise habitat fragmentation etc. ■ Where the gathering infrastructure crosses Woleebee Creek within PL 1037, the pipeline will be constructed using HDD method to avoid impeding this extant wildlife corridor. ■ Maximum RoW width will not exceed 18 m for gathering (and 24 m for trunklines). ■ Reinstatement of areas which are not required for ongoing operational purposes.
Fauna injury during construction activities and movement of machinery/vehicles	Construction and Operation	<ul style="list-style-type: none"> ■ The Senex Queensland Fauna Stock Management Procedure will be implemented. ■ Excavations and trenches shall be inspected for trapped fauna daily during construction. ■ Measures to prevent fauna entrapment and facilitate escape will be implemented within open trenches. ■ A qualified fauna spotter catcher will conduct a search immediately prior to clearing of woody vegetation for the presence of fauna species. Where fauna are detected, the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts on that fauna as a result of clearing.
Introduction and/or spread of weed species	Construction and Operation	<ul style="list-style-type: none"> ■ The Senex Queensland Weed Hygiene Procedure will be implemented.

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
		<ul style="list-style-type: none"> <li>■ Implementation of the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) which includes requirements for weed washdowns, certification and record keeping for all Project vehicles and machinery. <li>■ Project development will be planned to minimise vehicle, plant and equipment movements between properties that would otherwise require weed washdowns and certification prior to those movements. <li>■ Access to a landholder’s property will not occur unless authorised under a Senex Access to Work permit. Site specific weed management requirements will be defined prior to access to any property or work site. <li>■ Weed management and control methods will depend upon the location, weed species identified, the degree of the infestation, relevant landholder agreement or conduct and compensation agreements provisions, and local, state and national regulatory requirements. <li>■ Imported material able to transport weed seed will be assessed to ensure they are free of contamination, disease and invasive weeds. Landowner approval may also be required for imported soils and gravel.

5. SIGNIFICANT IMPACT ASSESSMENTS

5.1 Listed Threatened Ecological Communities

Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow TEC)

The Project in the Project Area is unlikely to result in a significant impact to the Brigalow TEC.

Brigalow (*Acacia harpophylla* dominant and co-dominant) is listed as Endangered under the EPBC Act. There is a total of 95.8 ha of Brigalow TEC within the Project Area. There will be no impact to Brigalow TEC within the disturbance footprint. Senex will further ensure avoidance of TEC through implementation of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001]. Mapping for this TEC is presented in Figure 2-3.

Based on this information, a significant impact assessment in accordance with the SIG 1.1 for the Endangered Brigalow TEC is presented in Table 5-1.

Table 5-1: Significant Impact Assessment for the Brigalow Threatened Ecological Community

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</i>		
Reduce the extent of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.	No
Fragment or increase fragmentation of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. TEC within the Project Area is already fragmented and as such disturbance in neighbouring areas is unlikely to materially affect the spread of seed and other propagative material throughout the TEC patches.	No
Adversely affect habitat critical to the survival of an ecological community	There will be no disturbance to TEC. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC. Buffer zones will also be avoided by infrastructure, with the exception of low impact petroleum activities and linear infrastructure, and mitigation measures will be applied to buffer zones that are not able to be avoided.	No
Modify or destroy abiotic factors necessary for an	Based on the assumption that the environmental management measures described in Section 4 will be implemented during clearing activities, such as erosion and sediment control	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</p>		
ecological community's survival	<p>measures, the construction of the project infrastructure would be unlikely to substantially modify abiotic factors required for TEC.</p> <p>During operation, the presence of project infrastructure is expected to have negligible impacts on surface water or groundwater flows.</p>	
Cause a substantial change in the species composition of an occurrence of an ecological community	<p>Impacts to the TEC are expected to be limited. No active disturbance to areas of TEC will be undertaken. Potential impacts to TEC composition related to pest and weed management are negligible and discussed further below. The potential for indirect impacts from weeds and pest is limited due to the existing land uses and disturbed nature of the TEC patches and present ground layer dominance of exotic pasture grasses in areas around the TEC patches. This includes a vehicle hygiene procedure to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to the disturbance footprint.</p>	No
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community	<p>Vehicle hygiene procedures will be implemented during construction and continue through operation to minimise risk of introduction of weed species propagating in TEC patches. Weed monitoring activities will include assessment of TEC patches nearby construction activities to allow for early detection.</p> <p>Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.</p>	No
Interfere with the recovery of an ecological community	<p>Given no TEC will be cleared as part of the Project, it is unlikely to interfere with the recovery of the TEC. Areas of regrowth Brigalow within the Project Area that do not currently meet the condition threshold have also been mapped and will be preferentially avoided through the development of the final layout and constraints protocol.</p>	No

Significant Impact: Not Significant

Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC)

The Project in the Project Area is unlikely to result in a significant impact to the Poplar Box TEC.

Poplar Box Grassy Woodland in Alluvial Plains is listed as Endangered under the EPBC Act. There is a total of 32.3 ha of Poplar Box TEC within the Project Area. There will be no impact to the areas shown as Poplar Box TEC in Figure 2-3. Senex Environmental Management will further ensure avoidance of direct and indirect impacts to this TEC through implementation of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] as well as the other plans and procedures listed in the Mitigation and Management Measures Section 4. Based on this information, a significant impact assessment in accordance with the SIG 1.1 for a Threatened Ecological Community is in Table 5-2.

Table 5-2: Significant Impact Assessment for the Poplar Box Threatened Ecological Community

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</i>		
Reduce the extent of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.	No
Fragment or increase fragmentation of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. TEC within the Project Area is already fragmented and as such disturbance in neighbouring areas is unlikely to materially affect the spread of seed and other propagative material throughout the TEC patches.	No
Adversely affect habitat critical to the survival of an ecological community	There will be no disturbance to TEC. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC. Buffer zones will also be avoided by infrastructure, with the exception of low impact petroleum activities and linear infrastructure, and mitigation measures (as detailed in Section 4) will be applied to buffer zones that are not able to be avoided.	No
Modify or destroy abiotic factors necessary for an ecological community's survival	Based on the implementation of mitigation and management measures described in Section 4 during clearing activities, such as erosion and sediment control measures, the construction of the project infrastructure would be unlikely to substantially modify abiotic factors required for TEC.	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</i></p>		
	<p>During operation, the presence of project infrastructure is expected to have negligible impacts on surface water or groundwater flows.</p>	
<p>Cause a substantial change in the species composition of an occurrence of an ecological community</p>	<p>Impacts to the TEC are expected to be limited. No active disturbance to areas of TEC will be undertaken. Potential impacts to TEC composition related to pest and weed management are negligible and discussed further below. The potential for indirect impacts from weeds and pest are limited due to the existing land uses and disturbed nature of the TEC patches and present ground layer dominance of exotic pasture grasses in areas around the TEC patches. This includes a vehicle hygiene procedure to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to the disturbance footprint.</p>	<p>No</p>
<p>Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community</p>	<p>Vehicle hygiene procedures will be implemented during construction and continue through operation to minimise risk of introduction of weed species propagating in TEC patches. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.</p>	<p>No</p>
<p>Interfere with the recovery of an ecological community</p>	<p>Given no TEC will be cleared as part of the Project, it is unlikely to interfere with the recovery of the TEC. Areas of regrowth Poplar Box Grassy Woodland on Alluvial Plains within the Project Area that do not currently meet the condition threshold have also been mapped and will be preferentially avoided through the development of the final layout and implementation of the constraints protocol.</p>	<p>No</p>

Significant Impact: Not Significant

5.2 Listed Threatened Species Known or Likely to Occur

Dulacca Woodland Snail (*Adclarkia dulacca*)

The Project in the Project Area is unlikely to result in a significant impact to the Dulacca woodland Snail.

The Dulacca Woodland Snail was listed as Endangered under the EPBC Act on 7 of December 2016 (TSSC, 2016). The likelihood of occurrence has concluded this species is likely to occur within the Project Area due to the presence of suitable habitat and previous records within the Project Area (Appendix A), however, the species was not detected during preliminary ecology surveys.

The Dulacca Woodland Snail inhabits vine thicket, Brigalow (*Acacia harpophylla*) woodland/open forest, Ironbark (*Eucalyptus* spp.) woodland, Lancewood (*Acacia shirleyi*) woodland and Gum-topped Box (*E. woollsiana*) woodland (TSSC, 2016). It is largely confined to the Dulacca Downs subregion where it is found in a highly fragmented landscape, living in patches or strips of habitat retained on roadsides, shade lines and/or ridges (Stanisic et al. 2010; ALA 2022). The Dulacca Woodland Snail is also able to exist in areas of Brigalow regrowth and even in cleared paddocks but only where logs, woody debris or other suitable microhabitat features remain (TSSC, 2016).

The Project Area includes several small patches of suitable habitat for the Dulacca Woodland Snail (Brigalow woodland), and the species has previously been collected from an area of RE 11.9.5a and 11.7.2 to the south of the Project Area (ALA, 2022). The total area of Dulacca Woodland Snail habitat within the Project Area is 666.3 ha. This is presented on Figure 2-10. Senex has committed to not clearing any areas known to be occupied by Dulacca Woodland Snail or areas confirmed as potential habitat for the species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 5-3.

Table 5-3: Significant Impact Assessment for the Dulacca Woodland Snail

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population	Senex has committed to not clearing any areas known to be occupied by Dulacca Woodland Snail or areas confirmed as potential habitat for the species. The species occurs mostly in small remnant vegetation patches (TSSC, 2016). Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence/absence of threatened species in the area to be disturbed will be undertaken by a suitably qualified person. This will include searches for snails in microhabitat (logs, timber and leaf litter). Infrastructure will avoid threatened species locations. Using this approach, a long-term decrease in the size of the population, reduced area of occupancy, or fragmentation of populations is unlikely. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key	No
Reduce the area of occupancy of the species		No
Fragment an existing population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>habitat features, vehicle speed limits and limited vehicle movements, daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat with tree or shrub cover and ground debris is critical to the survival of native land snails and increases the species ability to disperse and recolonise (Stanisic, 2011, cited in TSSC, 2016). The Project Area is majority cleared and infrastructure will be in already disturbed areas. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence/absence of threatened species in the area to be disturbed will be undertaken by a suitably qualified person. Infrastructure will avoid threatened species locations. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species. Therefore, it is unlikely that the impacts to Dulacca Woodland Snail habitat will lead to a decrease in the size of the species population. Thus, the Project is unlikely to adversely affect habitat critical to the survival of the species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population</p>	<p>Senex has committed to not clearing any areas known to be occupied by Dulacca Woodland Snail or areas confirmed as potential habitat for the species. Therefore, the ecological functions and extent of the habitat for the species will remain and ensure it is able to breed and will not decline.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>		<p>No</p>

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:</i>		
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Buffel Grass is a known threat to the species as it has replaced native grasses and increases fuel loads. This weed has been found to occur within the disturbed northern area of the Project Area. The construction and operation of the infrastructure is unlikely to increase the establishment of Buffel Grass. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline	The construction and operation of the infrastructure is unlikely to lead to introduction of a disease relevant to the species.	No
Interfere substantially with the recovery of the species	Key threats to the species relate to habitat loss, predation by rats, mice and pigs, invasion of Buffel Grass, trampling by cattle and horses and an increase in fire intensity. Project infrastructure will avoid Dulacca Woodland Snail habitat, and the construction and operation of the infrastructure is not expected to change the occurrence or prevalence of pest species. Therefore, it is unlikely that the Project will interfere with the recovery of the species.	No
Significant Impact: Not Significant		

Glossy Black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*)

The Project in the Project Area is unlikely to result in a significant impact to the Glossy Black-cockatoo.

The Glossy Black-cockatoo (south-eastern) is currently listed as Vulnerable under the EPBC Act, as of 10 August 2022. It has previously been recorded within the Project Area (BOOBOOK, 2021a, DES, 2022a), and two recent sightings (2009) have been reported within the adjoining areas (10 km buffer area) of the Project Area (ALA, 2022).

This is a specialised feeder dependent on seeds of Casuarinaceae (She-oak) trees. Breeding pairs nest in large hollows generally high up in large eucalypt trees or stags near water and food sources (Pavey et al., 2016). The species can move among isolated trees and small habitat patches within fragmented landscapes (Pavey et al., 2016; Holmes, 2012). Casuarinaceae food trees are abundant within the Project Area including Belah (*Casuarina cristata*), which occurs throughout the Project Area and Bull Oak (*Allocasuarina luehmannii*), which occurs in scattered woodland patches on sandy soils, however no individuals and no evidence of feeding (chewed cones) were observed during field surveys. Potential nest trees also occur in remnant Eucalypt woodland and forest and in well-developed riparian corridors across the Project Area (BOOBOOK, 2022).

The total area of habitat for this species within the Project Area is 1,003 ha and is mapped on Figure 2-9. Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 5-4.

Table 5-4: Significant Impact Assessment for the Glossy Black-cockatoo

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Glossy Black-cockatoo in the sense that there are currently no records of the species within the Project Area and there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. In addition, Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. It is therefore unlikely that the Project will lead to a long-term decrease in the size of, reduce the area of occupancy of, or fragment an important population. Climate change is a threat for the species based on the Conservation Advice in the form that rainfall is correlated with the breeding success for the species (DCCEEW, 2022b). The Project will not contribute to or exacerbate the impacts of climate change on this species. This is because the Project will not fragment vegetated corridors or inhibit the Glossy Black-cockatoo's ability to move across the landscape in response to potential climate change induced changes to rainfall patterns. Mitigation measures such as	No
Reduce the area of occupancy of an important population		No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. There are two records of the species in proximity to the Project Area. The Project Area is however unlikely to support an important population of the Glossy Black-cockatoo. In addition, Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. It is therefore unlikely that habitat critical to the survival of this species will be adversely affected. Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 4).</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>There is no evidence that the Project Area supports an important population of this species. In addition, Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. This Project is therefore unlikely to disrupt the breeding cycle of an important population, modify or decrease the availability or quality of habitat to the extent that it will cause species decline. Further, mitigation measures to reduce impacts to the breeding cycle of the species as well as no impact the quality or availability of habitat include preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>There is no evidence that the Project Area supports an important population of this species. In addition, Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. This Project is therefore unlikely to disrupt the breeding cycle of an important population, modify or decrease the availability or quality of habitat to the extent that it will cause species decline. Further, mitigation measures to reduce impacts to the breeding cycle of the species as well as no impact the quality or availability of habitat include preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>and the implementation of Senex’s suite of management plans (as detailed in Section 4). It is also with the implementation of these mitigation measures, that indirect impacts are also unlikely to be significant to the species.</p>	
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species’ habitat</p>	<p>Invasive species such as Feral Cats (<i>Felis catus</i>) and European Red Foxes (<i>Vulpes vulpes</i>) are common pests encountered Queensland and are particularly harmful to native, threatened birds. These invasive species are known to occur in the Project Area. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline</p>	<p>There is currently limited evidence of diseases causing detrimental effects on Glossy Black-cockatoo populations in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species</p>	<p>There is no formal adopted, or made, Recovery Plan for this species. Additionally, Project activities will still enable habitat to remain connected between the network of State Forests and remnant vegetation in the adjoining areas and the Project Area, ensuring the species will not be substantially interfered with if they were to land and roost within the Project Area.</p>	<p>No</p>

Significant Impact: Not Significant

Greater Glider (central and southern) (*Petauroides volans*)

The Project in the Project Area is unlikely to result in a significant impact to the Greater Glider.

The Greater Glider was upgraded from a listing of Vulnerable to Endangered under the EPBC Act, on 5 July 2022. This species has been assessed as known to occur within the Project Area as the species was detected during spotlighting surveys of riparian woodland along Wandoan Creek and along Woleebee Creek (BOOBOOK, 2022). The updated Conservation Advice for *Petauroides volans* (Greater Glider (southern and central)) has been considered for this analysis (DCCEEW, 2022a).

Greater Glider habitat consists of tall, montane Eucalypt forests with mature hollow-bearing trees (Eyre, 2004). Eyre et al., 2022 has listed habitat for the species that are REs with confirmed Greater Glider records that contain habitat attributes such as live and dead-hollowing bearing denning trees, feed and large trees and habitat connectivity. Habitat critical to survival for the Greater Glider has been defined in *Conservation Advice for Petauroides volans (Greater Glider (southern and central))* (DCCEEW, 2022a). Greater Glider habitat within the Project Area aligns with the conservation advice description of “large contiguous areas of Eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species’ preferred food species”. Suitable Greater Glider foraging habitat has been identified within the Project Area based on ground-truthing of REs listed in Eyre et al., is mapped on Figure 2-8. Therefore, Greater Glider habitat within the Project Area is considered habitat critical to survival of the species.

The Greater Glider was observed during spotlighting in the 2022 field investigation within mature forests with hollow bearing trees. Reviews of ALA shows only one recent record in the locality, located in the Cherwondah State Forest from 2002. Thus, species density is likely to be low in the Project Area. While there was generally a low number of records and observations of the species, it was conservatively concluded that an important population occurs in the Project Area and the surrounding landscape.

The Project has been assessed in the following ways. Initially, field investigations and mapping have designated a total of 528 ha of Greater Glider foraging habitat within the Project Area. The mapped Greater Glider foraging habitat includes mature Eucalypt woodland to open forests and woodlands to open forest associated with stream channels and rivers. From this, the first component of the layout design phase will be to avoid remnant vegetation identified as Greater Glider foraging habitat. The second component of the layout design will involve on the ground micro-siting that may result in infrastructure locations being adjusted if necessary to avoid suitable hollow bearing trees (i.e., those that contain large hollows >10 cm in diameter) that act as potential roosting and denning sites for the Greater Glider. This ensures that maximum avoidance of impact is assured for this species within the Project Area.

Other areas currently not mapped as Greater Glider foraging habitat, have the potential to be used for movement and dispersal purposes. Areas of foraging habitat will contain occasional hollow bearing trees that can be used for denning purposes.

Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 5-5.

Table 5-5: Significant Impact Assessment for the Greater Glider

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
<p>Lead to a long-term decrease in the size of a population</p>	<p>There will be no impact to Greater Glider foraging habitat within the Project Area. Additionally, surveys will be undertaken prior to construction at proposed infrastructure locations, further avoiding any hollow-bearing trees. The Project Area is largely cleared however the avoidance of direct impact ensures that it will remain connected to adjacent, larger remnant forests, such as Hinchley SF. Climate change has been identified in the Conservation Advice as a threat to this species in the way that high temperatures and low rainfall affect the species (DCCEEW, 2022a). This includes increased night temperatures resulting in the decline of the Greater Glider. The Project will not contribute to or exacerbate the impacts of climate change on this species as it will not fragment vegetated corridors or inhibit the Greater Glider's ability to move across the landscape in response to potential climate change induced changes to rainfall patterns and temperatures. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species. Therefore, the Project is unlikely to lead to a long-term decrease in the size of the population.</p>	<p>No</p>
<p>Reduce the area of occupancy of the species</p>	<p>This species is predicated to have an area of occupancy of 15,960 km² (Woinarski <i>et al.</i>, 2014). Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. Furthermore, indirect impacts will be avoided through the application of environmental management measures (as detailed in Section 4) such as the designation of 'no go' areas and implementation of weed and pest procedures. Therefore, the Project will not reduce the area of occupancy of the species.</p>	<p>No</p>
<p>Fragment an existing population into two or more populations</p>	<p>Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. No vegetated corridors will be severed, and HDD will be used for the crossing of</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered).</p> <p>Furthermore, given the infrastructure type, the disbursed layout of wells (averaging 500-750 m apart), burial of gathering pipes and post-construction rehabilitation of disturbed areas, light traffic movements at limited speeds, etc. will ensure that Greater Glider foraging habitat remains connected, both within and outside of the Project Area.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>The habitat for Greater Gliders within the Project Area has been concluded to be habitat critical to the survival of the species. This is because the presence of tall, mature Eucalyptus forests with hollow bearing trees, meets the criterion of being habitat necessary for foraging, breeding, roosting or dispersal of the species. Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. Therefore, the Project will not result in an adverse impact to habitat critical to the survival of the species. Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4).</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population</p>	<p>The design phase as well as micro siting will preferentially avoid hollow-bearing trees that are necessary for the successful breeding cycle of the species. Greater Gliders generally have a home range of 1-4 ha or up to 16 ha in more open forests (Henry, 1984; Eyre, 2004). The Project's avoidance of Greater Glider foraging habitat, as well as the design and micro siting efforts to avoid suitable Greater Glider micro-habitat features (i.e., large hollow-bearing trees), will not reduce the home ranges of the species. Thus, the species' ability to successfully breed in the Project Area will be unaffected. Furthermore, indirect impacts are unlikely to disrupt the breeding cycle of a population due to the implementation of mitigation measures including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers,</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
	relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. The habitat within the Project Area will therefore remain connected to larger remnant patches outside of the Project Area. Therefore, the avoidance of impact to Greater Glider foraging habitat will not remove/isolate or decrease the quality of habitat that would result in species decline.	No
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Invasive species such as Feral Cats and European Red Foxes are common pests encountered in Queensland and are particularly harmful to native threatened mammals. Both of these invasive species are known to occur in the Project Area. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on Greater Glider populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.	No
Interfere with the recovery of the species	There is no formal adopted, or made, Recovery Plan for this species. However, the avoidance of clearing of remnant patches and linear areas, will not result in any detrimental effect upon the recovery of this species. Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for Greater Gliders. This will enable the species to be able to continually traverse the landscape, ensuring genetic viability of the population.	No

Significant Impact: Not Significant

Koala (*Phascolarctos cinereus*)

The Project in the Project Area is unlikely to result in a significant impact to the Koala.

The Koala is currently listed as Endangered under the EPBC Act, as of the 12 February 2022. The Koala is generally found in temperate to tropical forests as well as woodlands and semi-arid communities dominated by Eucalyptus species (Martin and Handasyde, 1999). The species can be found in habitat broadly defined as woodlands and open forests, as long as food trees are present (DOE, 2022). The Koala has one of the broadest distributions of threatened terrestrial species under the EPBC Act with a range extending from north-eastern Queensland to the south-east corner of Southern Australia. The biological species distribution is widespread in coastal and inland areas that extends over approximately one million square kilometres (Martin & Handasyde, 1999).

Under the revised *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022c), released on 12th February 2022, habitat for the koala is described as:

Koala habitat includes both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.

Habitat critical to the survival of the species is defined as those that the species relies on to avoid or halt decline and promote the recovery of the species. Under the EPBC Act, the following factors are considered when identifying habitat that is critical to the survival of the species:

- (a) *Whether the habitat is used during periods of stress (examples: flood, drought or fire);*
- (b) *whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);*
- (c) *the extent to which the habitat is used by important populations;*
- (d) *whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;*
- (e) *whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;*
- (f) *whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation;*
- (g) *any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.*

Koalas are known to occur within urban and rural landscapes, utilising regrowth and remnant eucalypt dominated vegetation communities for foraging and breeding resources. Targeted searches for the species were conducted in suitable habitat throughout the Project Area. The field investigations conducted throughout 2022 did not directly record an individual Koala but did find evidence of Koalas through indirect signs of scratch marks on riparian Queensland Blue Gum trees in several locations along Wandoan Creek, Woleebee Creek and a tributary of Hellhole Creek.

Due to the indirect observations of Koala in the form of scratch marks in the Project Area, it has been conservatively concluded that habitat critical to the survival of the species does occur within the Project Area. Habitat has been classified and mapped based on recent habitat guidance for the species (Youngentob, K.N, et al, 2022). In this case the vegetated areas of the Project Area containing koala food trees (e.g., *E. tereticornis*, *E. populnea*, *E. crebra*, *E. longirostrata*, *E.*

melanophloia, *E. exserta* and *Corymbia citriodora subsp. variegata*) were mapped as Koala foraging and breeding habitat. This habitat mapping method and the corresponding three potential habitat types of foraging and breeding is presented in Table 5-6.

Table 5-6: Koala Habitat Types within the Project Area

	Potential Foraging and Breeding Habitat	Potential Dispersal Habitat	Potential Non-koala Habitat
Description	<ul style="list-style-type: none"> ■ Any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees that also provides adequate shelter and refuge from predators. ■ This includes remnant and regrowth vegetation. 	<ul style="list-style-type: none"> ■ Part of the broader landscape that includes grass/bare ground, rural land-uses, dwellings/towns, buildings, farm dams, sealed or unsealed roads and existing rail infrastructure. ■ Contains isolated or scattered foraging or shelter trees. ■ Contains vegetation generally not used frequently for foraging, sheltering and breeding purposes by the species. 	<ul style="list-style-type: none"> ■ Not suitable habitat includes barriers defined in the DCCEEW Guidelines (natural or artificial) that prevent the movement of koalas, such as mountain ranges, large water bodies or treeless areas that are greater than 2 km wide.
Presence within the Project Area	<ul style="list-style-type: none"> ■ Eucalypt woodland to open forest; ■ Woodland to open forest associated with stream channels and rivers; and ■ Open regrowth eucalypt woodland vegetation. 	<ul style="list-style-type: none"> ■ Cleared areas with occasional regrowth eucalypt woodlands along drainage lines; and ■ Vine forest/thickets and rainforest. 	<ul style="list-style-type: none"> ■ Potential non-habitat presents in the Project Area as waterways and treeless areas greater than 2km wide.
Total in the Project Area	<ul style="list-style-type: none"> ■ 698.5 ha foraging and breeding habitat 	<ul style="list-style-type: none"> ■ 9,072.6 ha dispersal habitat 	<ul style="list-style-type: none"> ■ 0 ha non-koala habitat
Total in the Disturbance Footprint	<ul style="list-style-type: none"> ■ 0 ha foraging and breeding habitat 	<ul style="list-style-type: none"> ■ Up to 530 ha dispersal habitat 	<ul style="list-style-type: none"> ■ 0 ha non-koala habitat

The impact assessment has determined the proportion of Koala habitat that will be impacted is minor compared to the total area of Koala habitat within the Project Area. This is provided in Table 5-7. Habitat mapping for the Koala is presented in Figure 2-7.

Table 5-7: Koala Habitat and Impact Quantification

Factors	Foraging and breeding habitat	Dispersal habitat
Total in the Project Area	698.5 ha	9,072.6 ha
Total in Disturbance Footprint	0 ha	Up to 530 ha
% Impacted Relative to Total in Project Area	0%	5.8%

It is noted that the wells for the Project will not inhibit Koala dispersal, and that movement opportunities will remain throughout the mapped potential dispersal habitat and potential foraging and breeding habitat. Therefore, the short-term and temporary disturbance to potential koala dispersal habitat will not result in a significant residual impact to the Koala.

It is noted that impacts within Koala dispersal habitat will be minimised using the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] but will, at times, require the unavoidable disturbance of open areas and removal of individual juvenile and non-juvenile trees and seedlings which are located within a predominantly cleared landscape. Application of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] means that individual juvenile and non-juvenile trees and seedlings will be avoided unless unavoidable due to other constraints, e.g., environmental features and values, cultural heritage values, geological features, landholder/livestock/agricultural requirements and existing or planned landholder, utility or community infrastructure. Senex has committed to not clearing any areas occupied by Koala individuals or areas confirmed as foraging and breeding habitat. Up to 530ha of Koala dispersal habitat is unavoidable.

In respect of the impacts to dispersal habitat, the disturbance is short term and temporary with permeability remaining, such that Koalas can still access and move across the Project Area. Additionally, the proposed mitigation measures will ensure continued Koala movement is maintained, and therefore does not impede the ability for Koalas to disperse across the broader landscape.

The commitment to no impact to foraging and breeding habitat in the Project Area as well impact to 5.8% of dispersal habitat available in the Project Area has been considered as part of the comprehensive assessment for the Koala against the SIG 1.1 for an Endangered species under the EPBC Act. This is found in Table 5-8.

Table 5-8: Significant Impact Assessment for the Koala

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population	There will be no impact on the total available foraging and breeding habitat in the Project Area. However, there will be an unavoidable impact of up to 530 ha, or 5.8% of the total available Koala dispersal habitat within the Project Area. Nonetheless, the impact to habitat will be short-term and will ensure Koala movement is not impeded, as the infrastructure will not impact landscape permeability. Climate change has been identified in the Conservation Advice as a threat to the species in the way that increased frequency and intensity of droughts and high temperatures, increasing prevalence of weather conditions to	No

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>promote bushfires and shrinking climatically suitable areas will impact the Koala (DAWE, 2022c). The Project will not contribute to or exacerbate the impacts of climate change on this species as the activities involved with the Project will not fragment vegetated corridors or inhibit the Koala's ability to move across the landscape in response to potential climate change induced changes to temperatures, rainfall and bushfire patterns. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that impacts are further minimised to the species. Therefore, it is unlikely that the impacts to Koala habitat will lead to a decrease in the size of a koala population.</p>	
<p>Reduce the area of occupancy of the species</p>	<p>The Project will not clear any Koala foraging and breeding habitat within the Project Area. Therefore, the impact will not lead to a reduced area of occupancy of the species. The area of occupancy for the Koala is 19,428 km² as of mapping and records from 2000 from state governments and CSIRO (DAWE, 2020). Thus, the clearing of a relatively small area of Koala dispersal habitat and the nature of the Project infrastructure and activities is unlikely to reduce the area of occupancy for the species.</p>	<p>No</p>
<p>Fragment an existing population into two or more populations</p>	<p>The Project will not fragment existing populations as the Project will not clear Koala foraging and breeding habitat within the Project Area and dispersal function will be maintained across the Project Area. No vegetated corridors will be severed and HDD will be used for crossing of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered).</p> <p>Furthermore, given the infrastructure type, the disbursed layout of wells (averaging 500-750m apart), burial of gathering pipes and post-construction rehabilitation of disturbed areas, light traffic movements at limited speeds, etc it is expected that the Koala will still be able to disperse across tracks and small cleared areas once construction has been completed in each area.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>The foraging and breeding, and dispersal habitat for Koala, has been mapped to occur within the Project Area. The foraging and breeding habitat within the Project Area is regarded as habitat critical to the survival of the species.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>Senex has committed to not clearing any areas occupied by Koala individuals or areas confirmed as potential habitat for the threatened species, with the exception of up to 530 ha of Koala dispersal habitat (5.8% of dispersal habitat). The nature of the infrastructure will allow for Koalas to continue to disperse across the landscape, even where dispersal habitat has been cleared. Therefore, the Project will not adversely affect habitat critical to the survival of the species. All Koala foraging and breeding habitat will be retained within the existing riparian corridors and areas of remnant and regrowth open Eucalypt forest and woodlands. Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex’s suite of management plans (as detailed in Section 4).</p>	
<p>Disrupt the breeding cycle of a population</p>	<p>The impacts of the Project will not result in clearing of foraging and breeding habitat but will unavoidably result in clearing of 5.8% of the available Koala dispersal habitat in the Project Area. The home range for the Koala is highly variable, however evidence suggest it can range from anywhere between 3 to 500 ha (Wilmott, 2020). Evidence of Koalas being present within the Project Area has been found on few occasions (scratch marks) and suggests a low-density population.</p> <p>The Project will not result in clearing of local Koala breeding habitat and is therefore unlikely to disrupt the breeding cycle of this species. Furthermore indirect impacts are unlikely to disrupt the breeding cycle of a population due to the implementation of mitigation measures including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex’s suite of management plans.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
<p>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>The Project will not reduce the Koala foraging and breeding habitat within the Project Area. Mitigation measures implemented, as part of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001], will also ensure that the Project will not modify, destroy or decrease the availability or quality of potential habitat to the extent that the species will decline. Such measures include preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that impacts are further minimised to the species. It is also with the implementation of these mitigation measures, that indirect impacts are also unlikely to be significant to the species.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Invasive species such as Wild Dogs (<i>Canis familiaris</i>), Feral Cats and European Red Foxes are common pests encountered in Queensland and Wild Dogs are particularly harmful to Koalas. These invasive species are known to occur in the Project Area. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area. Furthermore, it is unlikely that the Project will result in any increase in Wild Dog abundance.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline</p>	<p>Koala populations are known to be impacted by diseases, specifically koala retrovirus (KoRV) and Chlamydia (<i>Chlamydia pecorum</i>) and myrtle rust which affects koala feed trees and therefore habitat. There is no evidence to suggest the construction and/or operational activities would introduce a disease, such as Chlamydia, which would cause the species to be at risk of illness and subsequent population decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur, including following biosecurity measures such as ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
<p>Interfere with the recovery of the species</p>	<p>The interim recovery objectives for the Koala are:</p> <ul style="list-style-type: none"> ■ Protect and conserve the quality and extent of habitat refuges for the persistence of the species during droughts and periods of extreme heat, especially in riparian environments and other areas with reliable soil moisture and fertility; and ■ Maintain the quality, extent and connectivity of large areas of Koala habitat surrounding habitat refuges. <p>The Project will not result in an impact to Koala foraging and breeding habitat and only result in a relatively small impact to Koala dispersal habitat within the Project Area (5.8%). It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area.</p> <p>Therefore, the Project will not interfere with the recovery objectives for the species.</p>	<p>No</p>

Significant Impact: Not Significant

Ooline (*Cadellia pentastylis*)

The Project in the Project Area is unlikely to result in a significant impact to Ooline.

Ooline is currently listed as Vulnerable under the EPBC Act, as of 16 July 2000. Habitat for Ooline is made up of 118.7 ha of habitat consisting of relatively narrow remnant and regrowth patches in the far south of the Project Area. During field surveys, Ooline was observed in the adjoining areas (10 km buffer) and in addition, the desktop searches showed four additional records within the Project Area and another six within the 10 km buffer adjoining areas. During the 2023 field surveys, 35 individuals were recorded within the eastern portion of the Hillandale property, adjacent to existing Ooline records. The individuals identified ranged from juveniles to mature plants from 1 to 18 m in height, occurring in mostly cleared agricultural land (Attexo, 2023).

Senex has committed to avoiding all mapped Ooline habitat as well as any individual Ooline plants (should any be found to occur within or adjacent to the proposed disturbance footprints). Additionally, as stated, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within, and within 30 m of all proposed disturbance areas as part of the application of the Project's mitigation measures to ensure that if any individual plants are present, they can be avoided. A significant impact assessment based on guidance provided in the SIG 1.1 for Vulnerable species, is presented in Table 5-9. Mapping for this species is presented in Figure 2-4.

Table 5-9: Significant Impact Assessment for Ooline

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Habitat for Ooline which totals 118.7 ha will be avoided by the Project.	No
Reduce the area of occupancy of an important population	Site ecology surveys (undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] will confirm the location of any individuals present within each proposed disturbance location so they can be avoided. Therefore, the Project will not lead to a decrease in the size of reduce the area of occupancy of or fragment an important population of Ooline.	No
Fragment an existing important population into two or more populations		No
Adversely affect habitat critical to the survival of a species		Senex has committed to avoiding all individual plants (should any be found to occur within or adjacent to the proposed disturbance footprints). The initial avoidance of habitat in the design phase, as well as further on the ground detailed surveys to avoid Ooline individuals during construction will not result in any adverse impacts to habitat critical to the survival of this species.
Disrupt the breeding cycle of an important population	Senex has committed to avoiding all individual plants (should any be found to occur within or adjacent to the proposed disturbance footprints).	No
Modify, destroy, remove or isolate or decrease the	Pre-clearance ecology surveys (undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
availability or quality of habitat to the extent that the species is likely to decline	<p>Planning and Field Development [OPS-ATLS-EN-PLN-001] will confirm the location of any individuals present within or adjoining each proposed disturbance location so they can be avoided.</p> <p>The small amounts of disturbance in the larger context of the landscape will not remove/isolate or decrease the quality of habitat that would result in the species decline.</p>	
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Given the disturbed nature of the Project Area, and from field surveys efforts conducted in 2022 and 2023, weed species are known to occur. Two WoNS species, Common Pest Pear (<i>Opuntia stricta</i>) and Velvety Tree Pear (<i>Opuntia tomentosa</i>), were recorded within the Project Area at moderate densities in Brigalow woodland, and an additional five WoNS species are considered to have a potential to occur within the Project Area. However, vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to disturbance.</p>	No
Introduce disease that may cause the species to decline	<p>The construction and operation of the infrastructure is unlikely to lead to introduction or spread of a disease relevant to the species.</p>	No
Interfere substantially with the recovery of the species	<p>The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. Infrastructure will avoid Ooline habitat and individual Ooline plant locations. Ooline will continue to be able to propagate in areas around the infrastructure and therefore the recovery of the species will not be impacted.</p>	No

Significant Impact: Not Significant

White-throated Needletail (*Hirundapus caudacutus*)

The Project in the Project Area is unlikely to result in a significant impact to the White-throated Needletail.

The White-throated Needletail is currently listed as Vulnerable under the EPBC Act, as of 4 July 2019, as well as being listed as Migratory and Marine. This species has been assessed as known to occur within the Project Area. The White-throated Needletail was not observed during field investigations for the current Project, however, was observed within the Project Area during subsequent field surveys for Senex on 24 November 2022 (Cunningham, M pers. comm.). A flock of eight birds were observed flying low near Weldon's Road. Additionally, there is one record within the Cherwondah SF from 2002.

This species is predominantly aerial when on migration in Australia, occasionally stopping to roost in large patches of rainforest, wooded vegetation and open Eucalypt forests (Coventry, 1989; Higgins, 1999), generally associated with elevated areas. While occasional aerial observations occur for this species, the Project Area is unlikely to contain important foraging habitat for the species. Additionally, no threshold area for important habitat for this species can be determined at present and has not been identified (TSSC, 2019). The Project Area contains no rainforests and no elevated open forests with dense foliage that could be used for occasional roosting. While flights over the Project Area may occur from time to time, only elevated areas are regarded as roosting habitat. Thus, potential habitat has not been mapped for this species, and so no impact area has been calculated.

The significant Impact guidance for Vulnerable species in SIG 1.1, refers to impacts to 'important populations' of a species (DoE, 2013). Important population is defined as a population that is necessary for a species' long-term survival and recovery. This includes populations identified in recovery plans and/or are:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species' range (DoE, 2013).

This species was conservatively concluded to be an important population in the Project Area and the surrounding landscape due to the following reasons. Firstly, there is an absence of detailed population data for the Project Area, and it was recorded within the Project Area in 2022. However, as the White-throated Needletail is a largely aerial species, and the lack of habitat in the Project Area, a significant impact to this species is considered unlikely.

Based on this information, a significant impact assessment in accordance with the SIG 1.1 for a Vulnerable species is presented in Table 5-10.

Table 5-10: Significant Impact Assessment for the White-throated Needletail

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the White-throated Needletail. This is because there is no roosting habitat available, it is likely to be an occasional flyover, and the Project Area is not an important stopover point supporting an ecologically important number of migrating birds.	No
Reduce the area of occupancy of an important population		No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Fragment an existing important population into two or more populations</p>	<p>There will be no impact to White-throated Needletail foraging or roosting habitat within the Project Area. Additionally, this species is almost exclusively aerial when on migration in Australia.</p> <p>It is unlikely that the Project will lead to a long-term decrease in the size of, reduce the area of occupancy of, or fragment an important population. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There is no evidence that the Project Area supports habitat critical to the survival of these species.</p> <p>There will be no impact to White-throated Needletail foraging or roosting habitat within the Project Area. Additionally, this species exhibits highly aerial behaviours when on migration in Australia, stopping only occasionally to roost in elevated wooded areas, and so is unlikely to settle in the Project Area. It is unlikely that habitat critical to the survival of this species will be adversely affected.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>The White-throated Needletail does not breed in Australia, and therefore the Project will not disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>This species is almost exclusively aerial when on migration in Australia and so is unlikely to settle in the Project Area. This Project is unlikely to modify or decrease the availability or quality of habitat to the extent that it will cause species decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Invasive species such as Feral Cats and European Red Foxes are common pests encountered in Queensland and are particularly harmful to native, threatened birds such as the White-throated Needletail. Both of these invasive species are known to occur in the Project Area. Project activities during construction and operation will adopt and follow</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on White-throated Needletail populations. There is also no evidence to suggest the Project would introduce or spread a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.	No
Interfere substantially with the recovery of the species	There is no formal adopted, or made, Recovery Plans for this species. However, small and spread amount of clearing of remnant patches and linear areas, will not affect the recovery of this species. Additionally, the Project Area will remain connected to adjacent State Forests. While this species is predominately aerial, Project activities will still enable habitat to remain connected between the network of State Forests and remnant vegetation in the adjoining areas and the Project Area, ensuring the species will not be substantially interfered with if they were to land and roost within the Project Area.	No

Significant Impact: Not Significant

5.3 Listed Threatened Species with Potential to Occur

Australian Painted Snipe (*Rostratula australis*)

The Project in the Project Area is unlikely to result in a significant impact to the Australian Painted Snipe

The Australian Painted Snipe is currently listed as Endangered and Marine under the EPBC Act, effective 15 May 2013. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

The Australian Painted Snipe inhabits shallow, freshwater wetlands (occasionally brackish) and in ephemeral and permanent waterbodies (i.e., lakes, swamps, claypans, grassland / saltmarsh, dams, rice crops, sewage farms and bore drains), particularly for foraging activities (DCCEEW, 2022c). Potential habitat for the species can be found in all states and territories in Australia. Breeding habitat for the Australian Painted Snipe consists of shallow wetlands with bare mud and both upper parts of the understorey (i.e., shrubs and tall grasses) and canopy cover nearby. Majority of nest records have been recorded from or near small islands within freshwater wetlands, however these can also occur in/near swamps (including cane grass swamps), within flooded areas, in ground cover of water-buttions and grasses, at the base of tussocks, and under low saltbush (DSEWPaC, 2013).

The Project Area includes several small patches of suitable foraging habitat for the Australian Painted Snipe within the ephemeral wetlands on drainage lines; however, potential habitat within the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 79 km north of the Project Area, recorded in cleared non-native vegetation near Bellington Hut State Forest. The record does not list the record date.

The Project Area encompasses 69.7 ha of suitable foraging habitat for the Australian Painted Snipe. Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 5-11.

Table 5-11: Significant Impact Assessment for the Australian Painted Snipe

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population	The Project Area is unlikely to support an important population of the Australian Painted Snipe, as the Project is located outside of the known important areas for the species, and as there are currently no known records of the species within the Project Area or within 79 km of the Project Area. Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species. It is therefore unlikely that the Project will lead to a long-term decrease in the size of, reduce the area of occupancy of, or fragment a population. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee	No
Reduce the area of occupancy of the species		No
Fragment an existing population into two or more populations		No

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There is no evidence that the Project Area supports habitat critical to the survival of these species. There will be no disturbance to Australian Painted Snipe foraging habitat.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 4).</p> <p>It is therefore unlikely that habitat critical to the survival of this species will be adversely affected.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population</p>	<p>There is no evidence that the Project Area supports an important population of this species. Additionally, the Project Area does not contain suitable breeding habitat for the species. Therefore, this Project is unlikely to disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species. The habitat within the Project Area will therefore remain connected to larger patches of potential habitat outside of the Project Area. Therefore, the Project is unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Invasive species such as Feral Cats and European Red Fox are common pests encountered Queensland and are particularly harmful to native, threatened birds. This invasive species is known to occur in the Project Area. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that invasive species are not introduced into the Project Area.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
<p>Introduce disease that may cause the species to decline</p>	<p>There is currently no known evidence suggesting the Australian Painted Snipe is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere with the recovery of the species</p>	<p>The interim recovery objectives for the Australian Painted Snipe include:</p> <ul style="list-style-type: none"> ■ “Sustain a positive population trend (compared to the 2020 baseline counts) in the number of mature individuals of the Australian Painted Snipe.” (DCCEEW, 2022c) <p>Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species.</p> <p>It is noted that the flexibility in spacing of wells and the alignment of the gathering RoW helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area.</p> <p>Therefore, the Project does not interfere with the recovery objectives for the species</p>	<p>No</p>

Significant Impact: Not Significant

Belson’s Panic (*Homopholis belsonii*)

The Project in the Project Area is unlikely to result in a significant impact to Belson’s Panic.

Belson’s Panic (*Homopholis belsonii*) is a grass species that is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this flora species has the potential to occur within the Project Area, as potential habitat is present, and the species has been recorded within the locality (Appendix A).

Belson’s Panic occurs at elevations ranging from 200 m to 520 m above sea level. It is known to occur in dry woodland habitats on poor soils, such as those derived from basalt. It occurs on rocky hills supporting White Box (*Eucalyptus albens*) and in Wilga (*Geijera parviflora*) woodland; flat to gently undulating alluvial areas supporting Belah (*Casuarina cristata*); and soils and plant communities of Poplar Box (*Eucalyptus populnea*) woodlands.

It may also be associated with shadier areas of Brigalow (*Acacia harpophylla*), Myall (*A. melvillei*), and Weeping Myall (*A. pendula*) communities; in Mountain Coolibah (*Eucalyptus orgadophila*) communities; and on roadsides. It is generally found among fallen timber at the base of trees or shrubs, among branches and leaves of trees hanging to ground level or along the bottom of netting fences. The distribution of this species overlaps with the “Brigalow (*Acacia harpophylla* dominant and co-dominant)” EPBC Act-listed threatened ecological community (DEWHA, 2008b).

The Project Area includes several small patches of potential habitat for Belson’s Panic in Eucalypt dominated woodlands, particularly *Eucalyptus crebra*, *E. populnea* and *E. melanophloia*, and Acacia woodlands dominated by Brigalow (*Acacia harpophylla*). The flora species has not been previously recorded within the Project Area; however, there is one record of the species within 10 km of the Project Area. This record is located 2 km north of the Project Area and was recorded in Eucalyptus open forests with a shrubby understorey in 2007.

The Project Area contains a total of 366.3 ha of potential habitat for Belson’s Panic. Senex has committed to avoiding all areas identified as Belson’s Panic habitat. Senex has also committed to preferentially avoiding or, if necessary, relocating or reinstating any individual Belson’s Panic (grass) plants (should any be found to occur within proposed disturbance footprints).

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-12.

Table 5-12: Significant Impact Assessment for Belson’s Panic

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Belson’s Panic was not recorded during the 2022 or 2023 field surveys of the Project Area, and no historical records of the species exists within the Project Area. However, there is one record of the species 2 km north of the Project Area, recorded in 2007.	No
Reduce the area of occupancy of an important population	The Project Area contains 366.3 ha of suitable Belson’s Panic habitat, and Senex has committed to avoiding all identified habitat. Additionally, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas. Senex has also committed to preferentially avoiding or, if necessary, relocating or reinstating any individual Belson’s Panic plants (a	No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>grass that is known to recolonise in cleared or highly disturbed areas (Menkins, 1998) (should any be found to occur within proposed disturbance footprints).</p> <p>It is therefore unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.</p> <p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There are limited areas of potential habitat for this species in the form of isolated patches of Brigalow and Poplar Box open forests and woodlands scattered throughout the Project Area.</p> <p>Senex has committed to avoiding all areas identified as habitat for the threatened species. Additionally, the species has the ability to recolonise in cleared or highly disturbed areas (Menkins, 1998). Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>A total of 366.3 ha of Belson's Panic potential habitat is scattered throughout the Project Area, all of which, will be avoided by the Project. Additionally, the Project will</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>preferentially be located within previously cleared areas and pre-clearance surveys will be completed so that this a grass, which is known to recolonise in cleared or highly disturbed areas (Menkins, 1998), can be preferentially avoided, relocated or reinstated.</p> <p>Belson's Panic flowers from February to May and November to December, with fruiting typically recorded to occur in February. The species has the ability to recolonise in cleared or highly disturbed areas (Menkins, 1998). The small amounts of clearing in the larger context of the landscape will not remove/isolate or decrease the quality of habitat that would result in the species decline.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Given the disturbed nature of the Project Area, and from field surveys efforts conducted in 2022 and 2023, weed species are known to occur. Two WoNS species, Common Pest Pear and Velvety Tree Pear, were recorded within the Project Area at moderate densities in Brigalow woodland, and an additional five WoNS species are considered to have a potential to occur within the Project Area. However, vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to disturbance.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There are currently no known diseases to impact the Belson's Panic. The construction and operation of the infrastructure is unlikely to lead to introduction of a disease relevant to the species.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no formal adopted, or made, Recovery Plans for this flora species. Senex has committed to not clearing any areas identified as habitat for the threatened species.</p> <p>The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. Infrastructure will preferentially avoid threatened species locations (if identified).</p>	<p>No</p>

Significant Impact: Not Significant

Brown Treecreeper (*Climacteris picumnus victoriae*)

The Project in the Project Area is unlikely to result in a significant impact to the Brown Treecreeper

Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) is currently listed as vulnerable under the EPBC Act, effective 3 March 2023. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

The Brown Treecreeper (south-eastern) inhabits dry open eucalypt forests and woodlands, predominantly those dominated by stringybarks or other rough-barked eucalypt species. Favourable habitat for the species must be subjected to a form of ongoing disturbance (i.e., historically Indigenous burning practices) to prevent the ground layer from becoming too dense and uniform, leading to unfavourable habitat (DCCEEW, 2023a).

The species breeds and roosts in open dry eucalypt forest and woodlands with hollows, in either live trees, dead standing trees or tree stumps (considered essential for nesting). Brown Treecreeper (south-eastern) forage for invertebrates on-ground and in mature, live and/or dead trees (Bounds, 2019), with suitable foraging habitat for the species consisting of forests and woodlands with an open, grassy understorey, in which areas with fallen timber provide greater foraging opportunities (DCCEEW, 2023a).

The Project Area includes several patches of potential habitat for the Brown Treecreeper, however the large portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 195 km west of the Project Area, recorded in Blue grass (*Dichanthium*) and tall bunch grass (*Chrysopogon*) tussock grasslands near Barabanbel State Forest in 1960.

The Project Area encompasses 272.1 ha of potential habitat for the Brown Treecreeper. Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-13.

Table 5-13: Significant Impact Assessment for Brown Treecreeper

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Brown Treecreeper, as there are currently no known records of the species within the Project Area or within 195 km of the Project Area.	No
Reduce the area of occupancy of an important population	Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.	No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat critical to the survival of the Brown Treecreeper consists of any known or likely habitat. Therefore, the Project Area does contain habitat critical to the species survival. however, Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is unlikely the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>The species roosts and breeds in dry open eucalypt forests that contain hollow in living and/or dead standing trees. The riparian eucalypt open forests and woodlands within the Project Area contain abundant hollows, including the far south-east corner, which will be avoided by the Project. Habitat features including hollows and loose timber will be avoided or relocated using appropriate removal and translocation methods. Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species, and as such, the Project is unlikely to disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Brown Treecreepers are threatened by invasive species common in Queensland, including Feral Cats, European Red Fox, European Rabbits (<i>Oryctolagus cuniculus</i>) and Noisy Miners (<i>Manorina melanocephala</i>). Although the Noisy Miner are a native species, the introduction of them into Brown Treecreeper habitat has the potential to drive the Brown Treecreeper out of the habitats (if utilised).</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently no known evidence suggesting the Brown Treecreeper is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Collared Delma (*Delma torquata*)

The Project in the Project Area is unlikely to result in a significant impact to the Collared Delma

The Collared Delma (*Delma torquata*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

The Collard Delma occurs in eucalypt dominated woodland and open forest habitats, particularly where suitable micro-habitats (e.g., exposed rocky outcrops) are present (DEWHA, 2008c). The species inhabits ground cover dominated by native grasses (e.g., Kangaroo Grass, Barbed Wire Grass, Wiregrass and Lomandra) (Peck & Hobson, 2007).

The Project Area includes several patches of potential habitat for the Collared Delma, particularly within the far south-eastern corner of the Project Area. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known records of the species are located approximately 113 km north-west of the Project Area, near Bellington Hut State Forest in Eucalyptus open forests with a grassy understorey in 2001 and 2020.

The Project Area encompasses 259.7 ha of potential habitat for the Collared Delma. Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-14.

Table 5-14: Significant Impact Assessment for Collared Delma

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Collared Delma, as there are currently no known records of the species within the Project Area or within 113 km of the Project Area.	No
Reduce the area of occupancy of an important population	Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.	No
Fragment an existing important population into two or more populations	Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Surface rocks are considered critical habitat features to the survival of the Collared Delma. Other critical habitat has not been defined for the species. Habitat features including surface rocks will be avoided or relocated using appropriate removal and translocation methods. Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures, including pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex’s suite of management plans (as detailed in Section 4). It is therefore unlikely that habitat critical to the survival of this species will be adversely affected.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>There is no evidence to suggest the Project Area contains an important population of the Collared Delma, as the species has not been previously recorded within the area and the closest known record is located 113 km south-west of the Project Area in Bellington Hut State Forest. Therefore, the Project is considered unlikely to disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species. As the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>The main threatening invasive species to the Collared Delma is Dwarf Lantana (<i>Lantana montevidensis</i>), however the weed species was not recorded during the 2022 field surveys. Vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species that have the potential to threaten the Collared Delma.</p> <p>Additionally, the Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. Therefore, through the correct implementation of biosecurity measures, it is considered unlikely that the Project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently no known evidence suggesting the Collared Delma is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Corben's Long-eared Bat (*Nyctophilus corbeni*)

The Project in the Project Area is unlikely to result in a significant impact to the Corben's Long-eared Bat.

Corben's Long-eared Bat (*Nyctophilus corbeni*) is currently listed as Vulnerable under the EPBC Act, effective 4 April 2001. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

Within its distribution, Corben's Long-eared Bat inhabits inland woodlands, including box, ironbark, cypress-pine woodlands (particularly in Queensland), Buloke woodlands, Brigalow woodland, Belah woodlands, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee (TSSC, 2015a). The species is most abundant in extensive woodlands, rather than smaller patches and in habitats with distinct tree canopy, dense and cluttered understoreys (Turbill & Ellis, 2006).

Little information is publicly available on the species breeding behaviours and habitats. However, foraging and roosting habitat likely consists of forests and woodlands dominated by *Allocasuarina luehmannii*, *Acacia harpophylla*, *Casuarina cristata*, *Eucalyptus camaldulensis*, and various other types with dead hollow-bearing trees or trees with exfoliating bark. Roosting occurs within dead trees including ironbark, cypress and bull oak, and occasionally under peeling bark. Foraging only habitats consist of remnant and regrowth vegetation and low woodlands.

The Project Area includes several patches of potential habitat for Corben's Long-eared Bat within the southern portion of the Project Area only. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 28 km south-east of the Project Area, recorded in Eucalyptus woodlands with a shrubby understorey in 2002.

The Project Area encompasses 259.6 ha of potential habitat for Corben's Long-eared Bat. Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-15.

Table 5-15: Significant Impact Assessment for Corben's Long-eared Bat

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Corben's Long-eared Bat, as there are currently no known records of the species within the Project Area or within 28 km of the Project Area.	No
Reduce the area of occupancy of an important population	Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.	No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Critical habitat to the survival of the Corben's Long-eared Bat has not been defined in Queensland. The southern populations of the species (in Victoria) appear to rely on old-growth vegetation as a critical component to their distribution, however there is no evidence to suggest this is the case in Queensland. Additionally, Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>The Project Area is unlikely to support an important population of the Corben's Long-eared Bat. The species inhabits a wide range of inland woodland vegetation; however, due to a lack of available information habitat specific for breeding has not been specified in the species' conservation advice. Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. In addition, Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>		<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Predation of the Corben's Long-eared Bat by invasive species has not been demonstrated previously and the risk is unknown, however is considered a potential threat. It is likely that potential predation (if demonstrated) will be by Feral Cats and European Red Fox, which are known to occur in the Project Area and vicinity, respectively.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. Therefore, it is considered unlikely that the Project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Introduce disease that may cause the species to decline</p>	<p>There is currently no known evidence suggesting the Corben's Long-eared Bat is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>
<p>Significant Impact: Not Significant</p>		

Diamond Firetail (*Stagonopleura guttata*)

The Project in the Project Area is unlikely to result in a significant impact to the Diamond Firetail.

Diamond Firetail (*Stagonopleura guttata*) is listed as Vulnerable under the EPBC Act effective 31 March 2023. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

Diamond Firetails prefer habitats with relatively low tree density, minimal large logs and little litter cover. However, these habitats must include high grass cover for foraging, roosting and breeding (Antos et al., 2008).

Foraging habitat for the Diamond Firetail consists of grassy understoreys of open woodlands dominated by *Eucalyptus* spp., *Acacia* spp., and/or *Casuarina* spp., where the species forages exclusively on the ground for ripe grass, herb seeds, green leaves and insects (DCCEEW, 2023b). Diamond Firetail have also been recorded to occur in farmland and grassland with scattered trees (Higgins et al., 2007).

The species roosts in dense shrubs or smaller nests built especially for roosting. Breeding nests are globular structures built either in prickly shrubby understorey, or higher up in associated woodlands or open forests, especially under bird of prey nests.

The Project Area includes several patches of potential habitat for Diamond Firetail throughout the Project Area however the large portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 14 km south-east of the Project Area, in cleared non-native vegetation near Gurulmundi State Forest in 2019.

The Project Area encompasses 1287.4 ha of potential habitat for Diamond Firetail. Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-16.

Table 5-16: Significant Impact Assessment for Diamond Firetail

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Diamond Firetail, as there are currently no known records of the species within the Project Area or within 10 km of the Project Area. The closest record is located in a state forest approximately 14 km south-east of the Project Area.	No
Reduce the area of occupancy of an important population	Diamond Firetails are sedentary birds, only occasionally moving locally, therefore, as no populations have been found within the Project Area or within 10 km of the Project Area, it is considered unlikely that the Project will sustain an important population.	No
Fragment an existing important population into two or more populations	Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.</p> <p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat critical to the survival of the Diamond Firetail consists of eucalypt, acacia or casuarina woodlands, open forests, and lightly timbered habitats, within which, low tree density, few large logs, and little litter cover but high grass cover are critical habitat features.</p> <p>Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>The Project Area is unlikely to support an important population of the Diamond Firetail. The species inhabits eucalypt, acacia and/or casuarina woodlands and open forests, which are present within the Project Area. Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>		<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Diamond Firetail are threatened by invasive species common in Queensland, including European Rabbits, Pied Currawongs (<i>Strepera graculina</i>) and Noisy Miners.</p> <p>Although the Noisy Miner is a native species, it is considered an aggressive species and has the potential to drive the Diamond Firetail out of their habitats (if utilised). However Noisy Miner were not recorded during the field surveys.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline</p>	<p>There is currently no known evidence suggesting the Diamond Firetail is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Dunmall’s Snake (*Furina dunmalli*)

The Project in the Project Area is unlikely to result in a significant impact to the Dunmall’s Snake.

Dunmall’s Snake (*Furina dunmalli*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

Dunmall’s Snake inhabits open forests, dominated by Brigalow (*Acacia harpophylla*), Wattles (*A. burowii*, *A. deanii*, *A. leiocalyx*), native Cypress (*Callitris* spp.) and/or Bulloak (*Allocasuarina luehmannii*), and woodlands on floodplains associated with deep, cracking clays and clay loam soils (Covacevich et al., 1988, Cogger et al., 1993). The species is thought to be nocturnal, seeking fallen timber and in soil cracks for shelter (DoE, 2014a).

The Project Area includes several patches of potential habitat for Dunmall’s Snake within the southern portion of the Project Area only. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 14 km south-west of the Project Area, in Brigalow (*Acacia harpophylla*) forests and woodlands near Yuleba State Forest in 2009.

The Project Area encompasses 259.7 ha of potential habitat for Dunmall’s Snake. Senex has committed to not clearing any areas known to be occupied by Dunmall’s Snake individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-17.

Table 5-17: Significant Impact Assessment for Dunmall’s Snake

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	Dunmall’s Snake was not recorded within the Project Area during the 2022 field surveys, and the species has not been previously recorded within the area. The closest Dunmall’s Snake record is located in Yuleba State Forest, 14 km south-west of the Project Area. Therefore, it is unlikely an important population of the species is present within the Project Area.	No
Reduce the area of occupancy of an important population	Additionally, there is limited habitat within the Project Area with abundant litter, rocks and woody debris, located in the southern portion of the Project Area. This suitable habitat is largely located within the far south-eastern corner which will be avoided by the Project.	No
Fragment an existing important population into two or more populations	Senex has committed to not clearing any areas known to be occupied by Dunmall’s Snake individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>occupancy of an important population and fragment an existing important population of Dunmall's Snake.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Critical habitat for the species has not been defined in the conservation advice, and there is limited habitat within the Project Area (consisting of rocks, litter and woody debris), of which a large portion in the far south-eastern corner will be avoided by the action. Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is abundant available habitat within the surrounding locality, including State Forests. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of the Dunmall's Snake.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>It is unlikely an important population of the species is present within the Project Area. There is limited habitat within the Project Area (consisting of rocks, litter and woody debris), of which a large portion in the far south-eastern corner will be avoided by the action. Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be conducted to survey potential refuge sites (woody debris) for the species and ensure the species is not harmed by the Project if present. It is considered unlikely the Project will disrupt the breeding cycle of an important population of Dunmall's Snake.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>There is limited habitat within the Project Area, with any suitable habitat for the species located in the southern portion of the Project Area. This suitable habitat is largely located within the far south-eastern corner that will be avoided by the Project. Remaining available habitat is located in the south-western corner and in a central area of the southern Project Area. There is 259.7 ha of suitable habitat for the Dunmall's snake. Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is suitable habitat for the species located in the surrounding locality, including state forests. As such, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Predation and habitat occupation by invasive animals is a potential threat to Dunmall's Snake.</p> <p>Weed invasion is not a known threat to the species. Feral predators are a threat to the species and are likely present to some degree in the landscape.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently no known evidence suggesting Dunmall's Snake is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species, and a recovery plan is not required. The approved conservation advice specifies the following priority actions applicable to the Dunmall's Snake (DoE, 2014a):</p> <ul style="list-style-type: none"> • Protect and monitor known populations and identify threats; • Develop a fire management strategy for known populations and habitat; • Minimise adverse impacts from land use including road widening and maintenance; • Identify and control threatening weeds in Dunmall's snake habitat. <p>Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project will not interfere with the recovery of the species.	
Significant Impact: Not Significant		

Five-clawed Worm-skink (*Anomalopus mackayi*)

The Project in the Project Area is unlikely to result in a significant impact to the Five-clawed Worm-skink.

The Five-clawed Worm-skink (*Anomalopus mackayi*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

The Five-clawed Worm-skink inhabits woodlands generally supported by clay-loam soils (Shea et al., 1987), including grassy White Box woodlands, open woodlands and River Red Gum–Coolibah-Bimble Box woodlands (DEWHA, 2008d). Within these woodlands, the species resides in deep burrows and soil cracks. On the surface, the Five-clawed Worm-skink uses fallen logs and timber as sheltering sites (DEWHA, 2008d).

The Project Area includes several patches of potential habitat for the Five-clawed Worm-skink throughout the Project Area. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 150 km south-east of the Project Area, recorded in cleared non-native vegetation in 2002.

The Project Area encompasses 209.6 ha of potential habitat for the Five-clawed Worm-skink. Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-18.

Table 5-18: Significant Impact Assessment for Five-clawed Worm-skink

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	It is unlikely the Project Area sustains an important population of Five-clawed Worm-skink, as the species has not been recorded onsite and the closest record of the species is located 150 km south-east of the Project Area. Habitat suitable for the Five-clawed Worm-skink is present within the Project Area, albeit limited, with an absence of native grasslands with deep cracking clays. Limited habitats in the form of Brigalow woodlands, featuring coarse woody debris and leaf litter cover are present throughout the Project Area. Ephemeral wetlands and creek lines are also present along with cracking clay soils in some areas. Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of	No
Reduce the area of occupancy of an important population		No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	occupancy of an important population and fragment an existing important population of Five-clawed Worm-skink.	
Adversely affect habitat critical to the survival of a species	<p>Critical habitat for the species has not been defined in the conservation advice, and there is limited habitat within the Project Area, with an absence of native grasslands with deep cracking clays. Habitat where present is in the form of Brigalow woodlands, featuring coarse woody debris, leaf litter cover, as well as ephemeral wetlands, creek lines and cracking clay soils in some areas.</p> <p>Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is abundant available habitat within the surrounding locality, including State Forests. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of the Five-clawed Worm-skink.</p>	No
Disrupt the breeding cycle of an important population	<p>It is unlikely the Project Area sustains an important population of Five-clawed Worm-skink, as the species has not been recorded onsite and the closest record of the species is located 150 km south-east of the Project Area.</p>	No
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	No
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Five-clawed worm-skink are predated on by European Red Foxes and Feral Cats which are known to be present within the Project Area.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p> <p>With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	No
Introduce disease that may cause the species to decline, or	<p>There are currently no known diseases to impact the Five-clawed Worm-skink and there is no evidence to suggest the Project would introduce a disease that would cause the species to decline.</p>	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.</p>	
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Grey Snake (*Hemiaspis damelii*)

The Project in the Project Area is unlikely to result in a significant impact to the Grey Snake.

The Grey Snake (*Hemiaspis damelii*) is listed as Endangered under the EPBC Act, effective 5 October 2022. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

In Queensland, the Grey Snake favours woodlands dominated by Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*), on cracking clay soils, and in association with water bodies, including small gullies and ditches, ephemeral wetlands, and floodplains (DCCEEW, 2022d). Within these habitats, the species typically seeks shelter in floodplain environments beneath logs, rocks and soil cracks when required (DCCEEW, 2022d).

Additional habitat for the Grey Snake includes Bluegrass (*Dichanthium sericeum*) and/or Mitchell grass (*Astrelba spp.*) grassland on alluvial plains with cracking soils (DCCEEW, 2022d). In the Western Downs regions of south-east Queensland, a particular association between Grey Snakes and red sodosol soils with a strong contrast between the A horizon and sodic B horizon can be observed.

The Project Area includes several patches of potential habitat for the Grey snake, scattered throughout the Project Area, although majority is located towards the central and northern portions. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 52 km east of the Project Area, near Barakula State Forest, in Eucalyptus open woodlands with shrubby understorey in 2010.

The Project Area encompasses 431.2 ha of potential habitat for the Grey Snake. Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 5-19.

Table 5-19: Significant Impact Assessment for the Grey Snake

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population,	It is unlikely an important population of Grey Snake is present within the Project Area, as the species has not been previously recorded during field surveys. The closest known record of the Grey Snake is located 52 km east of the Project Area, in Barakula State Forest. The Project Area contains a total 431.2 ha of suitable habitat for the Grey Snake, scattered throughout the Project Area, in the form of Brigalow and Belah woodlands within the northern and far-south-eastern portions of the Project Area. Additionally, ephemeral wetlands and creek lines are present, with cracking clay soils in some areas. Although suitable habitat is present, only one frog species, being the Common Green Tree Frog, was recorded during the 2022 field surveys. Common Green Tree Frog is not a preferential frog species for Grey Snake.	No
Reduce the area of occupancy of the species,		No
Fragment an existing population into two or more populations,		No

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, a qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Grey Snake.</p>	
<p>Adversely affect habitat critical to the survival of a species,</p>	<p>No habitat critical to the survival has been defined for the Grey Snake, and no important populations are present within the Project Area.</p> <p>Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is abundant available habitat within the surrounding locality, including State Forests. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of the Grey Snake.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population,</p>	<p>It is unlikely the Project Area sustains an important population of Grey Snake, as the species has not been recorded onsite and the closest record of the species is located 150 km south-east of the Project Area.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline,</p>	<p>The Project Area contains a total 431.2 ha of suitable habitat for the Grey Snake, scattered throughout the Project Area, in the form of Brigalow and Belah woodlands within the northern and far-south-eastern portions of the Project Area. Additionally, ephemeral wetlands and creek lines are present, with cracking clay soils in some areas.</p> <p>Although suitable habitat is present, only one frog species, being the Common Green Tree Frog, was recorded during the 2023 field surveys. Common Green Tree Frog is not a preferential frog species for Grey Snake.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is considered unlikely the Project will modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Grey Snake are vulnerable to Cane Toad (<i>Rhinella marina</i>) toxins when ingested. Cane Toads are known to occur within the Project Area and surrounds, as the invasive species was recorded during the field surveys. Climate change is a threat for the species based on the Conservation Advice in the form that the distribution of the Cane Toad is predicted to encompass the entire geographic range of Grey Snake in Queensland (Kearney et al. 2008). The Project will not contribute to or exacerbate the impacts of climate change. Additionally, the Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There are currently no known diseases to impact the Grey Snake and there is no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere with the recovery of the species.</p>	<p>There is no recovery plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project will not interfere with the recovery of the species.	
Significant Impact: Not Significant		

Northern Quoll (*Dasyurus hallucatus*)

The Project in the Project Area is unlikely to result in a significant impact to the Northern Quoll.

The Northern Quoll (*Dasyurus hallucatus*) is currently listed as Endangered under the EPBC Act, effective 12 April 2005. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

Across its distribution, the Northern Quoll occupies a diverse range of habitats particularly for foraging and dispersal activities, ranging from rocky areas to eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert within close proximity to a permanent water source (SPRAT, 2017). Preferable habitats for the species typically encompass some form of rocky areas for denning with nearby access to vegetated habitats for foraging.

Breeding and denning habitat for the Northern Quoll consists of rocky areas for denning, with dens typically in rock crevices, tree hollows or termite mounds, near vegetated habitats and a permanent water source.

The Project Area includes few patches of potential habitat for the Northern Quoll within the southern portion of the Project Area only, largely associated with eucalypt and acacia woodlands and will be avoided by the Project. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 153 km north-east of the Project Area, recorded in Eucalyptus woodlands with a tussock grass understorey in 1892.

The Project Area encompasses 226.7 ha of potential foraging, breeding and denning habitat for the Northern Quoll. Senex has committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 5-20.

Table 5-20: Significant Impact Assessment for the Northern Quoll

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population,	It is unlikely the Project Area sustains an important population of the Northern Quoll, as the species has not been recorded within the Project Area and the closest record of the species is located 153 km north-east of the Project Area.	No
Reduce the area of occupancy of the species,	Habitat suitable for the Northern Quoll is present within the Project Area, albeit limited. Potential habitats within the Project Area are in the form of rocky areas for breeding, denning and foraging, within the plateau with eucalypt woodland/open forest habitat types in the far south-eastern corner.	No
Fragment an existing population into two or more populations,	The far south-eastern corner of the Project Area will be avoided by the Project. The Project Area contains a total 226.7 ha of potential habitat for the species. Senex has committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be	No

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Northern Quoll.</p>	
<p>Adversely affect habitat critical to the survival of a species,</p>	<p>Habitat critical to the survival of the Northern Quoll is defined as any areas where the species is least exposed to threats or least likely to be in the future (Hill & Ward, 2010).</p> <p>Senex has committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 4).</p> <p>It is therefore unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population,</p>	<p>The breeding season for the Northern Quoll generally occurs during the middle of the year, with young being born in the dry season. The Northern Quoll breeds in rocky areas where dens are made in rock crevices, tree hollows, hollow logs or termite mounds. Habitat features including hollows and large rocks will be avoided or relocated using appropriate removal and translocation methods.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). Therefore, it is considered unlikely that the Project will disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the</p>	<p>The Project Area contains suitable rocky habitats for the Northern Quoll for breeding, denning and foraging purposes. These areas, however, are limited to the far south-eastern corner of the Project Area, which will be avoided by the Project.</p> <p>Additionally, small fragments of Northern Quoll habitat containing microhabitat features can be found scattered in two additional areas within the southern portion of the Project Area. Senex has</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:		
species is likely to decline,	committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>Northern Quoll are vulnerable to Cane Toad toxins when ingested. Cane Toads are known to occur within the Project Area and surrounds, as the invasive species was recorded during the field surveys.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	No
Introduce disease that may cause the species to decline, or	Parasitism is thought to be a threatening factor to the Northern Quoll, particularly the toxoplasmosis disease. However, a later study concluded there is no compelling evidence that the disease is involved in the decline of the species, particularly within the Kakadu National Park (Oakwood & Pritchard, 1999). Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.	No
Interfere with the recovery of the species.	<p>The species recovery plan lists the following objectives (Hill & Ward, 2010):</p> <ul style="list-style-type: none"> ■ Protect the species populations on offshore island from invasion and establishment of cane toads, cats and other potential invasive species; ■ Foster the recovery of Northern Quoll sub-populations in areas where the species has survived alongside cane toads; ■ Halt Northern Quoll declines in areas not yet colonised by Cane Toads; ■ Halt declines in areas recently colonised by Cane Toads; 	No

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<ul style="list-style-type: none"> ■ Maintain secure populations and source animals for future reintroductions/introductions if they become appropriate; ■ Reduce the risk of northern quoll populations being impacted by disease; and ■ Reduce the impact of feral predators on Northern Quolls. <p>Impacts to this species from construction and operation of the infrastructure is limited to a potential marginal reduction in suitable habitat. The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Infrastructure will preferentially avoid threatened species locations. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	
<p>Significant Impact: Not Significant</p>		

Painted Honeyeater (*Grantiella picta*)

The Project in the Project Area is unlikely to result in a significant impact to the Painted Honeyeater.

The Painted Honeyeater (*Grantiella picta*) is currently listed as Vulnerable under the EPBC Act, effective 8 July 2015. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

The Painted Honeyeater inhabits Mistletoe in eucalypt forests and woodlands, riparian woodlands of Black Box and River Red Gum, box-ironbark-yellow gum woodlands, woodlands dominated by paperbarks, acacia spp., casuarina spp., Callitris spp., and occasionally farmlands and gardens (DoE, 2015a). Woodlands with a higher abundance of mature trees are of higher preference for Painted Honeyeater, as these contain a higher abundance of Mistletoes.

Breeding habitat for the Painted Honeyeater consists of Boree/Weeping Myall (*Acacia pendula*) woodlands, Brigalow (*A. harpophylla*) woodlands, box-gum woodlands and box-ironbark forests on the inland slopes of the Great Dividing Range. Additional breeding habitats include forests and woodlands with high quantities of mistletoe and where parasitism rates are high, preferably remnant vegetation. The species typically nests in mature trees that are abundant with mistletoe, where the species may use the mistletoe as a nesting substrate.

The Painted Honeyeater favours mistletoes of the genus *Amyema*, growing on forests and woodland eucalypts and acacias, for foraging and roosting habitat.

The Project Area includes several patches of potential habitat for the Painted Honeyeater scattered throughout the Project Area, however the large portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 47 km south-west of the Project Area, recorded in Eucalypt open forest with tussock grass understorey in 1997.

The Project Area encompasses 272.1 ha of potential habitat for the Painted Honeyeater. Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-21.

Table 5-21: Significant Impact Assessment for Painted Honeyeater

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	It is unlikely an important population of Painted Honeyeater is present within the Project Area, as the species has not been previously recorded during field surveys. The closest known record of the Painted Honeyeater is located 47 km south-west of the Project Area.	No
Reduce the area of occupancy of an important population	The Project Area contains a total 272.1 ha of suitable habitat for the Painted Honeyeater, scattered throughout the Project	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Fragment an existing important population into two or more populations</p>	<p>Area. Areas with a high abundance of mistletoe species in either eucalypt or acacia woodlands provide foraging habitat for this species. Mistletoe is present sparingly in Eucalypt woodlands across the Project Area that could be utilised as habitat for this species. Limited potential habitat of Brigalow woodland is also present within the Project Area.</p> <p>The far south-eastern corner of the Project Area encompasses a large patch of Painted Honeyeater habitat, which will be avoided by the Project. Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Additionally, a qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Painted Honeyeater.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There is no indication the Project Area comprises habitat critical to the survival of the species. Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 4).</p> <p>It is therefore unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>It is unlikely an important population of Painted Honeyeater is present within the Project Area. The species inhabits mature trees in remnant vegetation with a high abundance of mistletoe, which are present in the eucalypt woodlands across the Project Area, albeit sparingly.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that</p>	<p>Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
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 species is likely to decline	Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Painted Honeyeaters and their nests are predated on by Black Rats (<i>Rattus rattus</i>). Although the Noisy Miner is a native species, it is considered an aggressive species and have the potential to drive the Painted Honeyeater out of their habitats. However, Black Rats and Noisy Miners were not recorded during the field surveys. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline, or	There are currently no known diseases to impact the Painted Honeyeater and there is no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.	No
Interfere substantially with the recovery of the species.	The interim recovery objectives for the Painted Honeyeater include: <ul style="list-style-type: none">■ <i>“Measure and sustain a positive population trend (compared to the 2020 baseline counts) in the number of mature individuals of the Painted Honeyeater; and</i>■ <i>Maintain or improve the extent, condition, and connectivity of habitat of the Painted Honeyeater”</i> (DAWE, 2021) Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering RoW helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated	No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests. Therefore, the Project will not interfere with the recovery of the species.	
Significant Impact: Not Significant		

Slender Tylophora (*Vincetoxicum forsteri*)

The Project in the Project Area is unlikely to result in a significant impact to the Slender Tylophora.

Slender Tylophora (*Vincetoxicum forsteri*) is currently listed as Endangered under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this flora species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

- The species grows in dry scrub, open forest and woodlands associated with *Melaleuca uncinata*, *Eucalyptus fibrosa*, *E. sideroxylon*, *E. albens*, *Callitris endlicheri*, *C. glaucophylla*, *Allocasuarina luehmannii*, *Acacia hakeoides*, *A. lineata*, *Myoporum* spp., and *Casuarina* spp. This species occurs within the Border Rivers–Gwydir, Central West, Namoi (NSW), and Border Rivers Maranoa–Balonne (Queensland) Natural Resource Management regions (DEWHA, 2008e).

The Project Area includes several small patches of potential habitat for Slender Tylophora, particularly within the far south-eastern corner of the Project Area. There are five scattered small areas of potential habitats towards the centre of the Project Area, and one small area of potential habitat in the north-west of the Project Area. There are currently no known records of the species within the Project Area or within 100 km of the Project Area, where there is one record from May 1960, in Eucalyptus woodlands with a tussock grassy understorey.

The Project Area contains a total of 122.7 ha, of potential habitat for Slender Tylophora. Senex has committed to not clearing any areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within or adjoining proposed disturbance footprints).

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 5-22.

Table 5-22: Significant Impact Assessment for Slender Tylophora

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population,	It is unlikely the Project Area sustains an important population of Slender Tylophora as the species was not recorded during the 2022 or 2023 field surveys, and no historical records of the species exists within the Project Area or within 100 km of the Project Area. Limited areas of suitable habitat (dry eucalypt woodland) are present within the Project Area. Suitable habitat for the flora species includes areas of dry eucalypt woodland, with riparian and wetland eucalypt communities considered unsuitable for this species. The Project Area contains 122.7 ha of suitable Slender Tylophora habitat, with majority of this habitat located within the far south-eastern corner of the Project Area, which will be avoided by the Project. Senex has committed to not clearing any areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within or adjoining proposed disturbance footprints).	No
Reduce the area of occupancy of the species,		No
Fragment an existing population into two or more populations,		No

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species.</p> <p>It is therefore unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.</p>	
<p>Adversely affect habitat critical to the survival of a species,</p>	<p>There are limited areas of potential habitat for this species in the form of dry eucalypt woodland scattered throughout the Project Area. A large patch located within the far south-eastern corner of the Project Area will be avoided by the Project.</p> <p>Senex has committed to not clearing any areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within or adjoining proposed disturbance footprints). Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population, Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline,</p>	<p>A total of 122.7 ha of Slender Tylophora is scattered throughout the Project Area. Of which, a large patch located within the far south-eastern corner of the Project Area will be avoided by the Project. Additionally, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas to ensure avoidance if any individual plants are present.</p> <p>Slender Tylophora flowers from May to July. The small amounts of clearing in the larger context of the landscape will not remove/isolate or decrease the quality of habitat that would result in the species declining.</p>	<p>No No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Given the disturbed nature of the Project Area, and from field surveys efforts conducted in 2022 and 2023, weed species are known to occur. Two WoNS species, Common Pest Pear and Velvety Tree Pear, were recorded within the Project Area at moderate densities in Brigalow woodland, and an additional five WoNS species are considered to have a potential to occur within the Project Area. However, vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to disturbance.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There are currently no known diseases to impact the Slender Tylophora. The construction and operation of the infrastructure is unlikely to lead to introduction of a disease relevant to the species.</p>	<p>No</p>
<p>Interfere with the recovery of the species.</p>	<p>There is no formal adopted, or made, Recovery Plans for this flora species. Senex has committed to not clearing any areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within or adjoining proposed disturbance footprints).</p> <p>The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Infrastructure will preferentially avoid threatened species locations. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Southern Squatter Pigeon (*Geophaps scripta scripta*)

The Project in the Project Area is unlikely to result in a significant impact to the Southern Squatter Pigeon.

The Squatter pigeon (southern) (*Geophaps scripta scripta*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

Squatter pigeon (southern) foraging only habitat is generally defined as open forests to sparse, open woodlands and scrub, and less often, savannas. Habitats are mostly remnant, regrowth or partly modified vegetation communities dominated in the overstorey by Eucalyptus, Corymbia, Acacia or Callitris species. The species is nearly always found within 3 km of a permanent water source including rivers, creeks and waterholes (TSSC, 2015b).

In Queensland, foraging and breeding habitat for the Squatter Pigeon (southern) is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (i.e., RE Land Zone 5) and lateritic (duplex) soils on low 'jump-ups' and escarpments (i.e., RE Land Zone 7) (TSSC, 2015b).

Dispersal habitat for the species typically consists of any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies.

The Project Area includes several small patches of potential habitat for the Southern Squatter Pigeon largely associated with eucalypt and acacia woodlands in the far south-eastern corner of the Project Area, which will be avoided by the Project. The species not been recorded within the Project Area; however, there is one known record of the species located approximately 6 km east of the Project Area, recorded in cleared non-native vegetation in 2016.

The Project Area contains 164.3 ha of breeding and foraging habitat and 316 ha of dispersal for the Southern Squatter Pigeon. Senex has committed to not clearing any areas known to be breeding or foraging habitat for Southern Squatter Pigeon individuals, however 2.1 ha of dispersal habitat (of previously cleared land) will be impacted by the Project.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-23.

Table 5-23: Significant Impact Assessment for Southern Squatter Pigeon

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Important populations of the species include those in the Darling Downs of southern Queensland (DCCEEW 2023d). While field surveys of the Project Area did not record the species, there is one record of the species approximately 6 km east of the Project Area. As a result, populations potentially occurring within the Project Area and the broader Wandoan region may be 'important populations' or important subpopulations as per the SIG 1.1 definition.	No
Reduce the area of occupancy of an important population		No
Fragment an existing important population into two or more populations	The Project Area contains a total 164.3 ha of breeding and foraging habitat and 316 ha of dispersal habitat for the Southern Squatter Pigeon, largely within the southern portion	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>of the Project Area. Areas associated with eucalypt and acacia dominated woodlands provide potential habitat for the species.</p> <p>The far south-eastern corner of the Project Area encompasses a large patch of Southern Squatter Pigeon habitat, which will be avoided by the Project. Senex has committed to not clearing any areas known as breeding and foraging habitat for the Southern Squatter Pigeon, however up to 2.1 ha of dispersal habitat will be impacted by the Project. These disturbances will be located within previously cleared land, and such are not expected to impact an important population.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Southern Squatter Pigeon.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>All Southern Squatter Pigeon habitat within the Project Area is considered habitat critical to the survival of the species. Senex has committed to not clearing any areas known as breeding and foraging habitat for the Southern Squatter Pigeon, however 2.1 ha of dispersal habitat (of previously cleared land) will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 4).</p> <p>It is therefore unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>Important populations of the species include those in the Darling Downs of southern Queensland (DCCEEW 2023d). While field surveys of the Project Area did not record the species, there is one record of the species approximately 6 km east of the Project Area. As a result, populations potentially occurring within the Indicative Footprint and the broader Wandoan region is potentially considered to be an 'important</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>population' or an important subpopulation as per the SIG 1.1 definition.</p> <p>Senex has committed to not clearing any areas known as breeding and foraging habitat for the Southern Squatter Pigeon, however 2.1 ha of dispersal habitat (of previously cleared land) will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas. Breeding habitat for Southern Squatter Pigeon will not be impacted by the Project.</p> <p>Breeding habitat for the species occurs in stony rises, on sandy soils within 1 km of a permanent water source (Squatter Pigeon Workshop, 2011). There is an overall lack of breeding habitat to the north of the Project Area, as this area is largely cleared with dense pastoral grasses. Potential breeding habitat for the species, in the form of dry woodland habitat remains on and around the plateau in the far south-eastern part of the Project Area, which will be avoided by the Project.</p> <p>Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population.</p> <p>Furthermore, indirect impacts are unlikely to disrupt the breeding cycle of a population through the implementation of mitigation measures, including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.</p>	
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known as breeding and foraging habitat for the Southern Squatter Pigeon, however 2.1 ha of dispersal habitat will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas.</p> <p>Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Southern Squatter Pigeon are predated on by European Red Foxes and Feral Cats which are known to be present within the Project Area. Additionally, grazing by European Rabbits is a known threat to the Southern Squatter Pigeon.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p> <p>With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	No
Introduce disease that may cause the species to decline, or	<p>There is currently limited evidence of diseases causing detrimental effects on Southern Squatter Pigeon populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.</p>	No
Interfere substantially with the recovery of the species.	<p>There is no formal adopted, or made, Recovery Plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known as breeding and foraging habitat for the Southern Squatter Pigeon, however 2.1 ha of dispersal habitat will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas.</p> <p>Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for the Southern Squatter Pigeon.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	No

Significant Impact: Not Significant

Southern Whiteface (*Aphelocephala leucopsis*)

The Project in the Project Area is unlikely to result in a significant impact to the Southern Whiteface.

Southern Whiteface (*Aphelocephala leucopsis*) is listed as Vulnerable under the EPBC Act effective 31 March 2023. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

The Southern Whiteface resides in a wide range of open woodlands and shrubland environments dominated by *Acacia* spp. and *Eucalyptus* spp., particularly where understorey of grasses and/or shrubs are present (DCCEEW, 2023c). Along with the general habitat, breeding and roosting habitat for the species further consists of tree hollows, in either live or dead standing trees.

The Project Area contains several patches of potential habitat for the Southern Whiteface, scattered throughout the Project Area. The portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 57 km south-west of the Project Area, in a campground at Rocky Creek near Yuleba State Forest in 2016.

The Project Area encompasses 938.5 ha of potential habitat for the Southern Whiteface. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-24.

Table 5-24: Significant Impact Assessment for Southern Whiteface

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	It is unlikely an important population of Southern Whiteface is present within the Project Area, as the species has not been previously recorded within the Project Area. The closest known record of the Southern Whiteface is located 57 km south-west of the Project Area.	No
Reduce the area of occupancy of an important population	A total of 938.5 ha of potential habitat for the Southern Whiteface is scattered throughout the Project Area. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species.	No
Fragment an existing important population into two or more populations	As per the approved conservation advice, the species is predicated to have an area of occupancy of 80,000 km ² (DCCEEW, 2023c). Additionally, surveys will be undertaken prior to construction at proposed infrastructure locations. The Project Area is largely cleared however the avoidance of impact ensures that it will remain connected to adjacent, larger remnant forests, like Hinchley State Forest. Climate change has been identified in the Conservation Advice as a threat to this species in the way	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>of increased frequency or length of droughts in south-east Queensland with impacts to food sources (DCCEEW, 2023c). The Project will not contribute to or exacerbate the impacts of climate change, as the Project will not fragment vegetated corridors or constrain the movement of Southern Whiteface across the landscape in response to potential climate change induced changes to rainfall patterns and temperatures. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Southern Whiteface.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Potential habitat for the Southern Whiteface has been concluded to contain habitat critical to the survival of the species, as the Project Area contains living and dead trees with hollows and crevices that are essential for roosting and nesting. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species. Mitigation and management measures of any indirect temporary impacts will not result in an adverse impact to habitat critical to the survival of the species. Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4).</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>It is unlikely an important population of Southern Whiteface is present within the Project Area. Breeding habitat for the Southern Whiteface consists of open woodlands and shrublands with an understorey of grasses or shrubs and tree hollows, in either live or dead standing trees, which are present within the Project Area. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Furthermore, the design phase will avoid hollow-bearing trees that are necessary for the successful breeding cycle of the species. Habitat features including hollows and loose timber will be avoided or relocated using appropriate removal and translocation methods.</p> <p>Furthermore, indirect impacts are unlikely to disrupt the breeding cycle of a population through the implementation of mitigation measures, including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.</p>	
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species. This habitat will therefore remain connected to larger remnant patches outside of the Project Area. Therefore, the Project is unlikely to modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>There is currently limited evidence of invasive species causing detrimental effects on Southern Whiteface populations in Queensland.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently limited evidence of diseases causing detrimental effects on Southern Whiteface populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no formal adopted, or made, Recovery Plan for this species; however, a recovery plan is required. The small and dispersed nature of clearing of remnant patches and linear areas, will not affect the recovery of this species. Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for the Southern Whiteface.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>
<p>Significant Impact: Not Significant</p>		

Yakka Skink (*Egernia rugosa*)

The Project in the Project Area is unlikely to result in a significant impact to the Yakka Skink.

The Yakka skink (*Egernia rugosa*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

The Yakka Skink predominantly inhabits open dry sclerophyll forests and/or woodlands, refuging in cavities under or around surface microhabitats (i.e., beneath rocks, in dense ground vegetation and hollow logs, and soil-bound root systems of fallen trees) (Wilson and Knowles, 1988; Cogger, 2000). Yakka Skink may also occur in cleared habitats, where shelter sites (i.e., tunnel erosion, rabbit warrens and log piles) occur (DoE, 2014b). The species rarely travels far from its shelter site, with presence typically recorded by scat piles near the entrance, as the species use communal defecation sites (Eddie 2012; Wilson 2012). The Yakka Skink further occupy vegetation types including Poplar Box (*E. populnea*), Ironbark (*E. sideroxylon*), Brigalow (*A. harpophylla*), Mulga (*A. aneura*), Bendee (*A. catenulata*), White Cypress Pine (*C. columellaris*) and Lancewood (*A. shirleyi*) woodlands and open forests (DoE, 2014b).

The Project Area contains few scattered small potential habitats without the southern portion, and one large patch of potential Yakka Skink habitat in the far south-eastern corner, which will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 28 km south-east of the Project Area, recorded in other shrublands in 1998.

The Project Area encompasses 228 ha of potential habitat for the Yakka Skink. Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-25.

Table 5-25: Significant Impact Assessment for Yakka Skink

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	Yakka Skink was not recorded within the Project Area during the 2022 field surveys, and the species has not been previously recorded within the area. The closest species record is located approximately 28 km south-east of the Project Area.	No
Reduce the area of occupancy of an important population	An important population of Yakka Skink is defined where “any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified or any microhabitat where colonies are likely to be found” (DSEWPac, 2011). As the species was not recorded during field surveys or previously within the Project Area, or within 28 km of the Project Area, it is considered unlikely that an important population of the species is present within the Project Area.	No
Fragment an existing important population into two or more populations	Within the Project Area, suitable habitat with abundant litter, rocks and woody debris occurs in large remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner. The species is unlikely to occur in	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>the northern or central parts of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitats features for this species.</p> <p>Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Yakka Skink.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat critical to the survival for Yakka skink has not been defined in the species conservation advice. Known important habitat of Yakka Skink is defined where any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified or any microhabitat where colonies are likely to be found" (DSEWPaC, 2011). The Project Area contains abundant litter, rocks and woody debris in large remnant areas of forests and woodlands associated with the escarpment and plateau in the far south-eastern corner. This area of habitat will be avoided by the Project.</p> <p>Additionally, small fragments of Yakka Skink habitat containing microhabitat features can be found scattered in two additional areas within the southern portion of the Project Area. However, Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species, as thus, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>The breeding season for the Yakka Skink is currently unknown.</p> <p>Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). Therefore, it is considered unlikely that the Project will disrupt the breeding cycle of an important population.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project Area contains abundant litter, rocks and woody debris in large remnant areas of forests and woodlands associated with the escarpment and plateau in the far south-eastern corner. This area of habitat will be avoided by the Project. Additionally, small fragments of Yakka Skink habitat containing microhabitat features can be found scattered in two additional areas within the southern portion of the Project Area. Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species, as thus, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Yakka Skink are threatened by invasive species common in Queensland, including European Red Fox and Feral Cats, which are known to occur in the project Area. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline, or	There is currently no known evidence suggesting the Yakka Skink is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan (SENEX-QLDS-EN-PLN-001) and Senex Queensland Weed Hygiene Procedure (SENEX-QLD-EN-PRC-023) (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Interfere substantially with the recovery of the species.	There is no recovery plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas potential confirmed as habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Infrastructure will preferentially avoid threatened species locations. Additionally, the Project Area will remain connected to adjacent State Forests.	No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project will not interfere with the recovery of the species.	
Significant Impact: Not Significant		

Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*)

The Project in the Project Area is unlikely to result in a significant impact to the Yellow-bellied Glider (south-eastern).

The Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*) is currently listed as Vulnerable under the EPBC Act, effective 2 March 2022. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (Appendix A).

Yellow-bellied Glider (south-eastern) typically resides in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests (DAWE, 2022d). Within their favourable habitats, Yellow-bellied glider (south-eastern) show a preference for large patches of mature old growth forests (typically 100 years in age) as these provide suitable trees for foraging and shelter.

More specifically, breeding and denning habitat for Yellow-bellied Glider (south-eastern) consists of Eucalypt dominated woodlands and forests with hollow-bearing trees, primarily in living, smooth-barked eucalypts. Stags, being standing dead trees, are also used for denning purposes, however these only account for two percent of den trees in certain forest types.

The Project Area includes few patches of potential habitat for the Yellow-bellied Glider (south-eastern) within the southern portion of the Project Area only, including a large patch within the far south-eastern corner that will be avoided by the Project. The species has not previously been recorded within the Project Area, however there are three known records within 10 km of the Project Area. These records are all located within Eucalyptus open forests with a grassy understorey of Cherwondah State Forest and were recorded in 2009.

The Project Area encompasses 145.8 ha of potential habitat for the Yellow-bellied Glider (south-eastern). Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 5-26.

Table 5-26: Significant Impact Assessment for Yellow-bellied Glider (south-eastern)

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	There are no known important populations of the Yellow-bellied Glider (south-eastern) located within the vicinity of the Project Area. The species was not recorded during field surveys of the Project Area and there are no known historical records within the Project Area. However, there are three records of the species within a 10 km buffer of the Project Area and were all recorded within Cherwondah State Forest in 2009. The Project Area contains 145.8 ha of potential habitat for the Yellow-bellied Glider (south-eastern), of which is largely located in the far south-eastern corner of the Project Area. This area will be avoided by the Project. Additional potential habitat, in the form of eucalypt dominated woodlands with the presence of hollow-bearing trees, is also located in the south-western corner of the Project Area.	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species. Additionally, surveys will be undertaken prior to construction at proposed infrastructure locations, further avoiding any hollow-bearing trees. The Project Area is largely cleared however the avoidance of impact ensures that it will remain connected to adjacent, larger remnant forests, like Hinchley State Forest. Climate change has been identified in the Conservation Advice as a threat to this species in the way that high temperatures and low rainfall affect the species (DAWE, 2022d). The Project will not contribute to or exacerbate the impacts of climate change, as the Project will not fragment vegetated corridors or constrain the movement of Yellow-bellied Glider (south-eastern) across the landscape in response to potential climate change induced changes to rainfall patterns and temperatures. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex’s suite of management plans (as detailed in Section 4) will ensure that both direct and indirect impacts are further minimised to the species. Therefore, the Project is unlikely to lead to a long-term decrease in the size of the population.</p>	
<p>Reduce the area of occupancy of an important population</p>	<p>There are no known important populations of the Yellow-bellied Glider (south-eastern) within the Project Area. As per the approved conservation advice, the species is predicated to have an area of occupancy of 12,724 km² (DAWE, 2022d). Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species. Additionally, indirect impacts will be avoided through the application of environmental management measures such as the designation of ‘no go’ areas and implementation of weed and pest procedures. Therefore, the Project is considered unlikely to reduce the area of occupancy of the species.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Fragment an existing important population into two or more populations</p>	<p>There are no known records of the species within the Project Area, and the species was not recorded during field surveys. A total of 145.8 ha of potential habitat for the Yellow-bellied Glider (south-eastern) is located within the Project Area. Of which, the vast majority of potential habitat is located within the far south-eastern corner of the Project Area and will be avoided by the Project. Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species and the Project will not fragment existing populations (if any).</p> <p>No vegetated corridors will be severed, and HDD will be used for crossing of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered).</p> <p>Furthermore, given the infrastructure type, the disbursed layout of wells (averaging 500-750 m apart), burial of gathering pipes and post-construction rehabilitation of disturbed areas, light traffic movements at limited speeds, etc. will ensure that Yellow-bellied Glider (south-eastern) habitat remains connected, both within and outside of the Project Area.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Potential habitat for the Yellow-bellied Glider (south-eastern) has been concluded to be habitat critical to the survival of the species, as the Project Area contains large contiguous areas of floristically diverse eucalypt forest, mature living hollow-bearing trees. However, a large portion of this potential habitat is located within the far south-eastern corner of the Project Area and will be avoided by the Project. Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Mitigation and management measures of any indirect temporary impacts will not result in an adverse impact to habitat critical to the survival of the species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 4).</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Disrupt the breeding cycle of an important population</p>	<p>Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species. Furthermore, the design phase as well as micro siting will preferentially avoid hollow-bearing trees that are necessary for the successful breeding cycle of the species. Yellow-bellied Glider (south-eastern) has an exclusive home range of 50-65 ha (DAWE, 2022d). However, through the design phase and micro siting efforts, the Project will not reduce the home ranges for the species. Therefore, if the species is present within the area, they will be able to successfully breed.</p> <p>Furthermore, indirect impacts are unlikely to disrupt the breeding cycle of a population through the implementation of mitigation measures, including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species. This habitat will therefore remain connected to larger remnant patches outside of the Project Area. Therefore, the Project is unlikely to modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Yellow-bellied Gliders (south-eastern) are predated on by European Red Foxes, feral deer (family Cervidae) and Feral Cats which are known to be present within the Project Area.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p> <p>With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently limited evidence of diseases causing detrimental effects on Yellow-bellied Glider (south-eastern) populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no formal adopted, or made, Recovery Plan for this species. Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for Yellow-bellied Gliders (south-eastern). This will enable the species to be able to continually traverse the landscape, ensuring genetic viability of the population.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

5.4 Listed Migratory Species Known or Likely to Occur

White-throated Needletail (*Hirundapus caudacutus*) and Fork-tailed Swift (*Apus pacificus*)

The Project in the Project Area is unlikely to lead to a significant impact to the White-throated Needletail and Fork-tailed Swift.

The White-throated Needletail is a largely aerial species when on migration through Australia, only occasionally stopping to roost in Eucalypt forests (Higgins, 1999). A flock of eight birds were observed flying low through the Project Area but were not observed to land or roost. As a result, it is considered unlikely there will be a significant impact. It should be noted that this species is also listed as Vulnerable under the EPBC Act, however due to its aerial nature, it is also unlikely to be significantly impacted by Project activities.

The Fork-tailed Swift is almost exclusively aerial and occur mostly over inland plains and sometimes above foothills and coastal areas (Higgins, 1999). The Fork-tailed Swift was not observed during field surveys, and potential foraging habitat was assessed to occur over dry open habitats, where it would fly aerially over. Therefore, no habitat mapping was mapped on the ground.

The SIG 1.1 state that actions likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- 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;
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Important habitat for migratory species is explained as:

- 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.

An ecologically significant proportion of the population can be characterised by species population status, genetic distinctiveness and species-specific behavioural patterns.

The White-throated Needletail does not breed in Australia and exhibits highly aerial behaviour during its migration. Its migratory flightpath, which traverses the coastal extent of the Australia's eastern coast, does not occur over the Project Area. Additionally, this species occurs over a large range, throughout eastern and south-eastern Australia. According to the draft referral guideline for 14 birds listed as migratory species (DoE, 2015a), a nationally ecologically significant population of the White-throated Needletail population is defined as 10 individuals (0.1% of total population; DoE, 2015a). A single observation of eight individuals in a flock recorded during ecology surveys undertaken within the Project Area was below the threshold for a nationally important population. The draft referral guideline recognises that different types of development (e.g., tall buildings, powerlines and wind turbines) have the potential to have different impacts that are hard to predict, however suggests more targeted surveys may only be required when project including wind turbines, tall buildings, airport developments etc. are proposed within the White-throated needletail's range and or near its important habitats. The Project infrastructure is not conducive to causing annual mortality rates or affecting breeding cycles of White-throated Needletail meeting or exceeding the threshold for a nationally

important population (10 individuals). Additionally, given the paucity of important habitats, and that the Project is committed to avoiding any habitats for MNES species, the Project is regarded as unlikely to cause a significant impact on the species.

The Fork-tailed Swift occurs across a large array of inland plains and foothills and is almost exclusively aerial in Australia. A nationally ecologically significant proportion of the Fork-tailed Swift population is defined as 100 individuals (0.1%; DoE, 2015a). For this reason, the Project Area is not regarded as important habitat for this species and is unlikely to contain an ecologically significant proportion of the population. Additionally, as it is almost exclusively aerial, Project activities are not predicted to cause any impacts to the species.

As both migratory species have been concluded not be an important population, and/or ecologically significant proportion of a populations, an assessment against the SIG 1.1 criteria for Migratory species has not been undertaken. Overall, the Project in the Project Area is unlikely to lead to a significant impact to either of the migratory species.

5.5 Listed Migratory Species with a Potential to Occur

The following bird species are all listed as Migratory and/or Marine under the EPBC Act and have the potential to occur within the Project Area (Appendix A):

- Satin Flycatcher (*Myiagra cyanoleuca*);
- Rufous Fantail (*Rhipidura rufifrons*);
- Common Sandpiper (*Actitis hypoleucos*);
- Sharp-tailed Sandpiper (*Calidris acuminata*);
- Latham's Snipe (*Gallinago hardwickii*); and
- Oriental Cuckoo (*Cuculus optatus*) – Migratory only.

Ecologically significant proportions of the populations of each of these species are listed in Table 5-27. As the Project Area is not expected to provide habitat for ecologically significant proportions of a population for any of these species, an assessment against the SIG 1.1 criteria for Migratory species has not been undertaken. Overall, the Project in the Project Area is unlikely to lead to a significant impact to any of these migratory species.

Table 5-27: Ecologically Significant Proportions of Populations for Migratory Species with a Potential to Occur

Species	Ecologically Significant Proportion of a Population (0.1%)*
Satin Flycatcher	1,700
Rufous Fantail	4,800
Common Sandpiper	190
Sharp-tailed Sandpiper	85
Latham's Snipe	30
Oriental Cuckoo	1,000

*As defined for each species in the DoE (2015a) and Hansen et al. (2016).

5.6 Cumulative Impacts

The Atlas Stage 3 Gas Project (the Project) will be serviced by the ARC Pipeline proposed by ARC Pipeline Pty Ltd. Potential impacts of the ARC Pipeline, as detailed in the ARC Pipeline EPBC Act MNES Ecological Assessment Report (e2m, 2024), are the subject of a separate referral under the EPBC Act.

To address cumulative impacts of the Atlas Stage 3 Gas Project (the Project) and the ARC pipeline projects on MNES, consideration has been given to the combined impact of both projects on known and likely-to occur MNES identified in this report. An assessment of cumulative impacts on these MNES, based on information contained in the ARC Pipeline EPBC Act MNES Ecological Assessment Report, is provided below.

As indicated in the ARC Pipeline EPBC Act MNES Ecological Assessment Report (e2m, 2024), the ARC Pipeline has the potential to result in direct and indirect impacts to MNES known and likely to occur. As per the ARC Pipeline EPBC Act MNES Ecological Assessment Report (e2m, 2024) a suite of planning and management actions will be implemented to avoid, minimise and mitigate potential impacts from the ARC Pipeline on those matters.

Assessment against the SIG 1.1 Criteria was conducted which determined that the ARC Pipeline is unlikely to result in a significant residual impact on MNES.

As part of the Atlas Stage 3 Gas Project (the Project), Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). With the implementation of the proposed controls and mitigation measures, the Atlas Stage 3 Gas Project (the Project) is unlikely to result in any significant indirect impacts to any MNES. Given the above and noting that the ARC Pipeline is unlikely to result in a significant impact on MNES (having regard to the scale, context and intensity of direct impacts on MNES), it is unlikely that Atlas Stage 3 Gas Project (the Project) and the ARC Pipeline will cumulatively result in a significant impact on MNES prescribed under the EPBC Act.

6. CONCLUSION

This EPBC Act Ecology SIA was developed to determine the ecological values within the Project Area, and then to assess the potential impacts to these values. BOOBOOK Ecological Consulting undertook terrestrial field ecological surveys via targeted vehicle based and foot traverses of the Project Area, over the periods of 14 – 18th March 2022, 22 – 25th March 2022; 30 April – 5th May 2022, and 9 – 13th June 2022. Aquatic field ecological surveys were undertaken by Freshwater Ecology over an eight-day period (14 – 21 March 2022). Attexo Group undertook targeted flora surveys including surveys for Ooline (*Cadellia pentastylis*) between 31 January and 3 February 2023 and prepared a threatened flora survey memorandum.

The results from both the terrestrial and aquatic surveys have been incorporated into this EPBC Act Ecology SIA. The terrestrial field investigations involved using survey techniques aligned with survey guidelines including vegetation assessments, BioCondition assessment, targeted flora and fauna surveys and habitat assessment. The aquatic field surveys involved aquatic habitat assessments, water quality, macroinvertebrate samples and flora and fauna surveys. The EPBC Act Ecology SIA also involved a desktop assessment using several publicly available databases, mapping and aerial imagery.

Baseline botanical surveys were undertaken to describe dominant flora and vegetation community structure within the Project Area. Ground-truthing of the Regional Ecosystem (RE) vegetation communities within the Project Area was undertaken using the quaternary level of data collection as described by Neldner *et al.* (2022). The DoR mapping was generally consistent with ground-truthing performed during field investigations.

Management practices have been recommended to manage the potential impacts to terrestrial and aquatic ecology associated with the proposed activities in the Project Area. It is expected that by implementing the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001], adherence to the conditions stipulated in the relevant approvals, as well as the management practices identified in this EPBC Act Ecology SIA and the SSMP, the extent of habitat removed and associated impacts to flora and fauna (including MNES species) will be minimal.

Indirect disturbances to terrestrial and aquatic ecosystems relating to weeds and pests, displacement and degradation of habitat, as well as potential for mortality of fauna, will be able to be effectively managed by implementing the environmental management practices outlined.

For MNES protected under the EPBC Act, two listed Threatened Ecological Communities (TEC), six listed threatened species (five fauna and one flora) and two listed migratory species were assessed as known or likely to occur in the Project Area, due to direct field observations within the Project Area or recent historical records. The TECs were Brigalow (*Acacia harpophylla* dominant and co-dominant) and Poplar Box Grassy Woodland on Alluvial Plains. The listed threatened species were the Dulacca Woodland Snail, Koala, Glossy Black-cockatoo, Greater Glider, Koala, Ooline and White-throated Needle-tail. The listed migratory species were the White-throated Needle-tail and Fork-tailed Swift. An additional 16 listed threatened species (14 fauna and two flora) and six listed migratory species were assessed as having the potential to occur in the Project Area.

The Project will avoid disturbance to TECs and other remnant vegetation and advanced regrowth (which represents the majority of habitat for threatened and migratory species). Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm on-ground biodiversity values will be undertaken by a suitably qualified person. It is noted that Senex has committed to not clearing any individual Ooline or Slender Tylophora plants or areas identified as potential habitat for any threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat. The only direct disturbance to mapped potential habitat for threatened species will be clearing of Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). Belson's Panic (a grass) has not been recorded in the Project Area but is

known to have the ability to recolonise in cleared or highly disturbed areas (Menkins, 1998). Should any be found in cleared or highly disturbed areas within a highly constrained proposed disturbance footprint it will be preferentially avoided or, if necessary, relocated or reinstated.

Further mitigation measures that will, or have already been implemented as a part of the Project to mitigate any direct or indirect impacts will include:

- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-015];
- Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001];
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017];
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-0013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-0014];
- Delineation of 'no-go' areas clearly indicated for avoidance;
- Restricting access tracks to only low-level traffic with restricted speed;
- Erosion and sediment control measures;
- Dust management; and
- Appropriate storage and handling of fuel, oil and chemicals and appropriate spill response equipment.

The significant impact assessments undertaken against the relevant guideline (SIG 1.1 Guidelines), assessed the potential impacts as well as the implemented mitigation and management measures, to determine whether or not the Project would result in any significant impacts to likely or known MNES.

MNES Significant Impact Assessment Outcomes:

The following dot points detail the significant impact assessment outcomes for MNES against the SIG 1.1. The outcomes for TECs in the Project Area are as follows:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) is present as 17 patches totalling 95.8 ha (<1%) of the Project Area (as shown in Figure 2-3), all of which will be avoided by the Project; and
- Poplar Box Grassy Woodland on Alluvial Plains is present as 10 patches totalling 32.3 ha (<0.4%) of the Project Area (as shown Figure 2-3), all of which will be avoided by the Project.

The following dot points detail the significant impact assessment outcomes for listed threatened and/or migratory MNES that were assessed as either known or likely to occur in the Project Area:

- Dulacca Woodland Snail totalling 666.3 ha of habitat within the Project Area (as shown Figure 2-10), all of which will be avoided by the Project;
- Glossy Black-cockatoo (south-eastern subspecies) totalling 1,003 ha of habitat within the Project Area (as shown Figure 2-9), all of which will be avoided through careful design of the Project;
- Greater Glider totalling 528 ha of habitat within the Project Area (as shown Figure 2-8), all of which will be avoided by the Project;
- Koala totalling 698.5 ha of foraging and breeding habitat within the Project Area (as shown on Figure 2-7), all of which will be avoided through careful design of the Project such that there will be no disturbance to foraging and breeding habitat for the species. A total of 9,072.6 ha of Koala dispersal habitat occurs within the Project Area and impact upon this habitat will be minimised

through careful design of the Project such that any direct disturbance to habitat for the species will not exceed 530 ha; and

- Habitat for Ooline is made up of 118.7 ha of habitat consisting of relatively narrow remnant and regrowth patches in the far south of the Project Area (all of which will be avoided by the Project) (habitat mapped on Figure 2-4). Senex has also committed to avoiding all individual Ooline plants (should any be found to occur within proposed disturbance footprints). Additionally, as stated, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas as part of the application of the Project's mitigation measures to ensure that if any individual plants are present, they can be avoided.

It is noted that the White-throated Needletail (*Hirundapus caudacutus*) is known to occur within the Project Area, however it is likely only to be an aerial flyover visitor due to the lack of suitable roosting areas in the Project Area. Therefore, no habitat will be directly or indirectly impacted for this species. Further, the White-throated Needletail along with the Fork-tailed Swift were identified as listed migratory species known and likely to occur respectively. As with the White-throated Needletail, the Fork-tailed Swift was concluded to be an aerial flyover visitor only and so both migratory species were concluded to not be at risk of being significantly impacted by the Project.

Significant impact assessments were also conducted for listed threatened MNES that were assessed as having the potential to occur in the Project Area. It was concluded that all listed threatened species that have the potential to occur in the Project Area will not be significantly impacted by the Project. Significant impact assessments were deemed not necessary for listed migratory species, based on the estimations that if populations of these species are present, they are likely to not be an ecologically significant proportion of the population.

Biosecurity Issues

Eight introduced flora and three fauna species signs were recorded during field surveys. The three fauna species are listed as Restricted Invasive animals under the *Biosecurity Act 2014* including Dingo/Wild Dog, European Rabbit and Pig (*Sus scrofa*). Five flora, Common Pest Pear, Tiger Pear (*Opuntia aurantiaca*), Harrisia Cactus (*Harrisia martini*), Mother-Of-Millions (*Kalanchoe delagoensis*) and Velvety Tree Pear are listed as Restricted Matters under the *Biosecurity Act 2014*.

Opuntia species recorded are also classified as Weeds of National Significance. As mentioned above, appropriate biosecurity measures will be implemented to ensure that any biosecurity risks are minimised and will not impact MNES.

Concluding Remark

As most of the Project Area is cleared, the Project will be able to avoid direct impacts to all naturally vegetated habitat areas. The Project's mitigation measures, including Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] will be used to guide infrastructure siting, minimise direct and indirect disturbances and ensure the Project does not disturb MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat. As detailed in this report, the Project has been assessed against the relevant Commonwealth guidelines (SIG 1.1) and it has been determined that, with the implementation of the proposed controls and mitigation measures, the Project is unlikely to result in any significant direct or indirect impacts to any ecological MNES.

A separate assessment of cumulative impacts for the Project and the ARC Pipeline (the subject of a separate referral under the EPBC Act) determined that these projects would not result in a significant cumulative impact on MNES.

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APPENDIX A LIKELIHOOD OF OCCURRENCE OF MNES

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
Listed Threatened Species							
Flora							
<i>Acacia curranii</i>	Curly-bark Wattle	V	V	No	Yes – Locality	<p>This species is found in dry sclerophyll forests of heath associated with rock pavements. It is commonly found growing on toeslopes and north-facing crests of hills and ranges. They occur on mainly stony soils with an extensive bedrock crop, where they can also be found on sandstone forming red sandy soils.</p> <p><i>Suitable habitat (heath associated with rock pavements) is patchily distributed to the south of the Project Area, but not within the Project Area.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. This species is considered unlikely to occur due to the absence of suitable habitat (heath associated with rock pavements on land zone 7) within the Project Area. The nearest confirmed population is approximately 15 km south-southeast of the Project Area near the southern boundary of Gurulmundi State Forest (DES 2022a). <p>No records exist within the Project Area however, ten records exist within the Locality in suitable habitat heath associated with rock pavements on the southern boundary of Gurulmundi State Forest in 1982.</p>
<i>Arthraxon hispidus</i>	Hairy Joint Grass	V	V	No	No	<p>Growing in or on the edges of rainforest and in wet Eucalypt forest, often near creeks or swamps (TSSC, 2008). It has been recorded from many locations in north-eastern NSW and southeast Queensland. Outlying and disjunct populations of this species associated with springs and spring-fed wetlands occur in the Carnarvon Range and Taroom area (DES 2022h).</p> <p><i>There is a lack of suitable rainforest, wet Eucalypt forest or spring-fed wetland habitats within the Project Area.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> The Project Area is within the known distribution of the species Lack of suitable rainforest and wet Eucalypt forest habitat, as well as spring-fed wetlands in the Project Area <p>No recent records exist for this species within the Project Area/ Locality and no observations were made during field surveys. The closest record of the species was recorded 80 km north-east of the Project Area, in cleared, non-native vegetation near Dawson River in 1995.</p>
<i>Cadellia pentastylis</i>	Ooline	V	V	No	Yes – Project Area and Locality.	<p>Ooline grows in SEVT and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone. The species forms a closed or open canopy, as a dominant or commonly with White Box (<i>Eucalyptus albens</i>) and White Cypress Pine (<i>Callitris glaucophylla</i>), with an open understorey and leaf litter dominating the forest floor.</p> <p><i>This species is present in the southern part of the Project Area (South of Giligulgul Road). It was observed as retained isolated trees and clumps or extensively in remnant Brigalow woodlands.</i></p>	<p>Known to occur</p> <ul style="list-style-type: none"> This species is present in the far south-eastern corner of the Project Area (South of Giligulgul Road). It was observed as retained isolated trees and clumps or in remnant Brigalow woodlands. Thirty-five (35) specimen records occur within the Project Area and another six (6) records occurred within the 10 km desktop search area (DES 2022a). This species is locally abundant in Brigalow woodland around the plateau in the south-eastern corner of the Project Area. It was observed as isolated trees and clumps or as a common tree in Brigalow woodland in Gurulmundi State Forest, Stones Country Resource Reserve and adjacent properties, however these forests and reserves are outside of the Project Area. <p>Based on field surveys in 2022 and 2023, the area of known Ooline occurrence is restricted to a limited portion of the Project Area in the south-east corner, within Brigalow woodlands and adjacent cleared exotic pasture areas as isolated trees.</p>

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Calytrix gurulmundensis</i>	Gurulmundi Fringe-myrtle	V	V	No	Yes – Locality.	This species is recorded as having an area of occurrence in open shrubland with sparse stunted <i>Eucalypt</i> , <i>Casuarina</i> and <i>Acacia</i> spp., Often they are also found in <i>Triodia</i> spp. hummock grasslands with shallow red gravelly soil and on sandstones. <i>Suitable habitat (heath associated with rock pavements) is patchily distributed to the south of the Project Area, but not within the Project Area.</i>	Unlikely to occur <ul style="list-style-type: none"> Project Area is within the distribution for the species. <p>There is no suitable habitat (heath associated with skeletal soils and rock pavements on land zone 7) within the Project Area. This habitat type and the species are abundant in Gurulmundi State Forest to the south, including 26 specimen records within 10 km of the Project Area between 1961 and 2021 (DES 2022a). The species is abundant on the plateau area to the south of the Project Area including parts of Gurulmundi SF, Stones Country Resources Reserve and adjacent properties.</p>
<i>Dichanthium setosum</i>	Bluegrass	-	V	No	No	Associated with heavy basaltic black soils and red-brown loams with clay subsoils. Often found in moderately disturbed areas. Threats relate to heavy grazing, clearing for pasture improvement and cropping, fire, introduced grasses and road widening. Associated species include White Box (<i>Eucalyptus albens</i>), Silver-leaved Ironbark (<i>E. melanophloia</i>), Yellow Box (<i>E. melliodora</i>), Manna Gum (<i>E. viminalis</i>), Amulla (<i>Myoporum debile</i>), Purple Wiregrass (<i>Aristida ramosa</i>), Kangaroo Grass (<i>Themeda triandra</i>). <i>Associated species not present within the Project Area and the substrates present were not preferred by the species (prefers basalt derived soils).</i>	Unlikely to occur <ul style="list-style-type: none"> The Project Area is within the known distribution of the species. Associated species are not present within the Project Area and the substrates present were not preferred by the species (prefers basalt derived soils). <p>No recent records exist for this species within the Project Area, however the species has been recorded within the locality, in cleared non-native vegetation in 1971 and 2017.</p>
<i>Homopholis belsonii</i>	Belson's Panic	E	V	No	Yes – Locality.	It occurs on rocky hills supporting White Box (<i>Eucalyptus albens</i>) and in Wilga (<i>Geijera parviflora</i>) woodland; flat to gently undulating alluvial areas supporting Belah (<i>Casuarina cristata</i>) forest; and soils and plant communities of Poplar Box (<i>E. populnea</i>) woodlands. It may also be associated with shadier areas of Brigalow (<i>Acacia harpophylla</i>), Myall (<i>A. melvillei</i>), and Weeping Myall (<i>A. pendula</i>) communities; in Mountain Coolibah (<i>E. orgadophila</i>) communities; and on roadsides. <i>There is potential habitat of Poplar Box and Brigalow woodlands or open forests present within the Project Area.</i>	Potential to occur <ul style="list-style-type: none"> Project Area is within the distribution for the species. There are limited areas of potential habitat for this species in the form of isolated patches of Brigalow and Poplar Box open forests and woodlands within the Project Area. <p>There are no records for this species within the Project Area. One specimen has been recorded 2 km to the north at the junction of Woleebee and Wandoan Creeks in 2007 (ALA, 2022; DES, 2022).</p>
<i>Lepidium monoplacoides</i>	Winged Pepper-cress	-	E	No	No	This species grows in riparian open forest dominated by <i>Eucalyptus camaldulensis</i> and <i>Casuarina cunninghamiana</i> with a variably dense shrubby understorey of <i>Hymenathera dentata</i> , <i>Bursaria spinosa</i> , <i>Acacia fimbriata</i> , <i>A. floribunda</i> , <i>Callistemon viminalis</i> and <i>Leptospermum brachyandrum</i> . This species is most abundant in Tussock grasslands fringing riparian open forests. Areas of known populations of this species are in the Murray-Darling basin on floodplains and other periodically waterlogged areas with heavy clay soils (Mavromihalis 2010). The species has a wide distribution through inland NSW and Victoria. The sole records from Queensland are from the Yelarbon area (ALA 2022). <i>There is a lack of potential habitat in preferred Eucalyptus camaldulensis riparian areas within the Project Area.</i>	Unlikely to occur <ul style="list-style-type: none"> The Project Area is outside of the known distribution for the species. There is a lack of potential habitat in preferred Eucalyptus camaldulensis riparian areas within the Project Area. <p>No recent records exist for this species within the Project Area/Locality and no observations were made during field surveys.</p>

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Thesium australe</i>	Austral Toadflax	V	V	No	No	A semi-parasitic species that attaches to the roots of a range of grass species, particularly Kangaroo Grass (<i>Themeda triandra</i>). Distribution includes parts of Queensland, New South Wales, the ACT and Victoria. In Queensland, the species is known in Kumbia, Glen Rock Regional Park, Carnarvon National Park, Crows Nest, Clifton, Warwick, Greenmount, Cambooya, Dalby, the Bunya Mountains, Blackbutt and Imbil. The species occurs in open grassy heath dominated by Swamp Myrtle (<i>Leptospermum myrtifolium</i>), Small-fruit Hakea (<i>Hakea microcarpa</i>), Alpine Bottlebrush (<i>Callistemon sieberi</i>), Woolly Grevillea (<i>Grevillea lanigera</i>), Coral Heath (<i>Epacris microphylla</i>) and <i>Poa</i> spp. (Griffith 1991); Kangaroo Grass grassland surrounded by <i>Eucalyptus</i> woodland; and grassland dominated by Barbed-wire Grass (<i>Cymbopogon refractus</i>) (Leigh et al. 1984; Hunter et al. 1999). <i>Suitable habitat is not present within the Project Area.</i>	Unlikely to be present. <ul style="list-style-type: none"> The Project Area is within the distribution for the species. Suitable habitat (heath, Kangaroo Grass grassland) is not present within the Project Area. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 84 km from the Project Area in cleared, non-native vegetation in 1846.
<i>Vincetoxicum forsteri</i>	Slender Tylophora	E	E	No	No	<i>Vincetoxicum forsteri</i> has rarely been collected and is known to be present within eight localities in the Dubbo area and Mt Crow, near Barraba in NSW, and "Myall Park" near Glenmorgan in Queensland. Conservation of this species occurs within Goobang National Park, Eura State Forest, Goonoo SF, Pilliga West SF and Coolbaggie Nature Reserve. <i>Vincetoxicum forsteri</i> inhabits dry scrub, open forest and woodlands associated with <i>Melaleuca uncinata</i> , <i>Eucalyptus fibrosa</i> , <i>E. sideroxylon</i> , <i>E. albens</i> , <i>Callitris endlicheri</i> , <i>C. glaucophylla</i> , <i>Allocasuarina luehmannii</i> , <i>Acacia hakeoides</i> , <i>A. lineata</i> , <i>Myoporum</i> spp., and <i>Casuarina</i> spp. (DECC, 2005a; Forster et al., 2004). <i>Potential habitat of dry Eucalypt woodlands occurs within the far south-eastern corner of the Project Area.</i>	Potential to occur <ul style="list-style-type: none"> Project Area is within the distribution for the species. Limited areas of suitable habitat (dry eucalypt woodland) exists as several small fragments through the Project Area and a larger area in the southeast corner. Suitable habitat includes areas of dry eucalypt woodland, with riparian and wetland eucalypt communities considered unsuitable for this species. No records within the Project Area or Locality. The closest record is approximately 99 km south-west of the Project Area in Eucalyptus woodlands with a tussock grassy understorey in 1960.
<i>Xerothamnella herbacea</i>	Null	E	E	No	No	<i>Xerothamnella herbacea</i> is known from two sites north east of Chinchilla, a single record from near Theodore and a record near Yelarbon east of Goondiwindi, Queensland. This species occurs within the Condamine, Border Rivers Maranoa–Balonne and Fitzroy (Queensland) Natural Resource Management Regions. <i>Xerothamnella herbacea</i> occurs in Brigalow (<i>Acacia harpophylla</i>) dominated communities in shaded situations, often in leaf litter and is associated with gilgais (shallow ground depressions). Soils are heavy, grey to dark brown clays (Queensland Herbarium, 2008). <i>There is suitable habitat of Brigalow woodlands present within the Project Area.</i>	Unlikely to occur <ul style="list-style-type: none"> The Project Area is within the known distribution of the species. There is suitable habitat of Brigalow woodlands present within the Project Area. No recent records exist for this species within the Project Area/Locality and no observations were made during field surveys. The closest record is approximately 90 km south-east of the Project Area in cleared non-native vegetation, recorded in 1984.
Birds							
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V	V	No	No	This species has a wide distribution across much of Australia, including southern Queensland west of the Great Dividing Range. It inhabits a variety of open woodlands and shrublands that have a grassy and/or shrubby understorey and are dominated by acacia and eucalypt species. Breeding habitat: This species nests and roosts in tree hollows, in either live or dead standing trees within habitats dominated by Eucalypt and Acacia species.	Potential to occur. <ul style="list-style-type: none"> Project Area is within the distribution for this species. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 58 km from the Project Area, recorded at campground at Rocky Creek in Yuleba.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>Foraging habitat: This species forages almost exclusively on the ground, with preference for areas with low tree densities and an understorey consisting of herbs and leaf litter in habitats dominated by Eucalypt or Acacia species.</p> <p><i>Species will utilise almost all habitats present within the Project Area, excluding any cleared grazed.</i></p>	<ul style="list-style-type: none"> Species has the potential to utilise almost all habitats present within the Project Area, excluding any cleared grazed land. Potential habitats in the Project Area include all areas of eucalypt open forests/woodlands and acacia woodlands. Whilst potential foraging habitat occurs in all broad habitat types, breeding habitat is more likely to occur in areas of eucalypt open woodland/open forest with tree hollows. These areas of more abundant hollows are present in areas of riparian eucalypt open forest in the Project Area, and the larger patches of eucalypt woodland in the south-east corner.
<i>Lathamus discolor</i>	Swift Parrot	E	CE, Ma	No	No	<p>Majority of the Swift Parrot population winters in Victoria and New South Wales, inhabiting flowering woodlands and forests, including inland box-ironbark and grassy woodlands, coastal swamp mahogany (<i>E. robusta</i>) and spotted gum (<i>Corymbia maculata</i>) when in flower. Species distribution in mainland Australia fluctuates based on the availability of preferential food resources.</p> <p>Breeding habitat: This species does not breed in mainland Australia; breeding habitat is restricted to Tasmania.</p> <p>Foraging habitat: This species forages in the largest trees available, on <i>psyllid</i> lerps, seeds and fruits, with non-breeding birds preferring to feed in inland box-ironbark and grassy woodlands, coastal swamp mahogany (<i>E. robusta</i>) and spotted gum (<i>Corymbia maculata</i>) when in flower.</p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is not located within the distribution for this species. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 62 km south from the Project Area, recorded in cleared, non-native vegetation. The Project Area does not contain preferential foraging resources for the Swift Parrot.
<i>Calidris ferruginea</i>	Curlew Sandpiper	CE	CE, Ma and Mi	No	No	<p>This species is occasionally recorded inland, though less often than in coastal regions of Australia, within ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.</p> <p>Breeding habitat: This species does not breed in Australia.</p> <p>Foraging habitat: potential foraging habitat exists in the Project Area in the form of dams.</p> <p>Roosting habitat: this species roost in open situations with damp substrate, especially on bare shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh.</p> <p><i>Wetland habitat within the Project Area comprises small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is within the broad distribution of the species, however it is predominantly associated with the coastal fringe around Australia, with occasional vagrants recorded in inland area associated with wetland areas, including farm dams and modified habitats. Wetland habitat within the Project Area comprises small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species. No records for the species occur within the Project Area/Locality and no observations were made during field surveys. The closest record was recorded 9 km south of the Project Area, in eucalypt woodlands in with a tussock grass understorey in 2014.
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-cockatoo	V	V	No	Yes – within Locality	<p>The Glossy Black-cockatoo are uncommon but widespread. They can be found from Mitchell, Queensland, through eastern New South Wales to East Gippsland, Victoria.</p> <p>Foraging habitat: The glossy black cockatoo feed almost exclusively on the seeds of sheoaks (<i>Allocasuarina</i> spp. and <i>Casuarina</i> spp.), usually relying on one or two species within a region (Higgins 1999).</p>	<p>Likely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Potential foraging and breeding habitat exists in the southern and northern portions of the Project Area, in the form of Eucalypt woodland and Belah (She-oak) woodland. Additionally, some scattered patches exists within the central portion of the Project Area.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>Breeding habitat: They are hollow nesters, utilising large hollows in both living and dead Eucalypt trees (Higgins, 1999).</p> <p><i>Potential foraging and breeding habitat exists in the Project Area, in the form of Eucalypt woodland and mixed Eucalypt/Belah (She-oak) woodland. Additionally, some scattered patches exists within the central portion of the Project Area.</i></p>	<ul style="list-style-type: none"> ■ Potential breeding habitat is restricted to habitat types in the Project Area that contain suitable hollow-bearing trees. Potential nest trees occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the Project Area. ■ Two records within the adjoining area are present from 2009 and were recorded in Eucalypt open forest in with grassy understorey and Brigalow (<i>Acacia harpophylla</i>) forest and woodlands. No observations were made during field surveys.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	V	V	No	No	<p>Brown Treecreepers (south-eastern) inhabit open dry eucalypt forest and woodlands, mainly areas that are dominated by stringybarks or other rough-barked eucalypt species. The understorey is usually open and grassy, sometimes with few shrubs. They can also occur in open forest, woodlands and mallee that is subject to periodic inundation. This species is usually absent from areas with a dense shrubby understorey and heavily degraded woodland areas.</p> <p>Breeding and roosting habitat: This species nests and roosts in hollows, in either live trees, dead standing trees or tree stumps.</p> <p>Foraging habitat: An open understorey is preferable to enable individuals to forage on or near the ground while maintaining vigilance for predators. Areas with fallen timber provide greater foraging opportunities.</p> <p><i>Patches of suitable Callitris/ Eucalypt woodlands of exist along the Eastern boundary of the Project Area, just North and South of Jackson-Wandoan Road. Additionally Open Eucalyptus forest occurs along the Gurulmundi Road in the south-eastern corner of the Project Area. Small patches of open Eucalyptus forest exist both north and south of Weldons Road.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> ■ Project Area is marginally within the distribution for this species. ■ Suitable habitat is present within the Project Area. ■ No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 194 km from the Project Area in Bluegrass and Tall Bunch Grass tussock grasslands. ■ Small patches of suitable dry Eucalyptus woodland/ forest habitat occurs across the Project Area ■ Whilst potential foraging habitat occurs in all broad habitat types, breeding habitat is more likely to occur in areas of eucalypt open woodland/open forest with tree hollows. These areas of more abundant hollows are present in areas of riparian eucalypt open forest in the Project Area, and the larger patches of eucalypt woodland in the south-east corner.
<i>Erythroriorchis radiatus</i>	Red Goshawk	E	E	No	No	<p>This species prefers wooded and forested lands of tropical and warm-temperate Australia. Forests of intermediate density, with tall stands or individual trees so that nests are supported, are favoured, or ecotones between habitats of differing densities, e.g. between rainforest and eucalypt forest, between gallery forest and woodland, or on edges of woodland and forest where they meet grassland, cleared land, roads or watercourses. This species avoids very dense and very open habitats. This species has a large home range.</p> <p>Breeding and roosting habitat: This species rarely breeds in areas with fragmented vegetation. Breeding habitat is restricted to trees that are taller than 20 m and within 1km of a watercourse or wetland.</p> <p>Foraging habitat: Habitat has to be open enough for fast hunting and manoeuvring in flight, but with enough cover for ambushing of prey.</p> <p><i>Dense wooded areas for roosting and breeding habitat are lacking in the Project Area.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> ■ Project Area in the Brigalow Belt Bioregion is now considered to be outside of the distribution for the species. There are no validated recent records from this region (since 1997) and the Brigalow Belt Bioregion is now considered to be outside the species distribution (MacColl et al. 2021). ■ Dense wooded areas for roosting and breeding habitat are lacking in the Project Area. ■ No records for the species exist within the immediate Project Area/ Locality and no observations were made during field surveys. The closest record of this species was recorded 62.6 km south-east of the Project Area in cleared, native vegetation.
<i>Falco hypoleucos</i>	Grey Falcon	V	V	No	No	<p>This species prefers arid and semi-arid Australia and frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined watercourses.</p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> ■ Project Area is within the species distribution.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>This species has also been observed in treeless areas, frequenting tussock grassland and open woodland for foraging.</p> <p>Breeding habitat: Nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (<i>Eucalyptus camaldulensis</i>) and Coolibah (<i>E. coolabah</i>)</p> <p>Foraging habitat: timbered lowland plains, acacia shrubland crossed by tree-line watercourses, as well as treeless areas, tussock grasslands and open woodlands.</p> <p>Roosting habitat: this species is likely to roost in both its breeding and foraging habitat. This species has also been observed roosting on the ground.</p> <p><i>The Grey Falcon requires Acacia shrubland habitat as well as lowland plains associated with water, which is lacking within the Project Area.</i></p>	<ul style="list-style-type: none"> ■ The Grey Falcon requires Acacia shrubland habitat as well as lowland plains associated with water, which is lacking within the Project Area. ■ No records for the species occur within the Project Area/adjoining area and no observations were made during field surveys. The closest record of this species was recorded 63.8 km south-east of the Project Area in eucalyptus woodlands with a shrubby understorey.
<i>Geophaps scripta</i>	Southern Squatter Pigeon	V	V	No	Yes (within the 10 km Locality 2016, but within a large area of suitable habitat)	<p>Squatter pigeon (southern) habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by Eucalyptus, Corymbia or Callitris species. Additionally, they also favour remnant regrowth or partly modified vegetation communities that are within 3 km of water bodies.</p> <p>Breeding habitat: Breeding habitat occurs on stony rises on sandy, gravelly soils, within 1 km of a suitable, permanent waterbody (including farm dams and watercourses).</p> <p>Foraging habitat: Natural foraging habitat for the species is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils, within 3 km of a suitable, permanent or seasonal waterbody.</p> <p>Dispersal habitat: Dispersal habitat is any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies. Additionally, where scattered trees still occur and the distance of cleared land between remnant trees or patches of species' habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (Squatter Pigeon Workshop, 2011).</p> <p><i>There is a lack of foraging and breeding habitat to the north of Project Area due to it being largely cleared with dense pastoral grasses, however areas of suitable habitat are present in the south-eastern corner of the Project Area in the form of dry woodlands.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> ■ Project Area is within the distribution for the species. ■ There is a lack of foraging and breeding habitat to the north of Project Area due to it being largely cleared with dense pastoral grasses, however areas of suitable habitat are present in the south-eastern corner of the Project Area in the form of dry woodlands. ■ The landscape in the north of the Project Area is unsuitable for this species being largely cleared and with dense encroachment by pastoral grasses in most remaining woodland patches. Suitable dry woodland habitat remains on and around the plateau in the southeastern part of the Project Area. ■ No records within the Project Area and the closest record is from 2016 in cleared non-native vegetation near Cherwondah SF (ALA, 2022), which is a large area of suitable habitat around 10 km east of the Project Area.
<i>Grantiella picta</i>	Painted Honeyeater	V	V	No	No	<p>The Painted Honeyeater lives in dry, open forests and woodlands. The species usually occurs in areas with flowering and fruiting mistletoe and flowering Eucalypts. This species prefers Acacia dominated woodlands, as well Paperbarks, Casuarinas, Callitris and Box-Ironbark-Yellow Gum woodlands with a large number of mature trees as these host more Mistletoe.</p> <p>Breeding habitat: breeding habitat is typically mature trees in remnant vegetation with high quantities of mistletoe.</p> <p>Foraging and roosting habitat: Associated with woodlands and forests with Mistletoe.</p>	<p>Potential to occur</p> <ul style="list-style-type: none"> ■ Project Area is within the distribution for the species. ■ Areas with a high abundance of mistletoe species in either eucalypt or acacia woodlands provide foraging habitat for this species. Mistletoe is present sparingly in Eucalypt woodlands across the Project Area that could be utilised as habitat for this species. Limited potential habitat of Brigalow woodland is also present. ■ No records within the Project Area or Locality. The closest record of this species was recorded 47 km south-east of the Project Area, in eucalypt open forest with tussock grass understorey in 1997.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>Mistletoe is present sparingly in Eucalypt woodlands across the Project Area that could be utilised as habitat for this species.</i>	
<i>Hirundapus caudacutus</i>	White-throated Needletail	V	V and Mi	No	No	<p>According to Higgins (1999), this species occurs over most types of habitat, but are recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (as cited in DSEWPC, 2019b). Whilst rare, they have been recorded on wooded ends of ridges, roosting after dark high in the eucalypt tree canopies (Tarburton, 1993).</p> <p>Breeding habitat: this species does not breed in Australia.</p> <p>Roosting habitat: the species is noted to roost in tall mature forests and woodlands amongst dense foliage and in hollows often associated with ridgelines.</p> <p>Foraging habitat: the species almost always will fly aerially at 'cloud level' and forage over farmland, heathland and mudflats.</p> <p><i>Species likely to only fly aerially over the Project Area, which contains no rainforest vegetation. The Project Area does not contain habitat in the form of elevated eucalypt forests or wooded ridges to act as foraging and roosting habitat for the species.</i></p>	<p>Known to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Species likely only to fly aerially over the Project Area (through September to April on its migration), which contains no rainforest vegetation. The Project Area does not contain habitat in the form of elevated Eucalypt forests or wooded ridges to act as foraging and roosting habitat for the species. A flock of eight birds were observed flying low near Weldon's Road on 24 November 2022, during field surveys after those conducted for the current Project.
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	No	No	<p>The Australian painted snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. Marchant & Higgins (1993) stated that the Australian painted snipe can use modified habitats, such as low-lying woodlands converted to grazing pasture, sewage farms, dams, bores and irrigation schemes, however they do not necessarily breed in such habitats (as cited in DoE, 2019d).</p> <p>Breeding habitat: requirements specific for this species include shallow wetlands with bare mud and dense low vegetation cover and/or tree or shrub cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands.</p> <p>Foraging habitat: Terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They have also been observed in inundated grasslands as well as dams and bore drains.</p> <p><i>Small areas of foraging habitat present within small ephemeral wetlands on drainage lines. These may provide temporary refuge and foraging habitat for the species and support occasional transient visitors to the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Small areas of foraging habitat present within small ephemeral wetlands on drainage lines. These may provide temporary refuge for the species and support occasional transient visitors to the Project Area. No records within the Project Area or Locality. The closest record of this species was recorded 166 km south-west of the Project Area, in eucalypt open forest with tussock grass understorey.
<i>Stagonopleura guttata</i>	Diamond Firetail	V	V	No	No (However, within Locality; two records within 25 km in 2019 and 2021 and several within Barakula State Forest, 40 km to the east)	<p>Found in grassy eucalypt, acacia or casuarina woodlands, including Box-Gum Woodlands and Snow Gum <i>Eucalyptus pauciflora</i> Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.</p> <p>Breeding habitat: Nests are globular structures built either in the shrubby understorey, or higher up associated in woodland areas, especially under hawk's or raven's nests.</p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Suitable habitat is present within the Project Area. No records exist for this species within the Project Area or within the 10 km Locality and no observations were made in the field. The closest record of the species was recorded 14 km south-west of the Project Area in eucalypt woodlands with shrubby understorey, in 2019.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>Roosting habitat: Birds roost in dense shrubs of woodlands or in smaller nests built especially for roosting.</p> <p>Foraging habitat: Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season).</p> <p><i>Suitable habitat includes any Eucalyptus or Acacia woodlands/ forests throughout the Project Area.</i></p>	<ul style="list-style-type: none"> Suitable habitat includes any Eucalyptus woodlands/ forests throughout the Project Area. Species also occurs in Acacia dominant areas.
Fish							
<i>Maccullochella peelii</i>	Murray Cod	-	V	No	No	<p>This species is considered a main channel specialist but will occur in floodplains when inundated. They prefer complex structural features that slow the flow of water and provide ambush points, including rocks, snags, tree stumps and overhanging vegetation in water deeper than 2.4 m flowing less than 0.2 m/s.</p> <p>Breeding habitat: Nests in sunken logs, submerged rocks or excavated depressions in clay banks. Eggs and newly hatched larvae (up to 11 days old) are guarded by the male.</p> <p><i>Suitable habitat is not present in the Project Area due to the ephemeral nature of the creeks at the site, and an absence of deep channels (greater than 2.4m), with slow flowing water.</i></p>	<p>Unlikely to be present</p> <ul style="list-style-type: none"> Project Area is just outside the distribution for this species. Suitable habitat is not present in the Project Area due to the ephemeral nature of the creeks at the site. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 62 km from the Project Area in the Condamine River in 2015.
Mammals							
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	No	No	<p>Sandstone cliffs and fertile wooded valley habitat within close proximity of each other are considered as habitat critical to the survival of the Large-eared Pied Bat (DECC, 2007). Rainforest and moist Eucalypt forest habitats on other geological substrates (viz. rhyolite, trachyte and basalt) at high elevation are also considered to be important for this species (DERM, 2011c). Some populations of the Large-eared Pied Bat would rely in part on the TEC of Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant).</p> <p>Foraging and roosting habitat: The species requires a combination of sandstone cliffs to provide roosting sites, especially Box Gum woodlands and river corridors used for foraging. The large-eared pied bat requires the presence of diurnal roosts in order to shelter. Roosts are utilised during the day and also at night.</p> <p>Breeding habitat: the species is known to breed in two known locations, which are not in the vicinity of the Project Area.</p> <p><i>Potential habitat of Brigalow present but a lack of sandstone cliffs, and woodland valley areas for roosting.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> The Project Area occurs within the distribution for this species. The southern part of the Project Area includes forested escarpment areas along the Great Dividing Range. However, there are no records within the Western Downs Regional Council area. The closest records are from over 100 km northwest of the Project Area, in the Expedition Ranges (ALA 2022). Limited areas of potential habitat of Brigalow is present but a lack of sandstone cliffs, and woodland valley areas for roosting. No records occur within the Project Area/ Locality and no observations were made during field surveys. Closest records are from over 100km to the northwest of the Project Area, recorded in eucalyptus open forests with a grassy understorey in 2003.
<i>Dasyurus hallucatus</i>	Northern Quoll	-	E	No	No	<p>The northern quoll occurs in a range of habitats, including open dry sclerophyll forest and woodland, riparian woodland, low dry vine thicket, the margins of notophyll vine forest, sugarcane farms and in urban areas. They are most abundant in hilly or rocky areas close to permanent water.</p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Potential suitable rocky areas for breeding, denning and foraging habitat are limited to the far south-eastern corner of the Project Area in the plateau with eucalypt woodland/open forest habitat types.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>The preferred habitat of rocky areas close to permanent water are very scarce across the Project Area, however, dry sclerophyll forests associated with remnant Eucalypt woodlands are present. Frequent cool burns and the absence of old growth forests (with hollows) or high elevation rugged terrain or rock falls limits the potential habitat available for the species.</p> <p>Breeding habitat: generally requires habitat encompassing some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal, as well as connection to permanent water. Dens are made in rock crevices, tree holes or occasionally termite mounds.</p> <p>Foraging and dispersal habitat: this species is more likely to be present in Queensland where there are high relief areas that have shallower soils, greater cover of boulders, less fire impact and closer to permanent water.</p> <p><i>Potential suitable rocky areas for breeding, denning and foraging habitat are limited to the far south-eastern corner of the Project Area.</i></p>	<ul style="list-style-type: none"> No records within the Project Area or adjoining area. The closest record is approximately 142 km north-east of the Project Area in eucalyptus woodlands with a tussock grass understorey, recorded in 1966.
<i>Macroderma gigas</i>	Ghost Bat	E	V	No	No	<p>In Queensland the species occurs in 4-5 disjunct populations, north from Rockhampton (TSSC, 2016c). Populations are centred around maternity roosts in deep caves. Pairs and small groups disperse widely during the winter non-breeding season, using temporary daytime roosts in caves and rocky overhangs (TSSC, 2016c)</p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> The Project Area is outside the known distribution of this species, with the closest record over 223 km north-west of the Project Area, recorded in cleared non-native vegetation in 1997 (ALA 2022).
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	No	No	<p>This microbat species has a scattered distribution mostly within the Murray-Darling Basin, but with some records outside of this area. It is more common in box, ironbark and cypress pine woodland on the western slopes and plains. Its stronghold seems to be the Pilliga scrub. It roosts in tree hollows, crevices and under loose bark.</p> <p>Foraging habitat: Foraging tends to be located around patches of trees in the landscape.</p> <p>Breeding habitat: Little information is available on the breeding behaviour for the species.</p> <p>Roosting habitat: Roosting behaviour is located within dead trees including ironbark's, cypress and bullock.</p> <p><i>There is a small amount of potential foraging habitat present in the form of wooded areas in the south of the Project Area, with connectivity to woodland outside of the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is a small amount of potential foraging habitat present in the form of wooded areas in the south of the Project Area, with connectivity to woodland outside of the Project Area. Suitable habitat in the Project Area is associated with larger patches of remnant eucalypt and acacia woodlands. No records within the Project Area or Locality. The closest record is approximately 40 km south-east of the Project Area in cleared non-native vegetation in 2013.
<i>Petauroides volans</i>	Greater Glider (central and southern)	E	E	No	Yes (confirmed in Project Area during field surveys)	<p>The Greater Glider is an arboreal nocturnal marsupial, largely restricted to Eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is more common in taller, montane older forests which have an abundance of hollows.</p> <p>There is no information available that differentiates foraging, breeding and denning habitat for the species however, for denning and nesting it prefers tall mature forests with large tree hollows.</p>	<p>Known to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Potential foraging and denning habitat of tall, mature eucalypt forests present within the Project Area, specifically along the riparian areas. The species was detected in Queensland Blue Gum (<i>Eucalyptus tereticornis</i>) woodland in the north of the Project Area, in the remnant riparian corridors along Wandoan Creek and Woleebee Creek. The

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>Potential foraging and denning habitat of tall, mature Eucalypt forests is present within the Project Area, specifically along the riparian areas.</i>	species is likely to occur wherever large trees with hollows occur in woodland connected with these corridors and in open eucalypt woodland area in the southeast of the Project Area in 2022.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	V	V	No	No	<p>This species is found in Eucalypt dominated woodlands and forests, including both wet and dry sclerophyll forests (Kavanagh et al. 1995; Rees et al. 2007).</p> <p>Breeding habitat: Hollow-bearing trees used by the yellow-bellied glider (south-eastern) are primarily living, smooth-barked eucalypts of multiple species. Stags (standing dead trees) account for only two percent of den trees in certain forest types.</p> <p>Foraging and roosting habitat: The species shows a preference for larger patches of mature growth forests that contain suitable trees that they require for foraging and roosting.</p> <p><i>There is potential foraging and roosting habitat present in the form of wooded plateaus in the far south-eastern corner of the Project Area however no feed trees were detected in the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is potential foraging and roosting habitat present in the form of wooded plateaus in the far south-eastern corner of the Project Area however no feed trees were detected in the Project Area. No feed trees were detected within the Project Area. The species is unlikely to occur in the cleared and fragmented landscape across the north of the Project Area. The wooded plateau in the southeast is connected to suitably large areas of remnant woodland with potential feed trees. Denning habitat of tall, mature eucalypt forests present within the Project Area, specifically along the riparian areas. No records within the Project Area or Locality. The closest record is approximately 11 km east of the Project Area in eucalyptus open forests with a grassy understorey in 2009.
<i>Phascolarctos cinereus</i>	Koala	-	E	No	No	<p>Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species as explained by Martin & Handasyde 1999 (as cited in, DoE, 2019h).</p> <p>Breeding and foraging habitat: Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees.</p> <p>Dispersal behaviour: the species is known to traverse a matrix of landscape features from remnant and regrowth vegetation to paddock trees and grasslands.</p> <p><i>Foraging and breeding habitat of Eucalypt forests, and preferred food trees including E. tereticornis, E. populnea, E. crebra, E. longirostrata, E. melanophloia, E. exserta and Corymbia citriodora subsp. variegata), as well as dispersal opportunities, are present within the Project Area.</i></p>	<p>Likely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There are only sparse records in the locality suggesting a very low-density population, with no evidence of recent (last 25 years) Koala sightings in the Project Area or within 10km of the locality. A targeted field survey was undertaken in the Project Area, which included spotlighting, searches for scats and scratch marks, with no Koalas observed or scats detected during the 20 days of field surveys. Evidence of Koala from the 2022 field surveys was in the form of potential scratch marks only, and there is uncertainty that the scratches were from Koalas. There is potential foraging and breeding habitat for Koala present in the form of Eucalypt dominated woodlands and open forests in the Project Area, particularly along riparian areas.
Reptiles							
<i>Anomalopus mackayi</i>	Five-clawed worm-skink	E	V	No	No	<p>This species is associated with deep cracking clays that provide individuals with shelter. Habitat areas include Bluegrass and/or Mitchell Grass dominated grassland and other grasslands categorised as RE 11.3.21; River Red Gum - Coolibah-Bimble/Poplar Box and Weeping Myall grassy woodlands; White Box grassy woodland; Myall woodland, and Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant).</p>	<p>Potential to be present.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Areas of potential habitat are limited on the site, with an absence of native grasslands with deep, cracking clays. Potential habitat includes area of Brigalow woodlands, with coarse woody debris and deep leaf litter cover.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>There is no delineation between breeding, dispersal and foraging habitat for this species. However, microhabitat requirements include cracking clay soils or self-mulching friable basalt soils and woody debris.</i>	<ul style="list-style-type: none"> Ephemeral wetlands and creek lines are also present along with cracking clay soils in some areas. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record was recorded 150 km southeast of the Project Area in cleared non-native vegetation in 2023.
<i>Delma torquata</i>	Collared Delma	V	V	No	No	<p>This species normally inhabits eucalypt-dominated woodlands and open-forests in Queensland RE Land Zones. The RE it prefers are ones dominated by Poplar Box (<i>Eucalyptus populnea</i>) on alluvial plains, Lemon-scented Gum (<i>Corymbia citriodora</i>) open forest on coarse-grained sedimentary rocks and Poplar Box/Brigalow (<i>Acacia harpophylla</i>) open forests on fine-grained sedimentary rocks.</p> <p>There is no delineation between breeding, dispersal and foraging habitat for this species. However, microhabitat requirements include presence of rocks, logs and specific mats of leaf litter typically 30-100 mm thick.</p> <p><i>Suitable habitat with abundant litter, rocks and woody debris occurs in remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner of the Project Area. The species is unlikely to occur in the northern or central parts of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Suitable habitat with abundant litter, rocks and woody debris occurs in remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner of the Project Area. The species is unlikely to occur in the northern or central parts of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species. No records within the Project Area or Locality. The closest record was recorded 111 km north-west of the Project Area in eucalyptus woodlands with a tussock grass understorey in 2020.
<i>Egernia rugosa</i>	Yakka Skink	V	V	No	Yes – Locality	<p>The Yakka skink is known to occur in open dry sclerophyll forest, woodland and scrub. The core habitat of this species is within the Mulga lands and Brigalow belt south bioregions. It is known from rocky outcrops and sand plain areas with dense ground vegetation.</p> <p>There is no delineation between breeding, dispersal and foraging habitat for this species. However, microhabitat features required for this species include cavities under and between partly buried rocks, logs and tree stumps as well as abandoned animal burrows.</p> <p><i>Dry sclerophyll forests and vegetation within the Brigalow belt south bioregion is present within the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Suitable habitat with abundant litter, rocks and woody debris occurs in large remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner of the Project Area. The species is unlikely to occur in the northern or central parts of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species. No records within the Project Area and Locality. The closest record was recorded 29 km south-east of the Project Area in other shrublands in 1998.
<i>Eseya albagula</i>	White-throated Snapping Turtle	CE	CE	No	No	<p>The White-throated Snapping Turtle prefers clear, flowing, well-oxygenated waters for its habitat. The species prefers waterways with permanent flowing water, with undercut banks, large woody debris, deep pools (or approximately 6 m deep) and shallow riffle zones.</p> <p><i>There is a lack of well-flowing rivers with permanently flowing water with large woody debris present within the Project Area.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is a lack of well-flowing rivers with permanently flowing water with large woody debris present within the Project Area. No records within the Project Area or Locality. The closest record was recorded 60 km north-east of the Project Area in adjacent to Dawson Creek in 1998.
<i>Furina dunmalli</i>	Dunmall's Snake	V	V	No	No	<p>This species is found in forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (<i>Acacia harpophylla</i>), other Wattles (<i>A.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p><i>burowii</i>, <i>A. deanii</i>, <i>A. leiocalyx</i>), native Cypress (<i>Callitris</i> spp.) or Bull-oak (<i>Allocasuarina luehmannii</i>).</p> <p>There is no delineation between breeding, dispersal, and foraging habitat for this species. Microhabitat features preferred includes fallen timber and ground litter.</p> <p><i>There is some limited suitable habitat with abundant litter, rocks and woody debris present in the far south-eastern corner of the Project Area.</i></p>	<ul style="list-style-type: none"> There is some limited suitable habitat with abundant litter, rocks and woody debris present in the far south-eastern corner of the Project Area. No records within the Project Area or Locality. The closest record was recorded 38 km south-west of the Project Area in Brigalow (<i>Acacia harpophylla</i>) forests and woodlands in 2009.
<i>Hemiaspis damelii</i>	Grey Snake	E	E	No	No	<p>This species inhabits Brigalow <i>Acacia harpophylla</i> and Belah <i>Casuarina cristata</i> woodlands on dark brown to black cracking clay soils but are also found in Queensland Bluegrass <i>Dichanthium sericeum</i> and/or Mitchell Grass <i>Astrelba</i> spp. grasslands on alluvial plains with cracking clay soils, and red sodosol soils on the western downs of Queensland. Closely associated with waterbodies, particularly ephemeral wetlands and floodplains. Shelters in and under soils cracks, rocks, logs, flood debris and abandoned burrows.</p> <p>Breeding habitat: There is no information about breeding habitat for this species.</p> <p>Foraging habitat: Forages for frogs in and around temporary water bodies, including small gullies and ditches, ephemeral wetlands, and floodplains. Uses soil cracks and crevices for cover when hunting.</p> <p><i>Brigalow and Belah is present within the north and far south-eastern parts of the Project Area. Ephemeral wetlands and creek lines are also present along with cracking clay soils in some areas.</i></p>	<p>Potential to be present</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Brigalow and Belah are present in the north and far South-eastern parts of the Project Area, and ephemeral wetlands and creek lines are also present, with cracking clay soils in some areas. No records exist for this species within the Project Area or the Locality and no observations were made in the field. The closest record was recorded 51 km east of the Project Area in eucalyptus open woodlands with shrubby understorey in Barakula State Forest in 2010.
<i>Rheodytes leukops</i>	Fitzroy River Turtle	V	V	No	No	<p>The Fitzroy River Turtle is located mainly in rivers that contain large deep pools associated with rocky, sandy or gravel-based substrates, connected by shallow riffles. Areas that the species prefers are associated with higher water clarity and the species Ribbonweed (<i>Vallisneria</i> sp.) is often dominated in the creek beds.</p> <p><i>There is a lack of rivers with large deep pools and rocky or sandy substrates present within the Project Area.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is a lack of rivers with large deep pools and rocky or sandy substrates present within the Project Area. No records within the Project Area or Locality. The closest record was recorded 174 km north of the Project Area in cleared non-native vegetation in 2009.
Invertebrates							
<i>Adclarkia cameroni</i>	Brigalow Woodland Snail	V	E	No	No	<p>Found in remnant Eucalypt and Brigalow woodland associated with the Condamine River floodplain, centred on the area between Dalby and Miles/Condamine (TSSC 2016a).</p> <p>The Brigalow Woodland Snail requires both canopy cover (from trees and/or shrubs) and woody debris among leaf litter to maintain adequate microhabitat humidity levels for breeding and to avoid desiccation (TSSC 2016a). It is likely that the species can aestivate during dry periods, however, the potential extent of these periods is not known. The mobility, and therefore capacity for dispersal, of this species is very limited.</p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> The Project Area is outside the known distribution and separated from known occurrences by substantial barriers of unsuitable habitat. Limited areas of potential habitat of fragmented isolated patches of Brigalow and Eucalypt woodlands are present in areas across the Project Area, and given the fragmented nature of these habitats they are unlikely to be utilised or colonised by the species given it's very limited mobility. No records within the Project Area. The closest known record of the species was recorded in Gurulmundi State Forest, approximately 15 km south of the Project Area, recorded in 2014. However, this record was

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>Limited areas of potential habitat of fragmented isolated patches of Brigalow and Eucalypt woodlands are present in areas across the Project Area.</i>	incorrectly identified (refer to Appendix I of the Ecological Assessment Report (EAR)). The next nearest known record is 52.11 km south-east of the Project Area, recorded in 2011 (ALA, 2023). A statement from Craig Eddie (Principal Ecologist) is provided in Appendix I of the EAR.
<i>Adclarkia dulacca</i>	Dulacca Woodland Snail	E	E	No	Yes – Locality.	This species occurs in a small number of isolated populations in the areas between Miles and Dulacca, and south to Meandarra (TSSC 2016b). This species inhabits a variety of remnant and scattered habitats, such as vine thicket and Brigalow woodland patches on rocky outcrops with clay to loam soils, as well as ironbark and <i>Acacia shirleyi</i> woodlands on ridges and <i>Eucalyptus woollsiana</i> woodland. The Dulacca Woodland Snail is also able to exist in areas of brigalow regrowth and even in cleared paddocks but only where logs, woody debris or other suitable microhabitat sites remain (TSSC 2016b). This species can also shelter under loose bark at the base of trees. The Dulacca Woodland Snail requires both canopy cover (from trees and/or shrubs) and rocks or woody debris to maintain adequate microhabitat humidity levels for breeding and to avoid desiccation (TSSC 2016b). It is likely that the species can aestivate during dry periods, however, the potential extent of these periods is not known. The mobility of this species is limited, however, it will move between areas of suitable microhabitat. <i>Potential habitat of very fragmented, isolated patches of Brigalow woodlands is present in areas across the Project Area.</i>	Likely to occur <ul style="list-style-type: none"> Project Area is within the distribution for the species. The Project Area includes several small patches of suitable habitat (Brigalow woodland). Elsewhere the species persists in similarly fragmented landscapes. This species was not located in surveys of the Project Area. The species has previously been collected from an area of RE 11.9.5a and 11.7.2 south of the Project Area, in the adjoining area (ALA, 2022). A statement from Craig Eddie (Principal Ecologist) is provided in Appendix I of the EAR.
Migratory Species							
Marine Species							
<i>Apus pacificus</i>	Fork-tailed Swift	-	Mi, Ma	No	No	In Australia, they occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. Breeding habitat: Does not breed in Australia. Foraging habitat: exclusively aerial and found across a range of habitats. <i>Potential foraging habitat over dry open habitats present, where it would fly aerially over.</i>	Likely to occur <ul style="list-style-type: none"> Project Area is within the distribution for the species. Potential foraging habitat over dry open habitats present, where it would be only likely to fly aerially over. No records within the Project Area or Buffer Zo Likely to occur Project Area is within the distribution for the species. Potential foraging habitat over dry open habitats present, where it would be only likely to fly aerially over. No records within the Project Area or Locality. The closest record was recorded 12.5 km west of the Project Area in eucalypt open forest in Cherwondah State Forest in 2002.
Terrestrial Species							
<i>Cuculus optatus</i>	Oriental Cuckoo	-	Mi	No	No	The species is found in forest canopy, open wooded areas and orchards, often in hill country, also in coniferous forest and in birch (<i>Betula</i>) above the treeline. The species may occur in association with remnant and regrowth RE types 11.3.2,	Potential to occur <ul style="list-style-type: none"> Project Area is within the distribution for this species but occurs predominantly in coastal areas.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>11.3.25, 11.9.4, 11.9.5, 11.9.5a, 11.9.10, 11.3.19, 11.5.1 within the Project Area. The species winters in many different countries, including the coastal parts of northern and eastern Australia (BirdLife International, 2015).</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging and roosting habitat: Monsoonal rainforest, vine thickets, wet sclerophyll forest or open <i>Casuarina</i>, <i>Acacia</i>, or <i>Eucalyptus</i> woodlands. Frequently at the edges or ecotones between habitat types.</p> <p><i>There is limited areas of potential suitable remnant woodlands and non-remnant patches of native vegetation habitat, within the Project Area.</i></p>	<ul style="list-style-type: none"> Wetland habitat within the Project Area is limited to small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species. No records for the species exist within the Project Area/ Locality and no observations were made during field surveys. The closest record was recorded 84 km south-east of the Project Area in cleared, non-native vegetation in Chinchilla.
<i>Motacilla flava</i>	Yellow Wagtail	-	Mi, Ma	No	No	<p>Habitat requirements for the yellow wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves. This species may occur in association with non-remnant vegetation.</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging and roosting habitat: Has a strong association with water, particularly rock substrates along watercourses, but also lakes and marshes.</p> <p><i>Potential foraging habitat of waterbodies (predominately farm dams) present within the Project Area.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Potential foraging habitat of waterbodies (predominately farm dams) present within the Project Area. No records for the species exist within the Project Area/ Locality and no observations were made during field surveys. There are also no records for this species from southern inland Queensland and so it is unlikely to occur within the limited habitat present in the Project Area. The closest record was recorded 275 km north of the Project Area in cleared, non-native vegetation near Duaringa, in 1905.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	Mi, Ma	No	No	<p>Satin Flycatchers inhabit heavily vegetated gullies in Eucalypt-dominated forests and taller woodlands, and on migration, occur in drier woodlands and open forests.</p> <p>Roosting habitat: there is no information on the roosting behaviour for the species.</p> <p>Foraging habitat: the species is known to forage in the canopy and subcanopy of trees</p> <p>Breeding habitat: breeding occurs in south-east Australia but no other information is provided on the specifics of such locations.</p> <p><i>There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area. No records within the Project Area or Locality. The closest record was recorded 28 km north of the Project Area in eucalypt woodlands with shrubby understorey, in 1997.
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	Mi, Ma	No	Yes (within Locality, 2020)	<p>In east and south-east Australia, the rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as tallow-wood (<i>Eucalyptus microcorys</i>) and mountain grey gum (<i>E. cypellocarpa</i>). When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including spotted gum (<i>E. maculata</i>), yellow box (<i>E. melliodora</i>), ironbarks or stringybarks, often with a shrubby or heath understorey.</p> <p>Breeding habitat: breeding occurs in south-east Australia but no other information is provided on the specifics of such locations.</p> <p>Foraging and roosting habitat: There is no information concerning feeding or roosting sites during species migration.</p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area. No records within the Project Area, but there is a record from the Locality, from Nov 2020 in non-remnant riparian woodland near Sundown Rd, 8 km north of the Project Area (BOOBOOK unpublished data).

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.</i>	
Wetland Species							
<i>Actitis hypoleucos</i>	Common Sandpiper	-	Mi, Ma	No	No	<p>The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The common sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties.</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: this species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. It has been observed foraging in billabongs, lakes and dams.</p> <p>Roosting habitat: Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks</p> <p><i>Small areas of foraging habitat are present within small ephemeral wetlands, which may provide temporary refuge for the species, within the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Small areas of foraging habitat are present within small ephemeral wetlands on drainage lines, which may provide temporary refuge for the species and support occasional transient visitors to the Project Area. No records within the Project Area or Locality. The closest record was recorded 84 km south-east of the Project Area in cleared land adjacent to Baking Board Creek in Chinchilla.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	Mi, Ma	No	No	<p>Prefers habitat on muddy edges of freshwater wetlands or brackish wetlands. Can be found at dams inland. Will often occupy coastal mudflats when ephemeral terrestrial wetlands have dried out.</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: foraging habitat is at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. Also among inundated vegetation of saltmarsh, grass or sedges. They forage in sewage ponds, and often in hypersaline environments. After rain, they may forage in paddocks of short grass, well away from water. They may forage on coastal mudflats at low tide and move to freshwater wetlands near the coast to feed at high tide.</p> <p>Roosting habitat: Roosting occurs at the edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh. Occasionally, they roost on sandy beaches, stony shores or on rocks in water.</p> <p><i>Small areas of foraging habitat present within small ephemeral wetlands, which may provide temporary refuge for the species, within the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Small areas of foraging habitat present within small ephemeral wetlands on drainage lines, which may provide temporary refuge for the species and support occasional transient visitors to the Project Area. No records within the Project Area or Locality. The closest record was recorded 61 km south-east of the Project Area in cleared land 1 km east of Leichardt Highway and 2 km west of Condamine River.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	Mi, Ma	No	No	<p>In Australasia, the pectoral sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: forages in shallow water or soft mud at the edge of wetlands,</p> <p>Roosting habitat: prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.</p> <p><i>Wetland habitat within the Project Area is limited to small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species but occurs predominantly in coastal areas. Wetland habitat within the Project Area is limited to small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species. No records for the species exist within the Project Area/ Locality and no observations were made during field surveys. The closest record was recorded 108 km south-west of the Project Area in cleared, non-native vegetation near Roma, in 1996.
<i>Charadrius leschenaultii</i>	Great Sand Plover	V	V, Mi, Ma	No	No	<p>This species is found majorly within coastal wetlands occurrence when on migration throughout Australia. Records from inland sites are extremely rare and probably reflect vagrant birds blown off course by storms (TSSC, 2016b).</p> <p><i>There is no suitable foraging habitat of coastal wetlands present within the Project Area.</i></p>	<p>Unlikely to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. There is no suitable foraging habitat of coastal wetlands present within the Project Area. No records for the species exist within the Project Area/Locality and no observations were made during field surveys. The closest record was recorded 237 km south-east of the Project Area in cleared, native vegetation near Toowoomba in 2019.
<i>Gallinago hardwickii</i>	Latham's Snipe	-	Mi, Ma	No	No	<p>They usually occur in open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby. They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters, but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. This species has been said to occur very rarely in small patches of habitat such as roadside ditches and alpine bogs (Higgins & Davies, 1996). They can also be found around irrigation channels and modified habitats at farms.</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: characterized by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation)</p> <p>Roosting habitat: on the ground near (or sometimes in) their foraging areas, usually in sites that provide some degree of shelter, e.g. beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable.</p> <p><i>Small areas of foraging habitat are present within small ephemeral wetlands, which may provide temporary refuge for the species, within the Project Area.</i></p>	<p>Potential to occur</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Small areas of foraging habitat are present within small ephemeral wetlands on drainage lines, which may provide temporary refuge for the species and support occasional transient visitors to the Project Area. No records within the Project Area or Locality. The closest record was recorded 34 km south-east of the Project Area in eucalypt open forest with grassy understorey.

Note: CE = Critically Endangered; E = Endangered; V = Vulnerable; Mi = Migratory; Ma = Marine

**APPENDIX B BOOBOOK CONSULTING TERRESTRIAL ECOLOGY
REPORT**



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Broadscale Ecological Assessment Report

Senex Atlas 3 Gasfield Project – Survey of Terrestrial Ecological Values.

Compiled by BOOBOOK for ERM

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Table of Contents

1	Introduction	5
1.1	Site Description	5
1.2	Purpose & Scope	8
1.3	Survey Team	8
2	Methodology.....	8
2.1	Desktop & Literature Review	8
2.2	Field Survey	9
2.2.1	Ground-truthed vegetation survey.....	9
2.2.2	BioCondition Assessment	10
2.2.3	Flora Species Survey	11
2.2.4	Fauna Species Survey.....	11
2.2.5	Fauna Habitat Assessment	11
2.2.6	Environmentally Sensitive Areas (ESA)	11
2.3	Survey Conditions and Limitations	11
3	Results & Discussion.....	12
3.1	Matters of National Environmental Significance.....	12
3.1.1	Threatened Ecological Communities	12
3.1.2	Threatened Flora	13
3.1.3	Weeds of National Significance	15
3.1.4	Threatened Fauna.....	16
3.1.5	Migratory & Marine Fauna	23
3.2	State Biodiversity Values & Constraints	25
3.2.1	Regional Ecosystems & Other Regulated Vegetation	25
3.2.2	BioCondition Assessment	26
3.2.3	Threatened Flora	27
3.2.4	Special Least Concern Flora	29
3.2.5	Biosecurity Act Weeds and other weeds of Management Concern	29
3.2.6	Pest fauna and invasive species.....	30
3.2.7	Threatened Fauna.....	30
3.2.8	Special Least Concern Fauna	31
3.2.9	Fauna Habitat Features & Potential Breeding Places	31
3.2.10	Environmentally Sensitive Areas (ESA)	32
3.3	Predictive Habitat Mapping.....	32
3.3.1	MNES & MSES Threatened Flora	33
3.3.2	MNES & MSES Threatened Fauna.....	34
4	Conclusions	38
5	References.....	39
	Legislation.....	45
Appendix A.	Overview of Project Area.....	46
Appendix B.	Threatened Ecological Communities Occurring within the Project Area.	48
Appendix C.	Threatened Flora Occurring within the Project Area.....	50
Appendix D.	WoNS and other Pest Flora Occurring within the Project Area.....	52
Appendix E.	Threatened Fauna Occurring within the Project Area.....	54
Appendix F.	Regional Ecosystems Occurring within the Project Area.....	56
Appendix G.	Pest Fauna Occurring within the Project Area.....	59
Appendix H.	Environmentally Sensitive Areas Occurring within the Project Area.....	61
Appendix I.	Predictive Habitat Mapping of Threatened Flora and Fauna.	63

List of Abbreviations

ALA	Atlas of Living Australia (database)
AU	Assessment Units (vegetation)
Biosecurity Act	<i>Biosecurity Act 2014</i> (Qld)
CE/CR	Critically Endangered
DAFF	Department of Agriculture, Forestry and Fisheries (Qld)
DAWE	Department of Agriculture, Water and the Environment (Australia) – now the Department of Climate Change, Energy, the Environment and Water
DEE	Department of the Environment and Energy (Australia) – now the Department of Climate Change, Energy, the Environment and Water
DES	Department of Environment and Science. Queensland (Qld)
DNRM	Department of Natural Resources and Mines. Queensland (Qld)
DoR	Department of Resources (Qld).
E	Endangered
EP Act	<i>Environment Protection Act 1994</i> (Qld)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Australia)
ESA	Environmentally Sensitive Area/s
GDE	Groundwater Dependent Ecosystem/s
GIS	Geographic Information System
GPS	Global Positioning System
LC/C	Least Concern
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NCAP	No Concern at Present
NC Act	<i>Nature Conservation Act 1992</i> (Qld)
NT	Near Threatened
OC/O	Of Concern
PMST	Protected Matters Search Tool
Qld	Queensland
Rd	Road
RE	Regional Ecosystem/s
REDD	Regional Ecosystem Description Database
SF	State Forest
SLC	Special Least Concern
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Community/ies
V	Vulnerable
VMA	<i>Vegetation Management Act 1999</i> (Qld)
Water Act	<i>Water Act 2000</i> (Qld)
WDRC	Western Downs Regional Council
WoNS	Weeds of National Significance

Executive Summary

This report summarises an assessment conducted for ERM, of terrestrial ecological values across the Senex Atlas 3 project area, located southwest of Wandoan, southern inland Queensland. The project area includes the entirety or parts of ATP 2059 (roughly 18.5 km²), PL 445 (6.2 km²), PL 1037 (2.8 km²) and PL 209 (70.3 km²) tenements, covering a total area of approximately 97.7 km². This survey area is referred to here as the Project Area. The Project Area includes parts of the Taroom Downs and Southern Downs biogeographic subregions within the Brigalow Belt Bioregion. The northern part of the Project Area comprises meandering watercourses on broad floodplains surrounded by gently rolling downs on fine sedimentary rocks. Landscapes to the south are increasingly hilly, including steep slopes with outcropping sandstone around hill crests. Landscapes in the northern part of the Project Area are largely converted to non-remnant pasture land but include a network of narrow, winding, riparian woodland corridors along watercourses, with connectivity north to other tributaries of the Dawson River. Landscapes in the southern part of the Project area are dominated by non-remnant pastures on rolling downs but include a wooded plateau in the extreme southeast, which is contiguous with a large area of remnant woodland outside the Project Area, extending to the Great Dividing Range in the Gurulmundi area and beyond. Small, isolated fragments of remnant and regrowth vegetation are scattered on floodplains and rolling downs throughout the Project Area. However, an area around Gilgul Road contains little native vegetation and forms a filter or barrier to movement of wildlife between north and south.

A field assessment included identification and mapping of regional ecosystems (RE) and Threatened Ecological Communities (TEC), searches for notable flora and fauna, including threatened species and pest species, and verification of Environmentally Sensitive Areas (ESA) across the Project Area. Vegetation structure assessments and faunal habitat assessments were made at 57 locations representing the diversity of landforms and vegetation across the Project Area. BioCondition assessments were made at nine (9) of these locations representing the major vegetation types present in the northern part of the Project Area.

Threatened Ecological Communities present within the Project Area included Brigalow (*Acacia harpophylla* dominant and codominant) and Poplar Box grassy woodland on alluvial plains. Fifteen (15) regional ecosystems were present within the Project Area including four (4) Endangered RE and five (5) Of Concern RE.

Likelihood-of-Occurrence assessments, based on field survey results, desktop assessment and expert knowledge, were made for threatened flora and fauna, and for migratory and marine species listed under the Commonwealth of Australia *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Similar Likelihood of Occurrence assessments were made for threatened flora and fauna listed under the Queensland *Nature Conservation Act 1992* (NC Act). Six (6) threatened flora species were assessed as potentially occurring within the Project Area, including three (3) EPBC Act and NC Act listed species and three (3) further species listed under the NC Act. One EPBC Act and NC Act listed threatened plant species, *Ooline (Cadellia pentastylis)*, was detected during field surveys, occurring in the extreme south-eastern part of the Project Area. Seventeen (17) threatened fauna species were assessed as potentially occurring in the Project Area, including fourteen (14) EPBC and NC Act listed species, and an additional three (3) NC Act listed species. Two EPBC Act and NC Act threatened fauna species – Central Greater Glider (*Petauroides armillatus*) and Koala (*Phascolarctos cinereus*) – were detected within the Project Area during field surveys. Twelve (12) marine and migratory species listed under the EPBC were assessed as potentially present within the Project Area. All of these are bird species and they include threatened species as well as common and widespread species, some of which occur in the Project Area as annual visitors and others which may occasionally be present as vagrants. Predictive habitat mapping was conducted for all threatened flora and fauna species assessed as potentially occurring within the Project Area. The results of field surveys and subsequent assessments emphasize the importance of riparian corridors in the north and the extensively wooded area in the south to biodiversity in the Project Area.

Conclusions drawn in this report are based on available information at the time of writing. Any additional information may alter such conclusions and the author reserves the right to do so if such information becomes available. This report has been made as at the date of the report and is not to be used after six (6) months and not if there are any material changes meanwhile. In either event it should be referred back for review. To the extent permitted by law BOOBOOK does not accept liability for any loss or damage which any person may suffer arising from any negligence or breach of contract on its part. This report was prepared for the benefit of the party to whom it is directed only and for the purpose identified within. BOOBOOK does not accept responsibility to any other person for the contents of the report.

1 Introduction

1.1 Site Description

This report provides results from a broadscale assessment of terrestrial ecological values undertaken for ERM across the Senex Energy Atlas 3 Gasfield Project (the Project). The survey area (hereafter termed 'the Project Area') covers approximately 97.7 km² (9 771.08 ha) comprising the entirety of the 'Tetris' petroleum exploration area (ATP 2059, 18.5 km²), the entirety of petroleum tenement PL 445 (6.2 km²) and parts of PL 1037 (2.8 km²) and PL209 (70.3 km²). The Project Area includes parts of 25 cadastral land parcels comprising private and leasehold lands along with road reserves and easements. The Project Area extends from 10 to 24 km southwest and south-southwest of Wandoan and is accessed via Jackson-Wandoan Road, Gurulmundi Road, Giligulgul Road and local roads. The Project Area is entirely within the boundary of Western Downs Regional Council (WDRC), southern inland Queensland (Appendix A)

Biogeographically, the Project Area is entirely within the Brigalow Belt Bioregion and straddles a diffuse boundary between Subregion 25 (Taroom Downs) in the north and Subregion 26 (Southern Downs) in the south (as per Sattler and Williams 1999). ATP2059 and PL445 are entirely within Taroom Downs. Much of PL209, south to the Woleebee Creek and Conloi Creek floodplains, is also within Taroom Downs, with the remaining southern portion in Southern Downs. Landscapes in the Taroom Downs portion are dominated by meandering watercourses traversing broad alluvial plains (Landzone 3) flanked by rolling rises on fine-grained sediments (Landzone 9) with a few scattered patches of colluvial sand deposits (Landzone 5). Elevation in this area varies from 250 m above sea level on Woleebee Creek at the northern limit of the Project Area, up to 350 m on peaks to the southeast, with the bulk of the Taroom Downs portion on flats and gentle slopes below 300 m above sea level. Landscapes in the Southern Downs portion include similar landforms (Landzones 3, 5 and 9) but with alluvial sediments restricted to gullies along of streamlines and increasing topographic relief to the south, rising to a rocky scarp and plateau in the extreme southeast (Landzone 10). Elevation in the Southern Downs portion of the Project Area rises from around 265 m on Woleebee Creek to 420 m on the plateau in the extreme southeast. The Project Area is entirely drained by streams that flow north to the Dawson River, within the Fitzroy Basin.

Geologically the Project Area forms part of the Surat Basin, with substrates following a conformal north to south series of late-Jurassic to early-Cretaceous sedimentary strata, overlain by Quaternary alluvial deposits (Qa-Qld) on floodplains and by fine-grained Tertiary mudrock (Ts-Qld) in the extreme southwest. A minor southwest trending fault is associated with the course of Woleebee Creek south of the junction with Conloi Creek. The Taroom Downs portion lies on fine-grained sediments of the Springbok Sandstone (Jis) and Westbourne Formation (Jiw). The Biogeographic transition between Taroom Downs and Southern Downs subregions is associated with a broad band of medium to coarse-grained Gubberamunda Sandstone (JKig) with fine to medium-grained bedrock of the Orallo formation (Kyo) forming the rolling hills further south. Surface rock is generally absent from the northern part of the Project Area, excepting small patches of gravel that is not derived from the underlying substrate. By contrast, surface rocks and bedrock outcropping around hillcrests and slopes are increasingly common south of Giligulgul Road. Soils across the northern half of the Project Area vary from grey or brown sandy loams along streamlines, dark brown clay on floodplains and brown clay-loams on the surrounding undulating downs. Patches of duplex soils with a deep surface layer of pale-brown sand occur on Gubberamunda Sandstone in the central part of the Project Area.

The northern part of the Project Area is extensively cleared of native vegetation and converted to non-remnant pasture dominated by native and introduced grasses, notably Buffel Grass (*Cenchrus ciliaris*) and Sabi Grass (*Urochloa mossambicus*). This includes the entire Taroom Downs portion and the northern half of the portion in Southern Downs subregion. Riparian woodland dominated by Queensland Blue Gum (*Eucalyptus tereticornis*) with some fringing areas of Poplar Box (*Eucalyptus populneus*), Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*), follows the winding course of major watercourses through this landscape. These narrow woodland corridors are disturbed by thinning, regrowth, grazing, tracks, weeds, gaps and edge effects causing death of some peripheral trees. However, these corridors have high faunal habitat values, in particular for arboreal mammals and birds, due to features such as an abundance of large trees with hollows occurring on alluvial soils near water sources and ephemeral wetlands in floodplain depressions or cut-off oxbows from changes in stream path. The corridors along Wandoan Creek and Woleebee Creek form part of an extensive dendritic network of riparian woodland with connectivity north to the Dawson River at Taroom but isolated from other large woodland patches to the east, south and west. In the rolling downs beyond the watercourses, remaining fragments of woodland are small, scattered, isolated and disturbed.

The southern part of the Project Area, within Southern Downs subregion, includes similar but less continuous riparian woodland corridors along Hellhole Creek, Woleebee Creek and its tributaries. This area also includes many small,

disturbed fragments of Brigalow and Belah woodland on the rolling downs. A more substantially wooded area occurs around the plateau in the extreme southeast with Brigalow and Belah forest, Mountain Coolibah (*E. orgadophila*) woodland and open forest of Narrow-leaved Ironbark (*Eucalyptus crebra*). Stands of Ooline (*Cadellia pentastylis*) up to 35 m high occur in Brigalow woodland on the footslopes and midslopes in this area. This forest and woodland includes fringing areas of regrowth and in some areas is disturbed by fire, light grazing, weeds, tracks and fencelines. Nonetheless, this area shows high ecological integrity and overall low levels of disturbance. This area is tenuously connected with much larger area of forest beyond the Project Area, to the south and east, and in particular it is on the periphery of the very extensive forested area around Barakula SF. This combined area is of State significance for tract size, connectivity and special biodiversity values.

Significant ongoing threats to biodiversity within the Project Area include further loss of remnant and regrowth vegetation in an area that is already extensively cleared; potential loss of connectivity among areas of remnant and regrowth vegetation, especially though disruption of riverine corridors by tracks, powerlines and other linear infrastructure; loss of ecological integrity of vegetation patches through edge effects around fragments and along narrow corridors, death of larger trees without corresponding recruitment, disturbance of understorey vegetation, and invasion by weeds and pastoral grasses.

The main land use within the Project Area is grazing of stock for beef production. Some flood plain areas have been developed for centre-pivot agriculture. An approval to develop pipeline and gasfield infrastructure and to extract coal seam gas within this area (PL 209) was granted to APLNG incorporated as a component of the much broader Walloons gas fields (DSEWPaC 2009a). Major pipelines and high-voltage powerlines pass through the Site to supply adjacent industrial and agricultural infrastructure.

An overview map of important features of the Project Area is presented in Appendix A. Representative images of landscapes and vegetation within the Project Area are shown in Figure 1a-h.



Figure 1a-b: Representative images of landscapes and vegetation within the Project Area: View east across non-remnant pasture on an extensive floodplain to riparian vegetation along Woleebee Creek (left) and view west in non-remnant pasture on rolling hills near Giligulgul Road (right). Landscapes in the northern part of the Project Area are largely cleared and comprise non-remnant pasture dominated by introduced grasses such as Buffel Grass (*Cenchrus ciliaris*) on floodplains and gently undulating downs with corridors of riparian vegetation along water courses and scattered small fragments of remnant and regrowth woodland elsewhere.



Figure 1c-d: Queensland Blue Gum (*Eucalyptus tereticornis*) riparian woodland (RE 11.3.25) at BioCondition survey site 873-B04 near the proposed horizontal directionally drilled pipeline crossing point on Woleebee Creek (left), and Poplar Box (*Eucalyptus populnea*) grassy woodland on alluvial plains (RE 11.3.2, Poplar Box TEC) at BioCondition survey site 873-B03 (right).



Figure 1e-f: View east from non-remnant area to scarp and plateau in the southeastern part of the Project Area, with an isolated Kurrajong tree (*Brachychiton populneus*) in the foreground, Brigalow (*Acacia harpophylla*) and Ooline (*Cadellia pentastylis*) dominant (RE 11.9.5, Brigalow TEC) on the slopes behind and Narrow-leaved Ironbark (*Eucalyptus crebra*) open forest (RE 11.10.7) on the summit (left), and open forest of Ooline and Brigalow with Narrow-leaved Bottle Tree (*Brachychiton rupestris*) and Broad-leaved Bottle Tree (*B. australis*) emergent and semi-evergreen vine thicket understorey species (RE 11.9.5a, Brigalow TEC) at site 873-S96 (right).



Figure 1g-h: Ooline, Brigalow and Mountain Coolibah woodland (RE 11.9.5, Brigalow TEC) on the slopes of the plateau in the southeast at site 873-S97, which is part of an extensive patch along this scarp with varying abundance of Brigalow (left), and view south in low Brigalow woodland (RE 11.9.5, not TEC) with the plateau area in the background. This vegetation meets the criteria for mapping as remnant but is not TEC, due to evidence of past clearing with introduced Buffel Grass forming over 50% of the total vegetation cover.

1.2 Purpose & Scope

The purpose of this report is to provide a baseline description of terrestrial ecological values and potential constraints within the Project Area. Results presented here are based on an initial desktop assessment combined with field surveys to confirm vegetation communities, notable flora and fauna species and habitat values present within the Project Area.

BOOBOOK was requested to undertake the following assessments for Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) within the Project Area:

- ✦ Assess ground-truthed ecological values, specifically:
 - Identify Threatened Ecological Communities (TEC) listed under the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act);
 - Verify mapped Regional Ecosystems (RE) and identify their *Vegetation Management Act 1999* (VMA) and biodiversity status;
 - Identify areas of regrowth vegetation equivalent to endangered RE;
 - Conduct BioCondition assessments at up to 10 sites in the within the Project Area; and,
 - Verify mapped Environmentally Significant Areas (ESA) and identify any other potential ESA;
- ✦ Identify MNES or MSES flora and fauna species potentially present in the Project Area, including:
 - Threatened species listed under the EPBC Act and/or the *Nature Conservation Act 1992* (NC Act);
 - Migratory and Marine species listed under the EPBC Act; and,
 - Pest species, focussing on Weeds of National Significance (WoNS) and on species listed under the *Biosecurity Act 2014* (Biosecurity Act);
- ✦ Assess Queensland Government mapped areas of Essential Habitat for NC Act listed threatened flora and fauna species; and,
- ✦ Provide predictive mapping of habitat for EPBC Act and NC Act listed threatened flora and fauna species potentially present within the Project Area.

1.3 Survey Team

Field ecological surveys within the Project Area were conducted by BOOBOOK staff with assistance in land access from Senex staff. Field surveys were conducted by Michael Cunningham (Senior Ecologist), Courtney Andrew (Graduate Ecologist) and Rosamund Aisthorpe (Botanist) in the periods 14 – 18th March 2022, 22 – 25th March 2022; 30 April – 5th May 2022), and 9 – 13th June 2022. All aspects of the project including field survey and reporting were conducted under the supervision of Craig Eddie (Principal Ecologist).

2 Methodology

2.1 Desktop & Literature Review

A was performed prior to the field survey which included interrogation of the following datasets:

- ✦ EPBC Act Protected Matters Search Tool (PMST) (DAWE 2022a);
- ✦ WildNet Queensland fauna and flora records (DES 2022a);
- ✦ Atlas of Living Australia fauna and flora records (ALA 2022);
- ✦ Protected Plants Flora Survey Trigger Map (DES 2022b);
- ✦ Referable Wetlands mapping (DES 2022c);
- ✦ Environmentally Sensitive Area mapping (DES 2022d);
- ✦ Matters of State Environmental Significance (DES 2022e);
- ✦ State terrestrial biodiversity and aquatic conservation values (DES 2022f);
- ✦ Regulated vegetation mapping (DoR 2022);

- ✂ Remnant vegetation RE: Regional Ecosystems – biodiversity status (DES 2022g);
- ✂ Mature Regrowth mapping (DES 2020b);
- ✂ Essential Habitat mapping (DES 2019);
- ✂ Ordered stream mapping (DNRM 2010);
- ✂ Groundwater dependent ecosystem mapping (DES 2018);
- ✂ Previous ecological surveys in the Senex Atlas gasfield (BOOBOOK 2014, 2020, 2021a, 2021b, 2022; ERM 2018), and,
- ✂ A prior EPBC referral (DSEWPac 2009) and Environmental Impact Statement (APLNG 2010a, b) for gasfield and pipeline development within PL 209.

Desktop searches were conducted for the entire Project Area and separately, for each property within the Project Area. Searches were made using online spatial layers, and/or searches using lot/plan details as a reference or centre point coordinates within each property, with a 10 km buffer. The entire Project Area and 10 km buffer around this are referred to below as the 'Desktop Search Area'. Additional searches of species records (ALA 2022; DES 2022a) were made of well surveyed areas nearby (Gurulmundi SF, Cherwondah SF) of Western Downs Regional Council area and, separately, of records within Southern and Central Queensland of each threatened species considered as possibly occurring within the Project Area. These datasets provided a baseline for subsequent field assessment.

2.2 Field Survey

Field ecological surveys were conducted via targeted vehicle based and foot traverses of the Project Area. Location and other data for all notable features encountered were recorded using a Zebra tablet device, hand-held GPS receivers and written notes.

2.2.1 Ground-truthed vegetation survey

Baseline botanical surveys were undertaken to describe dominant flora and vegetation community structure within the Project Area. Ground-truthing of the Regional Ecosystem (RE) designation (DES 2022g) within the Project Area was undertaken using the quaternary level of data collection as described by Neldner *et al.* (2022).

Vegetation community assessments were undertaken within 50 m x 20 m plots (0.1 ha) within representative locations in all identified RE and regrowth vegetation types within the Project Area. Faunal habitat values were also assessed within these plots (see below). The locations of vegetation and habitat survey sites are shown in Appendix A.

Vegetation community polygons were verified in accordance with Queensland RE description and biodiversity status as per the latest updates of the Regional Ecosystem Description Database (REDD) (DES 2021) and TEC criteria (DAWE 2022b; TSSC 2013, 2019).

RE polygons were assigned to remnant or non-remnant status as defined by the *Vegetation Management Act 1999*, with reference to Version 3.2 of the Queensland Government BioCondition Benchmark Database (Queensland Herbarium 2021). Remnant vegetation had obtained a canopy cover more than 50% of the benchmark canopy layer and a height more than 70% of the benchmark height of minimally disturbed vegetation of a given RE (referred to below as the 50/70 rule). The minimum size of areas mapped as TEC follows the specified criteria for each listed vegetation community (TSSC 2013, 2019), which for Brigalow vegetation comprises areas larger than 0.5 ha. No minimum size has been specified for SEVT (McDonald 2010) therefore all patches of this vegetation type larger than 0.5 ha were mapped as TEC. Minimum size thresholds for native vegetation that is not a TEC follow the Queensland Herbarium guidelines and practice, which map vegetation at a scale of 1:100 000, with a minimum area of 5 ha (see p. 26 in Neldner *et al.* 2022). An exception to this rule was made for RE 11.3.27 (Freshwater wetlands), where a minimum size of 0.5 ha was applied to mapping. RE 11.3.27 includes a range of palustrine wetland communities that are typically small in area but contribute disproportionately to biodiversity, faunal breeding sites and habitat for threatened species. Where long, narrow linear corridors of vegetation were present, these features were mapped down to a minimum width of 25 m (equivalent to the 1:25 000 scale in Neldner *et al.* 2022). Note that these minimum thresholds for mapping refer to overall vegetation patch size, which may include two or more polygons of different vegetation types. Small or narrow polygons were also be mapped for patches of vegetation that meet these size criteria but extend beyond the survey boundaries, with only a small portion included within the Project Area. Some patches were excluded from vegetation mapping based on these minimum size criteria but were mapped as potential habitat areas where these included identified habitat features for threatened species. Ground-truthed areas of advanced regrowth vegetation (i.e. native vegetation older than 15 years that does not meet the 50/70 rule cited above) were assigned to the floristically equivalent RE for assessment of potential ESA status.

2.2.2 BioCondition Assessment

BioCondition assessments were used to evaluate ecological functionality of vegetation within the Project Area. These assessments applied the methodologies described by Eyre *et al.* (2015). This involved the establishment of a 100 m x 50 m plot for measurements relating to canopy layer structure and diversity, a 100 m transect to measure canopy cover, a 50 m x 10 m subplot for measuring plant richness in shrub and ground layers, a 50 m x 20 m subplot for measuring coarse woody debris, and five 1 x 1 m quadrats to estimate ecological components of ground cover within the assessment area. These values were used as indicators of ecosystem function relative to minimally disturbed benchmark sites (Queensland Herbarium 2021) within the same vegetation type (AU). As requested by the client, up to 10 BioCondition assessments were made to gauge ecological condition of the major vegetation types in the northern part of the Project Area only. These BioCondition assessments complement the quaternary vegetation assessments, which were made within remnant and regrowth of each vegetation type present within the Project Area.

The following information was recorded at each BioCondition site:

- ✎ Date;
- ✎ Observers;
- ✎ Description of location (bioregion, general description, co-ordinates for plot origin and centre, plot bearing and alignment);
- ✎ General habitat description and RE type;
- ✎ Median height for canopy, emergent and sub-canopy strata;
- ✎ Slope position/slope degree and slope aspect;
- ✎ Tree species richness (within 100 m x 50 m plot);
- ✎ Native plant species richness (within 50 m x 10 m plot);
- ✎ Non-native plant cover (within 50 m x 10 m plot);
- ✎ Total length of coarse woody debris (length >10 cm diameter and >0.5 m long within 50 m x 20 m plot);
- ✎ Number and average diameter at breast height (DBH) of large eucalypt and non-eucalypt trees (within 100 m x 50 m plot);
- ✎ Recruitment of canopy species (within the 100 m x 50 m plot);
- ✎ Tree and shrub canopy cover (within 100 m transect);
- ✎ Ground cover within 1 m x 1 m plots (native perennial grass and organic litter cover in the ground layer);
- ✎ Disturbances (severity, last event and observation type).

Large tree DBH thresholds for each RE were used where published benchmarks were available, otherwise the default ≥ 30 cm DBH for eucalypts and ≥ 20 cm DBH for non-eucalypts was applied.

Site photographs were taken using a digital camera in accordance with Eyre *et al.* (2015) (i.e. one photograph at plot origin and north, east, south and west photographs at the plot centre). Photograph numbers were recorded. Locations of BioCondition sites were determined using a handheld Global Positioning System (GPS) (Garmin GPSmap 78S) and BioCondition assessment data was captured by mobile GIS devices (Zebra tablet device). For this assessment it was not necessary to mark the origin and centre point of BioCondition plots with steel fence posts, as suggested in Eyre *et al.* (2015), due to current and proposed land use (grazing, forestry and coal seam gas development).

Scores for BioCondition sites were calculated in accordance with Eyre *et al.* (2015) which compares the values obtained at each survey site with values in the benchmark document for that particular RE (Queensland Herbarium 2021). Subscores are awarded to each site are totalled and divided by the maximum possible score for that RE. This provides a numeric index along a continuum of biodiversity condition, where scores close to 0 indicate sites that are ecologically 'dysfunctional' and scores closer to 1 indicate increasing functional integrity.

2.2.3 Flora Species Survey

A search was made for EPBC Act and NC Act listed threatened flora and selected Special Least Concern flora within the Project Area. Where found, the species, location and number of individuals were recorded. However, these broadscale surveys were not exhaustive. Many areas of vegetation beyond identified points of interest were not visited but were mapped from viewpoints and imagery, and assigned an appropriate level of confidence. Flora species names follow Brown (2021).

Significant weed species, WoNS and Biosecurity Act Restricted Matters, were recorded as representative examples to indicate the presence and abundance of the species within a given part of the Project Area.

2.2.4 Fauna Species Survey

Incidental and targeted searches were conducted to detect the presence of threatened vertebrate fauna. Incidental searches consisted of opportunistic active searches in suitable habitat while traversing the Project Area. Targeted faunal survey techniques included recordings of bat calls using Anabat recorders, and spotlighting for arboreal mammals. Bat calls were recorded overnight in two locations within the northern part of the Project Area. Spotlighting surveys were made in two sites, in riparian woodland along Wandoan Creek and in similar vegetation along Woleebee Creek, both within the northern part of the Project Area. Each spotlighting survey commenced one hour after sunset and consisted of a two-hour, approximately two-kilometre meandering transect through habitat suitable for arboreal mammals covering all vegetation strata along the route.

2.2.5 Fauna Habitat Assessment

Data were collected for fauna habitat features to inform likelihood of occurrence and significant impact assessments for threatened fauna. These data were collected within the same 50 m x 20 m plot used for vegetation assessments, including proposed infrastructure areas within non-remnant vegetation. Features were assessed semi-quantitatively and included the presence and abundance of:

- ✦ hollow-bearing live trees, stags and logs;
- ✦ logs by size class;
- ✦ leaf and woody litter, stone/rock and grassy ground cover;
- ✦ rock outcrops, gilgais, termite mounds and burrows; and,
- ✦ mistletoe and other potential food plants.

Active or potential fauna breeding places were also recorded where found. Such places included:

- ✦ Decorticating trees and logs; and,
- ✦ Hollow-bearing logs, live trees and stags.

The results of habitat assessments, combined with published information and ecologist knowledge of fauna distribution and habitat use, were used to predict habitat suitability for EPBC Act and NC Act listed threatened fauna species. These results were used to develop GIS-based maps of potential habitat for threatened species within the Project Area.

2.2.6 Environmentally Sensitive Areas (ESA)

Government mapped ESA include protected estates defined by cadastral boundaries, such as State Forests and Resource Reserves, as well as ecological features, such as endangered and of concern vegetation communities and mapped essential habitat for threatened species, comprising remnant vegetation within a 1 km radius of validated species records. Ecological ESA identified in desktop assessment (DES 2022d) were ground-truthed in the field to verify the existence and extent of these features. Ground-truthing of vegetation also identified additional areas of ESA.

2.3 Survey Conditions and Limitations

The weather during the survey period was mild and wet with 425.8 mm rainfall measured in January – May at the nearby Woleebee Nevasa weather station compared with long term (1912-2021) median value of 204.2 mm at this weather station (BOM 2022). Multiple survey mobilisations were required over a three-month period due to

disruptions by rain. Weather conditions during the survey were initially warm and humid, becoming mild to cool and humid with light frosts in later survey periods. Much of the soil remained moist with some areas waterlogged throughout this time. Abundant plant growth occurred during the period of initial surveys, with withering and haying off in the later period. There was limited flowering of plants during the survey, with many spring flowering shrubs and forbs in this area. Conditions during the survey period were generally good for detection and identification of threatened plant species. However, this broad scale survey was based on visits to identified points of interest chosen based on desktop and field assessments. It was not possible to visit and search all areas within the available survey time.

Similarly, faunal surveys were limited to incidental searches within areas of suitable habitat and targeted techniques for rapid detection of key species within the Project Area. In general, these targeted surveys conformed to generic guidelines for fauna survey techniques (Eyre *et al.* 2018) but search effort was insufficient to determine the presence or absence of most threatened species within the Project Area. For example, spotlighting surveys conformed to Australian Government guidelines (DSEWPaC 2011a) for detection of arboreal mammals within suitable habitat. However, these surveys were insufficient for estimating abundance and mapping occurrence of species such as Greater Glider, Yellow-bellied Glider and Koala across the Project Area. Several species of Long Eared Bats, *Nyctophilus* spp., may potentially occur within the Project Area and it is not possible to reliably distinguish these species on calls (DSEWPaC 2010a), therefore trapping is required to detect the South-eastern Long-eared Bat, *N. corbeni*. Only incidental searches were made for threatened birds and these do not meet the Australian government guidelines for search effort (e.g. 10 hours over 5 days of targeted stationary observations for Australian Painted Snipe, *Rostratula australis*; DSEWPaC 2010b). Timed surveys (20 min) were made for threatened reptiles at selected habitat assessment points as per DSEWPaC (2011b) guidelines. However, search effort was insufficient to cover the extent of suitable habitat within the project area (e.g. recommendation for 20 min search per hectare for detection of Yakka Skink, *Egernia rugosa*; Ferguson and Mathieson 2014).

Planned additional faunal surveys, including targeted searches for the threatened Dulacca Woodland Snail, *Adclarkia dulacca*, along with further spotlighting, active searches for reptiles and trapping of bats, was stymied by abundant rainfall that constrained access to much of the Project Area during the survey period. Consequently, predictive mapping of threatened flora and fauna occurrence are conservative estimates of occurrence that assume species presence within areas of potentially suitable habitat.

3 Results & Discussion

3.1 Matters of National Environmental Significance

3.1.1 Threatened Ecological Communities

PMST search results (DAWE 2022a) indicated the potential presence of five TECs within the Project Area these being:

- ✦ Brigalow (*Acacia harpophylla* dominant and co-dominant);
- ✦ Coolibah – Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;
- ✦ Poplar Box grassy woodland on alluvial plains;
- ✦ Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions; and,
- ✦ Weeping Myall woodlands.

Two TEC were detected within the Project Area, these being: Brigalow (*Acacia harpophylla* dominant and co-dominant) ('Brigalow TEC'); Poplar Box grassy woodland on alluvial plains ('Poplar Box TEC').

Seventeen (17) patches of Brigalow TEC were detected with the mapped area varying from 0.14 ha through to a maximum size of 44.93 ha. This includes six patches of regrowth (13.00 ha) and 11 patches of remnant (82.75 ha). These areas of Brigalow TEC (RE 11.9.5 and 11.9.5a) occur on rolling downs throughout the Project Area with larger patches around the plateau in the south. An additional 14 patches of Brigalow vegetation (RE 11.9.5; total 56.21 ha) did not meet the criteria for recognition as TEC – either with *Acacia harpophylla* absent or subdominant or with exotic perennial plants comprising over 50% of total vegetation cover within the patch. Additional patches of Brigalow dominated vegetation (equivalent to RE 11.3.1 and 11.9.5) were less than 0.5 ha in size and were excluded from recognition as TEC but were mapped as habitat areas for Brigalow dependent threatened species.

Ten patches of Poplar Box TEC were detected within the Project Area. All Poplar Box TEC comprised remnant vegetation of RE 11.3.2, including three patches assessed as Category B (Good Quality) and seven patches assessed as Category C (Moderate Quality). Areas of Poplar Box TEC within the Project Area vary in size from 0.03 to 9.58 ha, all

occurring on floodplains in the north, with some patches extending beyond the Project Area boundaries. An additional fourteen polygons of regrowth and remnant Poplar Box woodland on alluvial plains (RE 11.3.2) were assessed and did not meet the criteria for recognition as TEC. The ground stratum of these areas was generally dominated by exotic weeds and all but one of these polygons were smaller than 5 ha, being part of patches with other vegetation types.

Mapped areas of TEC within the Project Area are shown in Appendix B. The extent of TEC in the Project Area is summarised in Table 1. Representative images of TEC within the Project Area are shown in Figure 1d-g.

Table 1: Description and ground-truthed extent of TEC within the Project Area.

TEC Description	RE Codes	Extent of TEC (ha)
Brigalow (<i>Acacia harpophylla</i> dominant and codominant)	11.9.5, 11.9.5a	95.75
Poplar Box grassy woodland on alluvial plains	11.3.2	32.29

3.1.2 Threatened Flora

PMST search results (DAWE 2022a) indicated the possible occurrence of nine (9) EPBC Act listed threatened flora species within the Project Area. WildNet (DES 2022a) and ALA (2022) database searches returned records for four (4) of these species within the Desktop Search Area, these being Curly-bark Wattle (*Acacia curranii*), Ooline (*Cadellia pentastylis*), Gurulmundi Fringe-myrtle (*Calytrix gurulmundensis*) and Belson’s Panic (*Homopholis belsonii*).

One species of EPBC Act listed threatened flora, Ooline, was detected within the Project Area during field surveys. Ooline occurred from the footslopes to the crest of the scarp in the extreme southeast of the Project Area, occurring at all developmental stages, from juveniles and small trees through to trees over 30 m high. Ooline was recorded as isolated trees or clusters of trees in non-remnant vegetation, and at varying abundance, from scattered trees through to a dominant species in patches of RE 11.9.5 and 11.9.5a. Representative images of EPBC Act listed threatened flora species detected within the Project Area are shown in Figure 2a-b.

Details of the desktop search and field survey results are provided below in Table 2 with the likelihood of occurrence assessment of EPBC Act listed threatened flora that occur or could potentially occur in the Project Area. Desktop records of threatened flora species and locations where threatened flora species were detected during field surveys are mapped in Appendix C.

Table 2: Likelihood of occurrence assessment for EPBC Act-listed threatened flora in the Project Area.

Key to Status: E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Acanthaceae	<i>Xerothamnella herbacea</i> Herbaceous Xerothamnella	E	E	A small annual forb occurring in well shaded areas around shallow, braided drainage lines and gilgais in Brigalow woodland. Distributed in widely scattered sites across the southern Brigalow Belt of Queensland from Yelarbon, on the NSW border, north to Kokotungo in Central Queensland (ALA 2022).	Unlikely to be present. Small areas of suitable habitat are present however there are no known occurrences within 50 km of the Project Area. The closest specimen records occur northeast of Chinchilla and in the Arcadia Valley at Lonesome Holding, approximately 85 km east-southeast and 142 km northwest of the Project Area, respectively (ALA 2022).
Apocynaceae	<i>Vincetoxicum forsteri</i> (syn. <i>Tylophora linearis</i>) Slender Tylophora	E	E	A twining vine, which is widely distributed in dry woodland along the western slopes of the Great Dividing Range, mainly in NSW, from around West Wyalong north to Yetman. There are very few records of this species from Queensland, with one specimen collected near Glenmorgan in 1960 (ALA 2022) and a recent collection near Miles (BOOBOOK unpubl. data).	Potentially present. Suitable habitat (dry eucalypt woodland) exists as several small fragments through the Project Area and a larger area in the southeast corner. A recent collection is known from approximately 36 km southeast of the Project Area (BOOBOOK unpubl. Data).

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Brassicaceae	<i>Lepidium monoplocoides</i> Winged Peppergrass	V	LC	A small annual forb found in the Murray-Darling basin on floodplains and other periodically waterlogged areas with heavy clay soils (Mavromihalis 2010). The species has a wide distribution through inland NSW and Victoria. The sole records from Queensland are from the Yelarbon area (ALA 2022).	Unlikely to be present. Habitat in the Project Area is dissimilar to that at known localities and the Project Area is far outside the known range of this species.
Mimosaceae	<i>Acacia curranii</i> Curly-bark Wattle	V	V	A shrub or small tree occurring in widely disjunct areas of dry woodland on rocky ranges, from around Lake Cargelligo in southwestern NSW north to Gurulmundi in inland southern Queensland (ALA 2022). At Gurulmundi it occurs in scattered thickets of diverse heath scrub with emergent trees growing in red sandy soils on a deeply weathered and indurated (ironstone) sandstone plateau (DES 2022h).	Unlikely to be present. There is no suitable habitat (heath associated with rock pavements on land zone 7) within the Project Area. The nearest confirmed population being approximately 15 km south-southeast of the Project Area near the southern boundary of Gurulmundi SF (DES 2022a).
Myrtaceae	<i>Calytrix gurulmundensis</i> Gurulmundi Fringe-myrtle	V	V	A narrow endemic to areas around Gurulmundi State Forest and western parts of Barakula State Forest, in southern inland Queensland. This species occurs in heathy scrub and shrubby woodland communities, growing on skeletal soils overlying indurated rock pavements on plateau summits.	Unlikely to be present. There is no suitable habitat (heath associated with skeletal soils and rock pavements on land zone 7) within the Project Area. This habitat and the species are abundant in Gurulmundi SF to the south, including twenty-six (26) specimen records within 10 km of the Project Area (DES 2022a).
Poaceae	<i>Arthraxon hispidus</i> Hairy-joint Grass	V	V	A grass species growing in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps (TSSC 2008). It has been recorded from many locations in north-eastern NSW and southeast Queensland. Outlying and disjunct populations of this species associated with springs and spring-fed wetlands occur in the Carnarvon Range and Taroom area (DES 2022h).	Unlikely to be present. Suitable habitat (spring-fed wetlands) is absent from the Project Area. The closest known records are 81 km north of the Project Area around artesian springs near Taroom.
Poaceae	<i>Dichanthium setosum</i> A bluegrass	V	LC	Distributed across basalt tablelands and ranges of eastern inland NSW and Queensland (ALA 2022). In Queensland, it is recorded in disjunct patches from Toowoomba in the south to the Burdekin River dam in the north. It grows on basaltic black clays and hard-setting red-brown loams (DAWE 2022b) in woodland or open grassy woodland dominated by Brigalow and/or eucalypt species (DES 2022h). It can tolerate moderate disturbance and, in some areas, occurs in cleared woodland, grassy roadside remnants and highly disturbed pasture (DES 2022h).	Unlikely to be present. Substrates in the Project Area are dissimilar to those at known localities (basalt derived soils) and there are no records within 100 km of the Project Area.
Poaceae	<i>Homopholis belsonii</i> Belson's Panic	V	V	Distributed in the southern Brigalow Belt of northern NSW and southern Queensland (ALA 2022, DES 2022h). Within Queensland it principally occurs in Poplar Box, Brigalow and Belah dominated communities where it occurs in shaded situations on alluvial soils, often along drainage lines (DES 2022h). The species does not persist in intensively grazed landscapes.	Potentially present. The Project Area includes suitable habitat areas of Poplar Box and Brigalow/Belah woodland on alluvium. One specimen record occurs approximately 2 km to the north near the junction of Woleebee and Wandoan Creeks (ALA 2022, DES 2022a).

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Surianaceae	<i>Cadellia pentastylis</i> Ooline	V	V	Distributed in the southern Brigalow Belt of Queensland and northern NSW (DAWE 2022b). It occurs patchily from around Gunnedah north to Blackall and Duinga (ALA 2022). It grows on undulating plains, valley slopes, hillsides and scarps, often in association with Brigalow and SEVT communities (Santos 2012; DAWE 2022b; DES 2022h).	Confirmed present. This species is abundant in Brigalow woodland around the plateau in the southeastern part of the Project Area. It was observed as isolated trees and clumps or as a common tree in Brigalow woodland in Gurulmundi SF, Stones Country RR and adjacent properties. Four (4) specimen records occur within the Project Area and another six (6) records occurred within the 10 km desktop search area (DES 2022a).



Figure 2a-b: EPBC Act listed threatened flora species detected in the Project Area included Ooline, occurring in the south of the Project Area as isolated paddock trees (left) through to an abundant large tree dominating areas of Brigalow woodland along the southeastern scarp and adjacent footslopes. This species has distinctive ovate leaves (right) and was readily detected at a distance at the time of survey (Autumn) due to a red flush of new growth in the tree canopy.

3.1.3 Weeds of National Significance

Desktop searches of the Queensland Government WildNet database (DES 2022a) found five species of WoNS recorded within the Desktop Search Area, these being *Parthenium hysterophorus*, *Senecio madagascariensis*, *Anredera cordifolia*, *Opuntia stricta* and *O. tomentosa*. An additional WoNS species, *O. aurantiaca*, was detected during field surveys of PL 209 outside the Project Area. Two WoNS species were detected during field surveys within the Project Area, these being *Opuntia stricta* and *O. tomentosa*. Table 3 presents a likelihood of occurrence assessment of WoNS detected within the Desktop Search Area. Locations of WoNS detected within the Project Area are shown in Appendix D. Representative images of these WoNS are shown in Figure 3a-b.

Table 3. WoNS detected or potentially occurring within the Project Area.

Family	Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments
Asteraceae	<i>Parthenium hysterophorus</i>	Parthenium Weed	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Previously recorded from the Desktop Search Area (DES 2022a).
Asteraceae	<i>Senecio madagascariensis</i>	Fireweed	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Previously recorded from the Desktop Search Area (DES 2022a).

Family	Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments
Basellaceae	<i>Anredera cordifolia</i>	Madeira Vine	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Previously recorded from the Desktop Search Area (DES 2022a).
Cactaceae	<i>Opuntia aurantiaca</i>	Tiger Pear	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Detected nearby during field surveys. Occurring at moderate densities in Brigalow woodland around survey site 873-S74. The closest records in ALA (2022) are over 45 km away, around Yuleba North, Barakula and Taroom. No previous records in WildNet from the Desktop Search Area (DES 2022a).
Cactaceae	<i>Opuntia stricta</i>	Common Pest Pear	WoNS, Cat. 3 Restricted Matter	Confirmed present within the Project Area. Previously recorded from the Project Area (DES 2022a). Detected in field surveys throughout the Project Area at low densities.
Cactaceae	<i>Opuntia tomentosa</i>	Velvety Tree Pear	WoNS, Cat. 3 Restricted Matter	Confirmed present within the Project Area. Previously recorded from the Project Area (DES 2022a). Detected in field surveys throughout the Project Area at low densities.



Figure 3a-b: Weeds of National Significance (WoNS) detected in the Project Area included Velvety Tree Pear (*Opuntia tomentosa*) (left) and Common Pest Pear (*O. stricta*) (right). Both species are also Class 3 Restricted Matter under the Biosecurity Act. These pest species were present at low densities throughout the Project Area.

3.1.4 Threatened Fauna

Desktop searches (ALA 2022; DAWE 2022a; DES 2022a) combined with previous ecological surveys in the vicinity (BOOBOOK 2020, 2021a, 2021b, 2022; ERM 2018), and local knowledge, suggested twenty-two EPBC Act listed threatened terrestrial fauna species that might occur within the Project Area. PMST searches (DAWE 2022a) also identified three EPBC Act listed threatened aquatic fauna species that might occur within the Project Area – Murray Cod (*Machullochella peilii*), Southern Snapping Turtle (*Elseya albagula*) and Fitzroy River Turtle (*Rheodytes leukops*). These aquatic species are outside the scope of the present terrestrial ecological assessment and are addressed in a corresponding assessment of aquatic ecology. Desktop searches (ALA 2022; DES 2022a) revealed records of seventeen EPBC listed threatened terrestrial fauna species recorded from the WDRC Area of which six species were previously recorded within the Desktop Search Area.

EPBC Act listed threatened fauna species detected during field surveys included several Greater Glider (*Petauroides armillatus*) observed during spotlighting surveys of riparian woodland along Wandoan Creek and along Woleebee Creek, and indirect evidence of Koala (*Phascolarctos cinereus*), detected from scratches on riparian Queensland Blue Gum trees in several locations along Wandoan Creek, Woleebee Creek and a tributary of Hellhole Creek. Representative images showing evidence of threatened species detected within the Project Area are shown in Figure 4a-b.

Locations of historical records of threatened fauna, and sites where threatened species were detected during field surveys are shown in Appendix E. A likelihood of occurrence assessment for EPBC Act listed threatened fauna is presented in Table 4.

Table 4: Likelihood of occurrence assessment for EPBC Act listed threatened fauna within the Project Area.

Key to Status: CE/CR = Critically Endangered; E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo	V	V	Distributed through coastal areas and ranges of eastern Australia with scattered records further inland. This is a specialised feeder dependent on seeds of Casuarinaceae (She-oak) trees. Breeding pairs nest in large hollows generally high up in large eucalypt trees or stags near water and food sources (Pavey <i>et al.</i> 2016). The species is capable of moving among isolated trees and small habitat patches within fragmented landscapes (Pavey <i>et al.</i> 2016, Holmes 2012). The species roves widely across this landscape, with some evidence of seasonal movements following maturation of She-oak fruits (Stock and Wild 2005; Hourigan 2012; BOOBOOK, unpubl. data).	Likely to be present. Casuarinaceae food trees are abundant within the Project Area. These include Belah (<i>Casuarina cristata</i>), which occurs throughout the Project Area, Bull Oak (<i>Allocasuarina luehmannii</i>) in scattered woodland patches on sandy soils. Potential nest trees occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the Project Area. No evidence of feeding (chewed cones) was observed during field surveys. However, this species has previously been recorded within the Project Area (BOOBOOK 2021a, DES 2022a).
Birds	<i>Calidris ferruginea</i> Curlew Sandpiper	CE	CR	A non-breeding migratory wader species usually encountered on coastal saline and freshwater tidal and palustrine wetlands (Clemens <i>et al.</i> 2021; DAWE 2022b). The Australian population has declined by > 50-80% over the past 17 years (Clemens <i>et al.</i> 2021). This is a predominantly coastal, gregarious bird that feeds in shallow inundated areas and on recently exposed mudflats or sandy shores (Clemens <i>et al.</i> 2021). Passage migrants are very occasionally recorded on inland wetlands (ALA 2022; Birdlife Australia 2022). Nearest records of the species to the Project Area are from Lake Broadwater, a large palustrine wetland near Dalby (ALA 2022).	Unlikely to be present. Wetland habitat within the Project Area comprises small ephemeral vegetated swamps and billabongs associated with meandering drainage lines. The species not been recorded in the vicinity of the Project Area.
Birds	<i>Charadrius leschenaultii</i> Greater Sand Plover	V	V	This is a gregarious, migratory species that is overwhelmingly coastal in occurrence when in Australia (ALA 2022). Records from inland sites are extremely rare and probably reflect vagrant birds blown off course by storms (TSSC 2016b).	Unlikely to be present. This is a coastal species with no significant occurrences inland. There is no suitable habitat for this species within the Brigalow Belt South Bioregion.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Erythrotriorchis radiatus</i> Red Goshawk	V	E	A highly mobile species with a large home range. Breeding habitat is in intact tall open forest and woodland around major drainage lines, especially near permanent water bodies where there is high avian prey diversity, but the species could potentially forage much further away from these areas (Marchant and Higgins 1993). Telemetry studies indicate that the species forms a single wide-ranging population, with individuals covering distances over 1000 km from breeding areas in the tropical north to non-breeding areas further south (MacColl <i>et al.</i> 2021). The species is sensitive to landscape level clearing and may now be extinct in NSW and Southern Queensland (DERM 2012, Seaton 2014). There are no recent records in Queensland south of the Wet Tropics, Einasleigh Uplands, Gulf Plains and North West Highlands Bioregions (MacColl <i>et al.</i> 2021). The Brigalow Belt Bioregion is now considered to be outside the species extent of occurrence (MacColl <i>et al.</i> 2021).	Unlikely to be present. The Project Area is within the historical range of this species (ALA 2022). Woodland in the southeastern corner is connected to an extensive, wooded area of potentially suitable habitat around Gurulmundi and Barakula. However, there are no validated recent records from this region (since 1997) and the Brigalow Belt Bioregion is now considered to be outside the species distribution (MacColl <i>et al.</i> 2021).
Birds	<i>Falco hypoleucos</i> Grey Falcon	V	V	A rarely seen species, occurring at low densities throughout much of the arid and semi-arid interior of Australia (TSSC 2020). This is a pursuit predator that hunts birds and other small prey in open woodland plains. The species nests in large trees along stream lines (TSSC 2020). The species is very occasionally recorded in more mesic areas such as the Brigalow Belt (ALA 2022).	Unlikely to be present. The Project Area is far from the preferred habitat of this species, <i>Acacia</i> shrubland plains traversed by tree-lined watercourses in the southwest of the State (TSSC 2020). Occurrence in this region would only involve transient individuals.
Birds	<i>Geophaps scripta scripta</i> Squatter Pigeon (southern subspecies)	V	V	This subspecies occurs throughout the Brigalow Belt from Texas to Townsville and from Rockhampton west to Longreach (ALA 2022). This is a ground-feeding, ground-nesting inhabitant of grassy woodlands with open areas for foraging, usually within 3 km of a water source (Higgins and Davies 1996). The species feeds on seeds of legumes, forbs and some grasses (Higgins and Davies 1996; Ward <i>et al.</i> 2021). Ongoing declines, particularly in the south of the range, have been attributed to intensive grazing, land clearing, predation by foxes and cats, and encroachment of foraging habitat by introduced pastoral grasses, especially Buffel Grass (<i>Cenchrus ciliaris</i>) (Ward <i>et al.</i> 2021).	Potentially present. The Project Area is within the broad range of this species (ALA 2022). The landscape in the north of the Project Area is unsuitable for this species being largely cleared and with dense encroachment by pastoral grasses in most remaining woodland patches. Suitable dry woodland habitat remains on and around the plateau in the southeastern part of the Project Area. There are very few records from the area between Jackson, Miles and Wandoan, however survey effort is also low (Birdlife Australia 2022). The closest recent record is a 2016 sighting from near Cherwondah SF (ALA 2022), which is a large area of potentially suitable habitat around 6 km east of the Project Area.
Birds	<i>Grantiella picta</i> Painted Honeyeater	V	V	The breeding range extends along the eastern Murray-Darling basin from Chinchilla in Queensland to the Grampians range in western Victoria (Watson <i>et al.</i> 2021). Dispersed records from further northwest in Queensland represent seasonal migration and nomadic movements across the winter range (Watson <i>et al.</i> 2021; ALA 2022). This species lives and breeds in woodland with high densities of <i>Amyema</i> mistletoe food plants (Higgins <i>et al.</i> 2001, Watson 2012). Recent analyses suggest that the species population is larger than previously thought with no significant decline in the past decade (Watson <i>et al.</i> 2021).	Potentially present. The Project Area is within the broader range of this species (ALA 2022), however there are no publicly available records of this species from the region between Miles, Jackson and Wandoan (ALA 2022; Birdlife Australia 2022). Mistletoes (<i>Amyema</i> spp.) were present but uncommon across the Project Area.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Hirundapus caudacutus</i> White-throated Needletail	V	V	An aerial insectivore present in eastern and south-eastern Australia as a spring/summer non-breeding migrant (Tarburton 2021). Occurring over most habitat types, including disturbed areas, but with a preference for foraging over wooded areas (Tarburton and Garnett 2021). Individuals regularly roost in tall trees or trees on ridgelines, arriving and leaving roosts in the dark (Tarburton 2021). Migrating birds fly at high altitude and at night (Tarburton 2021). Ongoing declines largely due to loss of breeding sites (large trees with hollows) in northeast Asia (Tarburton and Garnett 2021).	Likely to be present. Likely to occur annually (September-April), following storm fronts throughout the Project Area.
Birds	<i>Rostratula australis</i> Australian Painted Snipe	E	E	A secretive nomadic wader that forages and breeds in variably inundated wetlands with features such as complex shorelines, areas of shallow water, dense low vegetation and exposed wet mud (DEE 2019; Rogers <i>et al.</i> 2021). Feeds on seeds and invertebrates (Rogers <i>et al.</i> 2021). Partially migratory, with birds in south-eastern Australia moving in autumn-winter to coastal areas of central and northern Queensland, where it occurs year-round (Rogers <i>et al.</i> 2021). The species is unpredictable in occurrence and difficult to detect. Total numbers are estimated at below 2500 individuals (DEE 2019).	Potentially present. The Project Area is within the species known range, however there are no publicly accessible records in the area between Miles, Roma, Injune and Taroom (ALA 2022). Previous records from WDRC include the Condamine River floodplain and Lake Broadwater near Dalby. Small areas of ephemeral wetland habitat occur within the Project Area and these may periodically provide temporary refuges for this species.
Mammals	<i>Chalinobus dwyeri</i> Large-eared Pied Bat	V	V	This species occurs in coastal and inland ranges of New South Wales through to central Queensland (ALA 2022). In Queensland the species has a disjunct distribution, occurring in the Scenic Rim area of Southeast Queensland, in the Carnarvon and Expedition Ranges, and in the Shoalwater Bay area of central Queensland. to the scenic rim area of southeast Queensland (ALA 2022). Known occurrences of this species are within or near forested landscapes with high relief (DAWE 2022b). The species roosts and breeds in deep fissures in large rocky outcrops and cliffs.	Unlikely to be present. The southern part of the Project Area includes forested escarpment areas along the Great Dividing Range. However, there are no records within the WDRC area. The closest records are from over 100 km northwest of the Project Area, in the Expedition Ranges (ALA 2022).
Mammals	<i>Dasyurus hallucatus</i> Northern Quoll	E	LC	This species is recorded from subcoastal ranges north from around Toowoomba through to Cape York, extending inland through the Fitzroy Basin (ALA 2022). However, the species has declined markedly and is now confined to rugged and remote areas throughout its distribution (Burnett 2012). Forested uplands with high relief and/or containing abundant rock outcrops may support the species (Oakwood 2008). The nearest recent records are from the Carnarvon Range (ALA 2022).	Potentially present. The Project Area is within the broader historical range of this species (ALA 2022), however there are no records within the WDRC area. Potentially suitable rocky habitat occurs around the wooded plateau in the southeastern corner of the Project Area.
Mammals	<i>Macroderma gigas</i> Ghost Bat	V	E	This species is a large carnivorous bat. In Queensland the species occurs in 4-5 disjunct populations, north from Rockhampton (TSSC 2016c). Populations are centred around maternity roosts in deep caves. Pairs and small groups disperse widely during the winter non-breeding season, using temporary daytime roosts in caves and rocky overhangs (TSSC 2016c). The species is likely to be sensitive to vegetation clearing (Bullen 2021).	Unlikely to be present. The Project Area is outside the known distribution of this species, with the closest record over 200 km further north (ALA 2022).

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Mammals	<i>Nyctophilus corbeni</i> Eastern Long-eared Bat	V	V	The Project Area is within the species' known range, which includes the Murray-Darling basin and Dawson River catchment (Churchill 2008). Inhabits shrubby woodland, particularly Box / Ironbark / Cypress Pine vegetation with a dense cluttered understory (TSSC 2015). Roosts solitarily, in tree hollows and crevices and under loose bark (Reardon 2012; TSSC 2015).	Potentially present. The species is unlikely to occur in the highly fragmented landscapes in the north of the Project Area. Suitable habitat occurs in wooded areas in the far south. The species has been recorded from Binkey SF, 22 km east, in woodland that is contiguous with that in the southeast of the Project Area.
Mammals	<i>Petauroides armillatus</i> Central Greater Glider	V	E	The taxonomy of Greater Gliders is in flux with at least two species now recognised (McGregor <i>et al.</i> 2020; TSSC 2022). Geographical boundaries between southern and central populations are unclear (TSSC 2022). The form occurring in this region is referred to <i>Petauroides armillatus</i> (Central Greater Glider) in Queensland, and this population is listed under the EPBC Act as <i>Petauroides volans</i> (Greater Glider (Southern and Central)). This form occurs in south and central eastern Queensland, extending inland along the Carnarvon Range (ALA 2022). The species occurs in eucalypt woodlands and open forest with large trees containing large hollows (TSSC 2022). This exclusively arboreal species is sensitive to fragmentation and is restricted to large habitat patches and highly connected corridors of riparian woodland with abundant hollow bearing trees.	Confirmed present. The species was detected in Queensland Blue Gum (<i>Eucalyptus tereticornis</i>) woodland in the north of the Project Area, in the remnant riparian corridors along Wandoan Creek and Woleebee Creek. The species is likely to occur wherever large trees with hollows occur in woodland connected with these corridors and also in the wooded southeast of the Project Area.
Mammals	<i>Petaurus australis australis</i> Yellow-bellied Glider (south-eastern)	V	V	Occurs in eucalypt forests from South Australia through to central Queensland, extending inland to the Expedition and Carnarvon Ranges (Eyre and Goldingay 2005; ALA 2022). This is a vocal, group living, territorial species, which feeds on tree exudates, pollen, nectar and invertebrates. The species occurs at low density, relative to other arboreal mammals, and requires large areas of contiguous forest habitat (Eyre and Goldingay 2005). This species is dependent on sap from selected smooth-barked eucalypts, in particular the Grey Gums (<i>Eucalyptus longirostata</i> , <i>E. major</i>) (Eyre and Goldingay 2005). Feed trees may be identified by characteristic incisions in the bark (Eyre and Goldingay 2005).	Potentially present. No feed trees were detected within the Project Area. The species is unlikely to occur in the cleared and fragmented landscape across the north of the Project Area. The wooded plateau in the southeast is connected to suitably large areas of remnant woodland with potential feed trees.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Mammals	<i>Phascolarctos cinereus</i> Koala	E	E	Requires eucalypt woodland and forest habitat with suitable food trees (mainly <i>Eucalyptus</i> spp.) (DAWE 2022c). Favoured habitat is <i>E. tereticornis</i> riparian woodland along streamline (Smith <i>et al.</i> 2013). Koalas outside riparian habitat in inland Queensland require access to water sources, generally within 1 km, including farm dams, especially during dry periods (Davies <i>et al.</i> 2013). The species is sensitive to habitat fragmentation (McAlpine <i>et al.</i> 2015; DAWE 2022c). Koalas are capable of traversing gaps between habitat patches and may feed in scattered paddock trees, but dispersing individuals in open habitats are at greater risk of predation and vehicle collision (Youngentob <i>et al.</i> 2021; DAWE 2022c). The species generally occurs at lower density in fragmented landscapes and depends on larger areas of primary habitat as source populations and as refuges in drought (Smith <i>et al.</i> 2013; McAlpine <i>et al.</i> 2015).	Likely to be present. This area is within the species distribution, with several previous records within 10 km of the Project Area (ALA 2022). Indirect evidence of occurrence within the Project Area (characteristic scratches) was detected from multiple locations during field surveys. This suggests a sparse population occurring across this area. Suitable habitat includes woodland corridors along major streams in the north along with the wooded area in the southeast corner of the Project Area. Potential food trees occurring in the Project Area including <i>E. tereticornis</i> , <i>E. populnea</i> , <i>E. crebra</i> , <i>E. melanophloia</i> and <i>E. orgadophila</i> .
Reptiles	<i>Delma torquata</i> Collared Delma	V	V	The species range extends from around Ipswich in South-east Queensland through the Southern Brigalow Belt, although occupancy appears extremely localised and patchy (DSEWPac 2011b, ALA 2022). Lives under surface rock or large woody debris in eucalypt woodlands and open forests (Peck 2012, Wilson 2022). The species is rarely encountered, difficult to detect and search effort in this region is low.	Potentially present. The closest publicly accessible records are over 100 km distant, around Roma and the Bunya Mountains (ALA 2022). However, the Project Area is within the broad range of the species (ALA 2022). The species is difficult to detect, it has been observed elsewhere in the region (BOOBOOK, unpubl. data) and survey effort is low. The species is unlikely to occur in the northern part of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species. Suitable woodland habitat with abundant litter, rocks and woody debris occurs on and around the plateau in the southeastern corner of the Project Area.
Reptiles	<i>Egernia rugosa</i> Yakka Skink	V	V	Ranges throughout the Brigalow Belt extending east to subcoastal areas of Central Queensland and north to the Einasleigh Uplands and lower Cape York Peninsula (ALA 2022). The species lives in woodland and open forests, extending into adjacent grassland with regrowth trees. Requires suitable loamy soils with infrequent flooding for burrows or shelters in sinkholes, abandoned rabbit warrens, large hollow logs, or piles of woody debris (Wilson 2022, Eddie 2012). The species is rarely encountered, difficult to detect and search effort in this region is low.	Potentially present. The Project Area is within the broad range of the species, with low resolution records from the Gurulmundi and Yuleba North areas (ALA 2022). The species is unlikely to occur in the northern part of the Project Area, where woodland fragments are small, isolated, narrow and disturbed, with few suitable habitat features for this species. Suitable habitat with large logs, rocky outcrops and abundant woody debris occurs in woodland on and around the plateau in the southeastern corner of the Project Area.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Reptiles	<i>Furina dunmalli</i> Dunmall's Snake	V	V	This snake occurs in scattered patches throughout the Southern Brigalow Belt and adjacent parts of South-east Queensland (ALA 2022, DSEWPac 2011b). Occupies woodlands and open forests, and may be reliant on the presence of abundant fallen woody debris (Hobson 2012). Feeds on lizards including skinks and possibly geckos (Shine 1981) and presumably requires abundant prey. Usually occurs on heavy soils (Wilson 2022), often with soil cracks and/or gilgais. The species is rarely encountered, difficult to detect and search effort in this region is low.	Potentially present. The Project Area is within the broad range of this species, with the closest publicly accessible records about 35 km distant, around Jackson North and Miles (ALA 2022). The species is unlikely to occur in the northern part of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species. Suitable habitat with abundant litter, rocks and woody debris occurs in southern part of the Project Area.
Molluscs	<i>Adclarkia cameroni</i> Brigalow Woodland Snail	E	V	This snail is found in eucalypt and brigalow woodland associated with the Condamine River floodplain, centred on the area between Dalby and Miles/Condamine (Stanisic <i>et al.</i> 2010; DAWE 2022b, ALA 2022).	Unlikely to be present The Project Area is outside the known distribution and separated from known occurrences by substantial barriers of unsuitable habitat. There are no validated records of the species within 50 km of the Project Area. A non-specimen backed record in WildNet and ALA (ALA 2022; DES 2022a) from Gurulmundi SF near Glenaubyn is incorrectly attributed to this species (Craig Eddie, unpubl. data).
Molluscs	<i>Adclarkia dulacca</i> Dulacca Woodland Snail	E	E	This snail inhabits vine thicket, Brigalow (<i>Acacia harpophylla</i>) woodland/open forest, ironbark (<i>Eucalyptus</i> spp.) woodland, Lancewood (<i>Acacia shirleyi</i>) woodland and Gum-topped Box (<i>E. woollsiana</i>) woodland (TSSC 2016a). It is confined to the Dulacca Downs subregion and adjacent areas of the Southern Downs subregion, occurring in highly fragmented landscapes, living in small woodland patches, strips of habitat retained on roadsides, shade lines and/or on ridges (Stanisic <i>et al.</i> 2010; ALA 2022).	Likely to be present The Project Area includes several small patches of suitable habitat (Brigalow woodland). Elsewhere the species persists in similarly fragmented landscapes. The species has previously been collected from an area of RE 11.9.5a and 11.7.2 within the Desktop Search Area (ALA 2022).

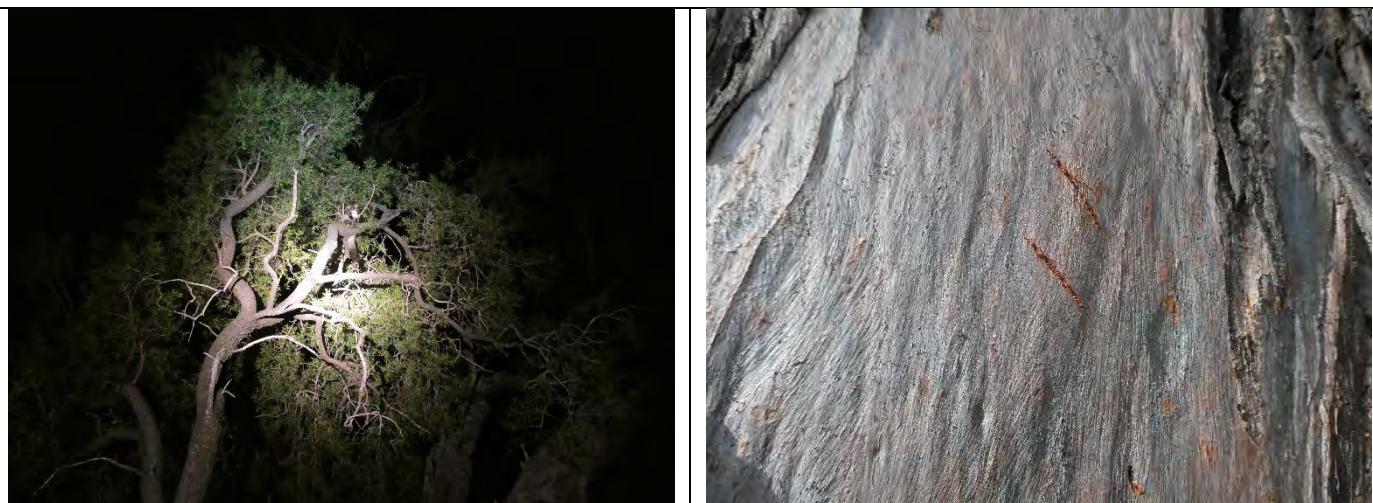


Figure 4a-b: Threatened Fauna detected in the Project Area included Central Greater Glider (*Petauroides armillatus*), seen here in riparian vegetation along Woleebee Creek (left), and characteristic scratches from Koala (*Phascolarctos cinereus*) (right).

3.1.5 Migratory & Marine Fauna

PMST search results indicated the possible occurrence of 12 migratory and 17 marine species listed under the EPBC Act. Table 5 provides a likelihood of occurrence assessment for these species. All species, excepting the threatened species discussed in section 3.1.4, are common and wide-ranging bird species. Five of these species are annual summer breeding or non-breeding migrants to the Project Area, with an additional four species likely regular visitors. The remaining species assessed as potentially occurring within the Project Area may be occasional transient visitors. One EPBC listed migratory or marine fauna species was detected during field surveys, this being Rainbow Bee-eater (*Merops ornatus*), an annual summer visitor likely breeding within the Project Area, which was observed in Poplar Box woodland near Woleebee Creek.

Table 5: Likelihood of occurrence assessment for EPBC Act listed migratory and marine fauna within the Project Area.

Key to EPBC Status: Mi = Migratory; Ma = Marine; CE = Critically Endangered; E = Endangered; V = Vulnerable

Family	Scientific Name	Common Name	EPBC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Actitis hypoleucos</i>	Common Sandpiper	Mi, Ma	Spring-summer migrant to Australia usually found in coastal environments (muddy, sandy or rocky stream banks, mangrove margins) but may occur on any inland freshwater or saline wetland during passage, including artificial habitats (Pizzey and Knight 2010). Less commonly reported from the inland (ALA 2022).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
Birds	<i>Anseranus semipalmata</i>	Magpie Goose	Ma	A gregarious, nomadic species that ranges widely across northern and eastern Australia (Menkhorst <i>et al.</i> 2019). Grazes on grassy margins around wetlands. Congregates during the dry winter season in permanent coastal wetlands in the north (Menkhorst <i>et al.</i> 2019).	Unlikely to be present. The species is occasionally recorded from larger wetlands in this region. However, there is insufficient suitable habitat to attract this species to the Project Area.
Birds	<i>Apus pacificus</i>	Fork-tailed Swift	Mi, Ma	Aerial spring/summer migrant and insectivore, present over most habitat types including disturbed areas (DAWE 2022b).	Likely to be present. May potentially occur overhead throughout the Project Area.
Birds	<i>Ardea ibis</i>	Cattle Egret	Ma	Widely distributed in northern and eastern Australia, also SW Australia. Inhabits a wide range of dryland and wetland habitats and notably associates with livestock (Pizzey and Knight 2010). Nests colonially in flooded or swamp forests.	Potentially present. Limited foraging habitat is present within the Project Area in small ephemeral wetlands and non-remnant grassland, but this species also forages in pasture with cattle. The species may occasionally occur as a casual visitor within the Project Area.
Birds	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mi, Ma	A widespread spring-summer migrant to Australia, utilizing both inland and coastal wetlands such as tidal mudflats, saltmarshes and saline and freshwater inland swamps (Pizzey and Knight 2010). There are numerous records from inland southern Queensland (ALA 2022).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.

Family	Scientific Name	Common Name	EPBC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Calidris ferruginea</i>	Curlew Sandpiper	Mi, Ma, CE	A migratory species usually encountered on coastal and near-coastal saline and freshwater tidal and palustrine wetlands (DAWE 2022b). Passage migrants are occasionally present on inland wetlands but the species is sparsely recorded across inland Queensland (ALA 2022).	Unlikely to be present. In southern Queensland the species occurs predominantly in coastal areas. There is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), which is unlikely to attract this species.
Birds	<i>Calidris melanotos</i>	Pectoral Sandpiper	Mi, Ma	Spring-summer migrant preferring freshwater wetlands, both inland and sub-coastally (Pizzey and Knight 2010). Much less common than the related Sharp-tailed Sandpiper in Australia, there are few records in inland southern Queensland (ALA 2022).	Unlikely to be present. In southern Queensland the species occurs predominantly in coastal areas. There is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), which is unlikely to attract this species.
Birds	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo	Ma	The Project Area is within the range of the species (ALA 2022). Breeding migrant to inland Australia, inhabiting dry woodlands and shrublands (Pizzey and Knight 2010).	Likely to be present. Limited areas of suitable habitat are present within remnant woodland and non-remnant patches of native vegetation. The species is commonly recorded from the region.
Birds	<i>Charadrius leschenaultii</i>	Greater Sand Plover	Mi, Ma, V	This species is overwhelmingly coastal in occurrence when in Australia (ALA 2022). Records from inland sites are extremely rare and probably reflect vagrant birds blown off course by storms (TSSC 2016b).	Unlikely to be present. This species occurs in coastal wetlands and migrates along coastlines. There is no suitable habitat in this area.
Birds	<i>Cuculus optatus</i>	Oriental Cuckoo	Mi	Migrant to coastal and near-inland northern and eastern Australia, inhabiting denser forest types but may occur in other habitats on passage (Pizzey and Knight 2010).	Potentially present. Limited areas of suitable habitat are present within remnant woodland and non-remnant patches of native vegetation.
Birds	<i>Gallinago hardwickii</i>	Latham's Snipe	Mi, Ma	Spring-summer migrant, preferring wet pastures, boggy margins of vegetated wetlands and similar habitat at a range of elevations (Pizzey and Knight 2010). It occurs throughout eastern Australia including southern inland Queensland (ALA 2022).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
Birds	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Ma	Occurs around the entire Australian coast but also penetrates far inland on larger rivers (Pizzey and Knight 2010). Feeds on a variety of vertebrates and will take carrion. There are numerous records of the species in the Dawson catchment (ALA 2019).	Unlikely to be present. May overfly the Project Area but there is no suitable lacustrine or riverine habitat to support foraging by the species.
Birds	<i>Hirundapus caudacutus</i>	White-throated Needletail	Mi, Ma, V	Aerial spring/summer migrant and insectivore, present over most habitat types including disturbed areas (DAWE 2022b).	Likely to be present. Likely to forage over the Project Area seasonally, following low-pressure fronts.

Family	Scientific Name	Common Name	EPBC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Merops ornatus</i>	Rainbow Bee-eater	Ma	Widespread and abundant species frequently present in southern inland Queensland during spring and summer (ALA 2022, Barrett <i>et al.</i> 2003). Feeds on aerial insects and nests in burrows in sandy soils (Pizzey and Knight 2010).	Likely to be present. Spring – Summer visitors are likely to occur regularly in the Project Area.
Birds	<i>Motacilla flava</i>	Yellow Wagtail	Mi, Ma	Summer migrant in small numbers to mostly coastal northern Australia but birds often sighted in southern Australia: it prefers open grassed areas such as wetland margins, pasture and parks (Pizzey and Knight 2010).	Unlikely to be present. There are no existing records of this species from southern inland Queensland (ALA 2022).
Birds	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Mi, Ma	The Project Area is within the species known range (ALA 2022). A passage migrant in southern Queensland, with birds recorded in a variety of woodland types as well as parks and gardens, but breeding in south-east Australia in more closed forest types (Pizzey and Knight 2010).	Potentially present. Limited suitable habitat is present within remnant and non-remnant woodland. Sparse records of this species within the region represent occasional passage migrants.
Birds	<i>Rhipidura rufifrons</i>	Rufous Fantail	Mi, Ma	Occurs throughout coastal and subcoastal eastern Australia. Most individuals overwinter on Cape York, Islands of Torres Strait and New Guinea (Menkhorst <i>et al.</i> 2019). Occurs as a passage migrant in the southern Brigalow Belt.	Potentially present. Limited suitable habitat is present within remnant and non-remnant woodland. Individuals are occasionally recorded in this region, including a Nov 2020 record from non-remnant riparian woodland near Sundown Rd, 8 km north of the Project Area (BOOBOOK unpubl data).
Birds	<i>Rostratula australis</i> Listed as <i>R. benghalensis</i> (<i>sensu lato</i>)	Australian Painted Snipe	Ma, E	The Project Area is within the species' known range (ALA 2022); forages at shallow edges and adjacent vegetated margins of freshwater wetlands (DAWE 2022b).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.

3.2 State Biodiversity Values & Constraints

3.2.1 Regional Ecosystems & Other Regulated Vegetation

Areas of Queensland state government mapped remnant and regrowth vegetation are shown in Appendix F1.

Ground truthing of vegetation during field surveys found a total area of 810.89 ha of native vegetation from 15 Regional Ecosystems (RE), including 663.98 ha of remnant and 146.91 ha of advanced regrowth vegetation. Ground-truthed vegetation within the Project Area is shown in Appendix F2. Ground-truthed remnant and regrowth vegetation within the Project Area is summarised in Table 6. Representative images of vegetation within the Project Area are shown in Figure 1c-h.

Table 6: Ground-truthed RE detected within the Project Area.

E = Endangered; OC = Of Concern; LC = Least Concern; NCAP = No Concern at Present

RE Code	VM Act Class	Biodiversity Status	Short Description (DES 2021g)	Extent – remnant (ha)	Extent – regrowth (ha)
11.3.2	OC	OC	<i>Eucalyptus populnea</i> woodland on alluvial plains	54.74	18.09
11.3.4	OC	OC	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	1.57	3.92
11.3.17	OC	E	<i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	16.42	17.85
11.3.19	LC	NCAP	<i>Callitris glaucophylla</i> , <i>Corymbia</i> spp. and/or <i>Eucalyptus melanophloia</i> woodland on Cainozoic alluvial plains	13.25	0.91
11.3.25	LC	OC	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	267.69	20.63
11.3.27f	LC	OC	Freshwater wetlands: <i>Eucalyptus coolabah</i> and/or <i>E. tereticornis</i> open woodland to woodland fringing swamps	24.81	33.34
11.5.1	LC	NCAP	<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces	11.59	-
11.5.5	LC	NCAP	<i>Eucalyptus melanophloia</i> , <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains and/or remnant surfaces. Deep red sands	5.79	-
11.9.2	LC	NCAP	<i>Eucalyptus melanophloia</i> +/- <i>E. orgadophila</i> woodland to open woodland on fine-grained sedimentary rocks	19.52	5.76
11.9.5	E	E	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	98.96	41.61
11.9.5a	E	E	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks: with <i>Cadellia pentastylis</i> and <i>Brachychiton</i> spp. as emergent or dominant in some places, a dense tall shrub layer and a more open low shrub layer of Semi-evergreen vine thicket species, occurring on undulating plains and rises.	11.40	-
11.9.7	OC	OC	<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	4.45	3.63
11.9.10	OC	E	<i>Eucalyptus populnea</i> open forest with a secondary tree layer of <i>Acacia harpophylla</i> and sometimes <i>Casuarina cristata</i> on fine-grained sedimentary rocks	25.04	1.18
11.10.7	LC	NCAP	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	103.38	-
11.10.11	LC	NCAP	<i>Eucalyptus populnea</i> , <i>E. melanophloia</i> +/- <i>Callitris glaucophylla</i> woodland on coarse-grained sedimentary rocks	5.38	-

3.2.2 BioCondition Assessment

Vegetation condition was assessed using the BioCondition methodology of Eyre *et al.* (2015) at nine (9) locations representing major vegetation types in the northern part of the Project Area (Appendix F2). BioCondition sites were located in eight (8) Assessment Units (AU), these being a combination of RE and growth status (remnant or regrowth). All BioCondition sites were in remnant vegetation, and these locations were chosen as the best example of each RE within this area. Representative images of BioCondition sites are shown in Figure 1e-f. Raw data and standard images for BioCondition assessments are provided separately to this report. BioCondition site characteristics and scores are summarised in Table 7.

Table 7: Summary of BioCondition assessment sites and results within the Site.

AU	RE	Structural condition	Assessment sites	Averaged BioCondition score
1	11.3.2	remnant	873-B03	0.58
2	11.3.25	remnant	873-B01, 873-B04	0.53
3	11.3.27f	remnant	873-B05	0.56
4	11.5.1	remnant	873-B02	0.67
5	11.5.5	remnant	873-B06	0.60
6	11.9.5	remnant	873-B07	0.67
7	11.9.7	remnant	873-B09	0.61
8	11.9.10	remnant	873-B08	0.73

All AU received moderate (0.40 – 0.60) to high (0.60 – 0.80) BioCondition scores. These results reflect significant disturbance and consequent loss of ecosystem integrity relative to intact areas of each RE. These scores also reflect landscape level fragmentation with small patch size, low connectivity and a low proportion of remnant and regrowth vegetation in the surrounding landscape.

3.2.3 Threatened Flora

A total of 13 species of NC Act listed threatened flora were predicted to potentially occur or known to occur (DAWE 2022a, DES 2022a, DES 2022h ALA 2022) within the Desktop Search Area. Seven (7) of these species are also EPBC Act listed threatened flora, these being Herbaceous Xerothamnella, Slender Tylophora, Curly-bark Wattle, Gurulmundi Fringe-myrtle, Hairy-joint Grass, Belson’s Panic and Ooline, which are discussed above in section 3.1.2 including their likelihood of occurrence assessment provided in Table 2.

The remaining six (6) species of NC Act listed threatened flora included Red-soil Woolly Wrinklewort (*Rutidosis lanata*), Thomby Range Wattle (*Acacia wardellii*), Plunkett Mallee (*Eucalyptus curtisii*), Gurulmundi Heath-myrtle (*Micromyrtus carinata*), *Cryptandra ciliata* and Winged Nightshade (*Solanum stenopterum*). Database searches of WildNet (DES 2022a) and ALA (2022) and previous surveys within the Project Area (e.g. BOOBOOK 2014) found records for four (4) of these species within the Desktop Search Area, these being Thomby Range Wattle, Plunkett Mallee, Gurulmundi Heath-myrtle and Winged Nightshade.

One NC Act listed threatened plant species, Ooline, was detected within the Project Area during field surveys. This species is also EPBC Act listed and is addressed in section 3.1.2. Habitat for Ooline is shown in Figure 1e-g and representative images of Ooline are shown in Figure 2a-b. Locations of threatened flora recorded in the Project Area are shown in Appendix C.

Several High-Risk Areas as shown on a Protected Plants Flora Survey Trigger Map (DES 2022b) are mapped within the extensive remnant vegetation at the southern portion of the Project Area (Appendix C). These areas correspond to WildNet (DES 2022a) records of Curly-bark Wattle, Thomby Range Wattle, Gurulmundi Fringe-myrtle, Gurulmundi Heath-myrtle and Ooline.

Details of the desktop search and field survey results are provided below in Table 8 with the likelihood of occurrence assessment of NC Act listed threatened flora that occur or could potentially occur in the Project Area.

Table 8: Likelihood of occurrence assessment for additional NC Act-listed threatened flora in the Project Area.

Key to Status: E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Asteraceae	<i>Rutidosis lanata</i> Red-soil Woolly Wrinklewort	-	NT	A perennial forb with a core distribution restricted to the western Darling Downs from Jackson to south of Hannaford, south eastern Queensland (ALA 2022, DES 2022h). An outlying population was recorded southwest of Moura in 2018 (ALA 2022). Occurs along ecotones between Brigalow and Poplar Box woodland on clay or loam soils, and dry sclerophyll eucalypt woodland dominated by <i>Eucalyptus woollsiana</i> , <i>Eucalyptus crebra</i> or <i>E. fibrosa</i> on loam or sand (DES 2022h).	Potentially present. The Project Area is within the species broad distribution and suitable ecotonal habitat occurs within the Project Area.
Mimosaceae	<i>Acacia wardellii</i> Thomby Range Wattle	-	NT	A slender shrub or small tree endemic to south southern inland Queensland from north of Mundubbera to south of Surat (ALA 2022). Occurs in woodland to tall open forest with <i>Corymbia trachyphloia</i> , <i>C. intermedia</i> , <i>Eucalyptus major</i> , <i>E. cloeziana</i> , <i>E. decorticans</i> and <i>E. crebra</i> on gravelly soils from shallow weathered sandstone (DES 2022h). A specimen collection was recorded in 2014 from Gurulmundi State Forest (ALA 2022, DES 2022a).	Potentially present. The species was detected during field surveys within 4 km of the Project Area and has previously been found elsewhere in the Desktop Search Area.
Myrtaceae	<i>Eucalyptus curtisii</i> Plunkett Mallee	-	NT	Occurs in dry sclerophyll woodland on sandy podosols with impeded drainage, shallow stony soils, clay loams and stony clays with a surface layer of loose stones (DES 2022h). Three low precision (+/- 2 km) records occur in Gurulmundi SF area (DES 2022h, ALA 2022).	Unlikely to be present. No suitable habitat (stony, impeded drainage soils) occurs within the Project Area. Gurulmundi SF records are mapped around 14 km from the Project Area boundary. The species has previously been recorded within the Desktop Search Area around 7 km South of the Project Area, along the escarpment in Stones Country RR (C. Eddie, pers. comm.).
Myrtaceae	<i>Micromyrtus carinata</i> Gurulmundi Heath-myrtle	-	E	A pendulous shrub species endemic to the Gurulmundi area with the exception of an outlier southwest of Nudley State Forest, in southern inland Queensland (ALA 2022). Occurs on the tops of laterised ridges, on shallow to deep, yellow or red sands. Grows in heath or open woodland with associated species including <i>Triodia</i> sp., <i>Homalocalyx polyandrus</i> , <i>Corymbia trachyphloia</i> , <i>Acacia triptera</i> and <i>Eucalyptus exserta</i> (DES 2022h).	Unlikely to be present. There is no suitable habitat (heath associated with skeletal soils and rock pavements on land zone 7) within the Project Area. The species is abundant in parts of Gurulmundi SF, Stones Country RR and adjacent properties around the Great Dividing Range.

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Rhamnaceae	<i>Cryptandra ciliata</i>	-	NT	Grows on sandy soil in association with <i>Acacia shirleyi</i> , <i>Corymbia citriodora</i> , <i>C. watsoniana</i> and <i>Eucalyptus acmenoides</i> . Two low precision records from Gurulmundi area (ALA 2022, DES 2022a), northeast of Gurulmundi SF.	Unlikely to be present. There is no suitable habitat (woodland on sandy soils in landzone 7) within the Project Area. Potentially suitable habitat for this species occurs in the Desktop Search Area within Gurulmundi SF, Stones Country RR and adjacent properties around the Great Dividing Range.
Solanaceae	<i>Solanum stenopterum</i> Winged Nightshade	-	V	Occurs in Poplar Box or Belah woodland and in grassland, including disturbed areas, on clay and loam soils (DES 2022h). Occurs in scattered localities from Ashford in northern NSW north to Gayndah and from the Lockyer Valley west to around Jackson (ALA 2022). The species has been recorded from the Condamine floodplain around Dalby, Chinchilla and Condamine and also from two localities along Tchanning Creek (ALA 2022).	Potentially present. The Project Area is within the broad distribution of this species and includes areas of potentially suitable habitat.

3.2.4 Special Least Concern Flora

Three species of selected Special Least Concern (SLC) flora (*Brachychiton* spp.) were detected at locations scattered throughout the Project Area, these being Kurrajong (*Brachychiton populneus*), Narrow-leaved Bottle Tree (*B. rupestris*) and Broad-leaved Bottle Tree (*B. australis*) (Figure 1e-f). Other SLC species observed within the Desktop Search Area include various Orchid species (Orchidaceae), Bluebells (*Wahlenbergia* spp.) and Forest Grass Tree (*Xanthorrhoea johnsonii*). Additional SLC species are likely to occur within the Project Area.

3.2.5 Biosecurity Act Weeds and other weeds of Management Concern

Desktop searches (ALA 2022; DES 2022a) identified records of seven invasive plant species listed under the Queensland *Biosecurity Act 2014* occurring within the Desktop Search Area. In addition, Tiger Pear was detected during field surveys of PL 209 within 3 km of the Project Area, occurring in a single patch of Brigalow woodland around vegetation assessment site 873-S74, where it was moderately common. These eight invasive plant species include the six WoNS given in Table 3 (Section 3.1.3) – Parthenium Weed, Fireweed, Madeira Vine, Tiger Pear, Common Pest Pear and Velvety Tree Pear – along with Mother-of-millions (*Bryophyllum delagoensis*) and Mother-of-millions Hybrid (*Bryophyllum X houghtonii*).

Four species of weeds (invasive plants) proscribed as Category 3 restricted matter under the Biosecurity Act were detected during field surveys within the Project Area. Velvety Tree Pear (*Opuntia tomentosa*) and Common Pest Pear (*O. stricta*) were common throughout the Project Area occurring at low to moderate density in remnant and regrowth woodland and in non-remnant pasture. These two species are also WoNS (see section 3.1.3). Harrisia Cactus (*Harrisia martini*) was detected at low density in two locations in the north of the Project Area. Mother-of-millions (*Bryophyllum delagoensis*) was detected in two locations, each of which are in Poplar Box woodland on floodplains with numerous shallow drainage channels.

Other weeds of management interest detected within the Project Area include: Willows Cactus (*Cereus uruguayanus*), occurring in Narrow-leaved Ironbark woodland in the central part of the Project Area and African Lovegrass (*Eragrostis curvula*), occurring on sandy soils in the central and southern part of the Project Area. Locations for these species is included in spatial data accompanying this report.

WoNS that are also Category 3 restricted matter under the Biosecurity Act are presented in Table 3 (Section 3.1.3). Additional Biosecurity Act listed invasive plants detected or potentially occurring within the Project Area are given in Table 9. Representative images of these invasive plant species are presented in Figure 5a-b. Locations of WoNS and Biosecurity Act listed flora species recorded within the Project Area are shown in Appendix D.

Table 9. Additional Biosecurity Act listed weeds detected or potentially occurring within the Project Area.

Family	Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments
Cactaceae	<i>Harrisia martini</i>	Harrisia Cactus	Cat. 3 Restricted Matter	Isolated occurrences recorded in two localities in the north of the Project Area: in Narrow-leaved Ironbark (<i>Eucalyptus crebra</i>) woodland (RE 11.5.1) along Weldons Road and in nearby Poplar Box woodland (RE 11.3.2) on the floodplain of Wandoan Creek.
Crassulaceae	<i>Bryophyllum delagoense</i>	Mother-of-Millions	Cat. 3 Restricted Matter	Isolated occurrences recorded in Poplar Box woodland on alluvial plains (RE 11.3.2) in two localities: a single plant observed in the reserve area along Jackson-Wandoan road near survey site 873-S93; and abundant within a limited patch in a reserve area along Woleebee Creek south of the crossing on Gadsbys Road.
Crassulaceae	<i>Bryophyllum X houghtonii</i>	Mother-of-Millions	Cat. 3 Restricted Matter	Not detected during field surveys. Potentially occurring within the Project Area.



Figure 5a-b: Biosecurity Act listed invasive plants detected in the Project Area included Harrisia cactus (*Harrisia martini*) (left), and Mother-of-Millions (*Bryophyllum delagoense*) (right).

3.2.6 Pest fauna and invasive species

Evidence of pest fauna detected within the Project Area included occasional rabbit (*Oryctolagus cuniculus*) latrines, frequent Dingo or Dog (*Canis familiaris*) tracks, and Pig (*Sus scrofa*) scats and diggings. These species are listed as Category 3,4,5,6 or Category 3,4,6 restricted matter under the Biosecurity Act. Locations for Biosecurity Act listed pest fauna recorded within the Project Area are shown in Appendix G.

3.2.7 Threatened Fauna

Desktop searches (ALA 2022; DES 2022a) revealed records of eight (8) NC Act listed threatened fauna species occurring within the Desktop Search Area. These include six EPBC Act listed threatened fauna species – Glossy Black-Cockatoo, White-throated Needle-tail, Southern Squatter Pigeon, Central Greater Glider, Southern Yellow-bellied Glider and Koala – which are addressed in section 3.1.4. Central Greater Glider and evidence of Koala was found within the Project Area during field surveys. A likelihood of occurrence assessment of three additional NC Act listed threatened fauna species possibly occurring in the Project Area is given in Table 10. None of these additional species were detected during field surveys of the Project Area, however, there were no targeted searches for these species.

Table 10: Likelihood of occurrence assessment for additional NC Act listed threatened fauna within the Project Area.

Key to Status: CE/CR = Critically Endangered; E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Reptiles	<i>Acanthophis antarcticus</i> Common Death Adder	-	V	A widespread but patchily distributed snake (ALA 2022, DES 2022h). Lives in woodlands, open forests and heathlands; requires abundant shelter/ambush predation cover e.g. low shrubs, rocks, logs and dense leaf litter (Wilson 2022).	Potentially present. Unlikely to occur in the largely cleared and fragmented northern part of the Project Area. Suitable habitat with abundant shelter features occurs on and around the plateau in the southeastern part of the Project Area.
Reptiles	<i>Strophurus taenicauda</i> Golden-tailed Gecko	-	NT	This gecko is endemic to inland southern and central Queensland, where it inhabits a variety of dry woodland and open forest habitats in the Brigalow Belt (DES 2022h). Within these habitats it lives in tree hollows and splits, and under loose bark on live and dead trees (DES 2022h, Wilson 2022). The species also occurs in non-remnant vegetation with abundant <i>Acacia</i> species near to remnant and regrowth habitat patches (BOOBOOK, unpubl. data)	Likely to be present. The species has been recorded nearby in woodland and regrowth areas (ALA 2022; DES 2022a). Suitable remnant and regrowth woodland habitat with <i>Acacia</i> spp. and other species with abundant peeling bark occurs throughout the Project Area, includes corridors of non-remnant vegetation along minor streamlines.
Insects	<i>Jalmenus eubulus</i> Pale Imperial Hairstreak (butterfly)	-	V	This butterfly species is endemic to the Brigalow Belt, distributed from far northern NSW to the Eungella area of central Qld (ALA 2022). Usually associated with mature Brigalow (<i>Acacia harpophylla</i>) open forests and woodlands (Eastwood <i>et al.</i> 2008; Valentine and Johnson 2012). The species has a naturally fragmented habitat and is capable of dispersal over moderate distances, with vagrant individuals found far from patches of Brigalow habitat (Eastwood <i>et al.</i> 2008).	Likely to be present. The species has previously been found within the Desktop Search Area (DES 2022a). The closest publicly accessible record is from Gurulmundi SF near Glenaubyn, around 15 km southeast of the Project Area (ALA 2022). The Project Area includes abundant suitable habitat including isolated patches of Brigalow throughout and more extensive areas, within a matrix of other remnant vegetation, in the south.

3.2.8 Special Least Concern Fauna

Short-beaked Echidna (*Tachyglossus aculeatus*) have previously been recorded elsewhere in the Desktop Search Area (ALA 2022; DES 2022a) and are likely to occur in the Project Area. This common, widespread and adaptable species is likely to occur in remnant and regrowth vegetation and adjacent non-remnant areas throughout the Project Area. Fork-tailed Swift (*Apus pacificus*) has also been recorded in the Desktop Search Area (ALA 2022; DES 2022a) and is likely to be an annual summer non-breeding visitor to this area (see section 3.1.5). These taxa are listed as SLC species under the NC Act.

3.2.9 Fauna Habitat Features & Potential Breeding Places

The results of fauna habitat assessments conducted within the Site are included with the associated spatial data. Habitat assessments found that important features for ground-dwelling fauna, such as leaf-litter, rocks with surface contact, rock crevices and low shrubs are generally sparse within small remnant and regrowth fragments and riparian corridors of vegetation within the Project Area. These features are more abundant in the larger area of woodland in the southeastern corner of the Project Area. Other ground level features, such as large logs with hollows and woody debris, vary among sites in similar situations. Conversely, arboreal features such as large trees with hollows, nests and stags are abundant within riparian woodland (> 50 hollows per hectare) and less common in other patches of remnant and regrowth vegetation. Decorticated trees were particularly abundant in remnant and regrowth areas of Brigalow dominated vegetation. Fauna habitat features associated with vegetation clearing such as windrowed timber piles and scattered timber were common across the Project Area.

3.2.10 Environmentally Sensitive Areas (ESA)

Government mapped and ground-truthed ESA, as defined in the *Environmental Protection Regulation 2019*, are mapped across the Project Area in Appendix H. There are no Category A ESA within the Project Area. Category B ESA within the Project Area are ground-truthed endangered RE (Biodiversity Status), which consists of patches of the following RE: 11.3.17, 11.9.5, 11.9.5a and 11.9.10.

Category C ESA within the Project Area include ground-truthed remnant and regrowth vegetation within government mapped areas of 'essential habitat' or 'essential regrowth habitat', and Of Concern RE (Biodiversity Status), which comprises the following RE: 11.3.2, 11.3.4, 11.3.25, 11.3.27f and 11.9.7.

ESA in the north of the Project Area include the extensive riparian corridors along Wandoan Creek and Woleebee Creek (Category C). ESA in the north also comprise small fragments of Brigalow and/or Belah woodland, including areas with co-dominant Poplar Box, either fringing riparian corridors or scattered across the surrounding undulating downs (Category B). ESA in the south of the Project Area also include scattered fragments of Brigalow/Belah dominant and codominant woodland on rolling downs and around the plateau area in the southeast (Category B) along with a riparian corridor along Hellhole Creek (Category C). ESA in the south also comprises a mapped area of essential habitat (Category C) covering part of the wooded plateau in the southeast of the Project Area, including areas of RE 11.10.7 Narrow-leaved Ironbark open forest.

3.3 Predictive Habitat Mapping

Likelihood of occurrence assessments indicated twenty-two (22) EPBC Act and/or NC Act threatened flora and fauna species that may potentially occur within the Project Area (Tables 2, 4, 8 and 10). The results of site-based habitat assessment plots were combined with desktop searches and ecologist knowledge to develop RE-based predictive habitat mapping for these species. Identified habitat areas were assessed as either Essential or General Habitat using the following definitions:

Essential Habitat – consists of areas that contain resources considered essential for the maintenance of populations of the species (e.g. potential habitat for reproduction, growth, roosting, feeding and/or shelter for either migratory or non-migratory species). Essential Habitat may be defined based on known records and expert knowledge of habitat relationships, as habitat types favoured by the species, within which the species is most frequently recorded and/or the species is most abundant.

Note that this definition, which applies to predictive mapping of all potential habitat within the Project Area, differs from state government mapped 'Essential Habitat', which is based on Queensland government mapped vegetation around known records of threatened species (DES 2019).

General Habitat – consists of less favoured areas that may be used by transient individuals or where a species has been recorded but there is insufficient information to assess the area as essential habitat. General Habitat may be defined from habitat around known records and based on expert knowledge of habitat relationships, despite the absence of specimen backed records. General Habitat may include areas of suboptimal habitat for species and habitat types within which the species is less frequently reported or occurs at lower densities. All areas are mapped as General Habitat where there is no clear identification of essential resources or no clear difference in abundance among habitat types in which the species occurs.

Mapping rules and the estimated total availability of habitat within the survey area for threatened flora species potentially occurring within the Project Area are given in Table 11. Corresponding mapping rules and habitat areas for threatened fauna species potentially occurring within the Project Area are given in Table 12. These tables also include brief statements of essential habitat features that could not readily be mapped in this broadscale survey. Refer to the Likelihood of Occurrence assessments for a summary of distribution and habitat requirements for each species (Table 2, Section 3.1.2; Table 4, Section 3.1.4; Table 8, Section 3.2.3; and Table 10, Section 3.2.7). Predictive habitat maps for threatened species considered potentially occurring within the Project Area are presented in Appendix I.

3.3.1 MNES & MSES Threatened Flora

Predictive habitat maps for threatened flora species considered potentially occurring within the Project Area are presented in Appendix I1a-c.

Table 11: Potentially suitable REs and estimated extent of General Habitat for EPBC and NC Act listed threatened flora species potentially present in the Project Area.

Family	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Apocynaceae	<i>Vincetoxicum forsteri</i> (syn. <i>Tylophora linearis</i>) Slender Tylophora	E	E	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species occurs in shrubby dry sclerophyll woodland and forest.	11.5.1, 11.5.5, 11.10.7	122.7
Asteraceae	<i>Rutidosia lanata</i> Red-soil Woolly Wrinklewort	-	NT	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species favours ecotonal transitions between dry eucalypt woodland or forest and Brigalow vegetation.	11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.7, 11.9.10	271.8
Mimosaceae	<i>Acacia wardellii</i> Thomby Range Wattle	-	NT	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species occurs in dry woodlands and forest.	11.5.1, 11.5.5	18.9
Poaceae	<i>Homopholis belsonii</i> Belson's Panic	V	V	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species occurs in Poplar Box and Brigalow dominated woodlands.	11.3.2, 11.3.17, 11.9.5, 11.9.5a, 11.9.7, 11.9.10	366.3
Solanaceae	<i>Solanum stenopterum</i> Winged Nightshade	-	V	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species habitat preferences are unclear, however, in this region it has been recorded from remnant and regrowth vegetation on clay and clay-loam soils.	11.3.2, 11.3.17, 11.9.2, 11.9.5, 11.9.7, 11.9.10	380.7
Surianaceae	<i>Cadellia pentastylis</i> Ooline	V	V	Mapped Essential Habitat comprises all remnant and regrowth of nominated RE within Southern Downs bioregion. Mapped General Habitat comprises remnant and regrowth of nominated RE and adjacent non-remnant areas of nominated preclear RE, within Southern Downs bioregion. Excludes previously surveyed vegetation patches (e.g. BOOBOOK 2022a).	Essential: 11.9.4, 11.9.5, 11.9.5a General: 11.3.25, 11.5.1, 11.9.2, 11.9.10, 11.10.7 and non-remnant preclear: 11.9.5/11.5.5 80/20, 11.9.10/11.5.5 60/40.	118.7 habitat 3,231.7 potential area of occurrence

3.3.2 MNES & MSES Threatened Fauna

Predictive habitat maps for threatened fauna species considered potentially occurring within the Project Area are presented in Appendix I2a-d.

Table 12: Potentially suitable REs and estimated extent of General Habitat for EPBC and NC Act listed threatened fauna species potentially present in the Project Area.

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Birds	<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo	V	V	Mapped General habitat comprises remnant eucalypt dominated RE that typically include large hollow bearing trees along with remnant and regrowth RE with potential feed trees (Casuarinaceae spp.).	Remnant and regrowth: 11.3.17, 11.5.1, 11.5.5, 11.9.5, 11.9.5a, 11.9.10, 11.10.7, 11.10.11 Remnant only: 11.3.2, 11.3.4, 11.3.25, 11.3.27f, 11.9.7	659
Birds	<i>Geophaps scripta scripta</i> Squatter Pigeon (Southern Subspecies)	V	V	Mapped General Habitat comprises remnant and regrowth of eucalypt dominated woodland and open forest within largely wooded landscapes. The species favours grassy woodland areas with patchy ground cover. Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Gilgulgul Road.	11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.7, 11.9.10, 11.10.7, 11.10.11	164.3
Birds	<i>Grantiella picta</i> Painted Honeyeater	V	V	Not mapped. This nomadic species forages on mistletoe in remnant, regrowth and other non-remnant vegetation, including shadelines and scattered trees and shrubs in cleared areas.	-	-
Birds	<i>Hirundapus caudacutus</i> White-throated Needletail	V	V	Not mapped. This is an aerial foraging species that follows weather fronts over wooded and cleared landscapes. The species shows a general preference for wooded landscapes but it is not tied to any specific vegetation or habitat features in the Project Area.	All areas, aerial use only	N/A
Birds	<i>Rostratula australis</i> Australian Painted Snipe	E	E	Mapped General habitat comprises wetland areas and wetland associated RE. The species favours wetland areas with dense low vegetation, muddy banks and shallow water.	11.3.27f, mapped wetland areas in other RE and non-remnant vegetation.	69.7

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Mammals	<i>Dasyurus hallucatus</i> Northern Quoll	E	LC	<p>Mapped Essential Habitat comprises contiguous areas of woodland and forest within 1 km of rocky scarps.</p> <p>Mapped General Habitat comprises contiguous areas of remnant and regrowth woodland and forest within 5 km of cliffs and rocky scarps and connected to these refuges by continuous native vegetation.</p> <p>Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p>	All RE (11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.9.7, 11.9.10, 11.10.7, 11.10.11)	226.7
Mammals	<i>Nyctophilus corbeni</i> Southeastern Long-eared Bat	V	V	<p>Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest. The species favours areas with a multilayered shrubby understorey.</p> <p>Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p>	All RE except SEVT (11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.9.7, 11.9.10, 11.10.7, 11.10.11)	259.7
Mammals	<i>Petauroides armillatus</i> Central Greater Glider	E	E	<p>Mapped General Habitat comprises remnant only woodland within the well-connected riparian corridors along Wandoan Creek and Woleebee Creek in the north of the Project Area, as well as larger contiguous areas of remnant eucalypt woodland and open forest south of Giligulgul Road. The species requires large hollow-bearing trees in areas with eucalypt feed trees.</p> <p>Excludes small isolated fragments and regrowth areas.</p>	11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.7, 11.9.10, 11.10.7, 11.10.11	528
Mammals	<i>Petaurus australis</i> Yellow-bellied Glider (Southern Subspecies)	V	E	<p>Mapped General Habitat comprises larger contiguous areas of remnant only eucalypt woodland and open forest of the nominated RE. The species requires large hollow-bearing trees for dens and preferred feed tree species (selected eucalypts).</p> <p>Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p>	11.3.25, 11.5.1, 11.10.7	145.9
Mammals	<i>Phascolarctos cinereus</i> Koala	E	E	<p>Mapped General Habitat comprises all areas of eucalypt dominated remnant and mature regrowth woodland and open forest within the Project Area. The species requires eucalypt feed trees, shelter trees with dense canopies and access to riparian vegetation.</p>	11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.7, 11.9.10, 11.10.7, 11.10.11	715.7 foraging and breeding habitat 9,098.3 dispersal habitat

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Reptiles	<i>Acanthophis antarcticus</i> Common Death Adder	-	V	Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and forest. The species favours areas with abundant low shrubs, leaf litter and woody debris. Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	All RE (11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.9.7, 11.9.10, 11.10.7, 11.10.11)	259.7
Reptiles	<i>Delma torquata</i> Collared Delma	V	V	Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and forest. The species requires areas with abundant leaf litter and woody debris or rocks. Excludes SEVT and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	All RE except SEVT (11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.9.7, 11.9.10, 11.10.7, 11.10.11)	259.7
Reptiles	<i>Egernia rugosa</i> Yakka Skink	V	V	Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest. The species requires loamy soils with large logs, accumulations of woody debris and/or rocky outcrops. Excludes SEVT and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	11.3.2, 11.3.17, 11.3.19, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.7, 11.10.11	228
Reptiles	<i>Furina dunmalli</i> Dunmall's Snake	V	V	Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and forest. The species favours areas with abundant leaf litter and woody debris. Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	All RE (11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.9.7, 11.9.10, 11.10.7, 11.10.11)	259.7

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Reptiles	<i>Strophurus taenicauda</i> Golden-tailed Gecko	-	NT	<p>Mapped Essential Habitat comprises remnant and regrowth RE with abundant decorticating trees, stags and woody debris (RE with abundant tall <i>Acacia</i> spp. and/or <i>Callitris</i>)</p> <p>Mapped General Habitat comprises other RE within which the species is occasionally recorded.</p>	<p>Essential: 11.3.17, 11.3.19, 11.5.1, 11.5.5, 11.9.5, 11.9.5a 11.9.10, 11.10.7, 11.10.11</p> <p>General: 11.3.2, 11.3.4, 11.3.25, 11.3.27f, 11.9.7</p>	906.7
Insects	<i>Jalmenus eubulus</i> Pale Imperial Hairstreak (butterfly)	-	V	Mapped General Habitat comprises Brigalow (<i>Acacia harpophylla</i>) dominant remnant woodland.	11.3.17, 11.9.5, 11.9.5a, 11.9.10	180.2
Molluscs	<i>Adclarkia dulacca</i> Dulacca Woodland Snail	E	E	<p>Mapped Essential Habitat comprises remnant and regrowth Brigalow woodland and forest, and SEVT. The species favours areas with abundant leaf litter and woody debris.</p> <p>Mapped General Habitat comprises woodland and open forest of the nominated RE that are connected to patches of essential habitat.</p>	<p>Essential: 11.9.4, 11.9.5, 11.9.5a</p> <p>General: 11.9.10, 11.10.7</p>	305.25

4 Conclusions

An ecological assessment within the Project Area identified the following ecological values/potential constraints:

Matters of National Environmental Significance:

- ✦ Two Threatened Ecological Communities (TEC):
 - Brigalow (*Acacia harpophylla* dominant and co-dominant); and,
 - Poplar Box grassy woodland on alluvial plains.
- ✦ One EPBC Act listed threatened flora species:
 - Ooline (*Cadellia pentastylis*).
- ✦ Two additional EPBC Act listed threatened flora species potentially occur.
- ✦ Two Weeds of National Significance (WoNS) species:
 - Common Pest Pear (*Opuntia stricta*); and,
 - Velvety Tree Pear (*O. tomentosa*).
- ✦ Six WoNS potentially occur.
- ✦ Two EPBC Act listed threatened fauna species detected:
 - Central Greater Glider (*Petauroides armillatus*); and,
 - Koala (*Phascolarctos cinereus*).
- ✦ Nine EPBC Act listed threatened fauna species likely occur.
- ✦ Five EPBC Act listed threatened fauna species potentially occur.
- ✦ Two EPBC Act listed migratory and marine fauna species likely occur.
- ✦ Ten EPBC Act listed migratory and marine fauna species potentially occur.

Queensland Biodiversity Values and Constraints:

- ✦ Four Endangered RE present as remnant and/or regrowth.
 - ✦ Five Of Concern RE present as remnant and/or regrowth.
 - ✦ Six No Concern at Present RE present as remnant and/or regrowth.
 - ✦ One NC Act listed threatened flora species detected.
 - ✦ Three NC Act listed threatened flora species potentially occur.
 - ✦ Three targeted SLC flora (*Brachychiton populneus*, *B. rupestris* and *B. australis*) present.
 - ✦ Four Biosecurity Act Category 3 Restricted Matter invasive plants present.
 - ✦ Nine Biosecurity Act Category 3 Restricted Matter invasive plants potentially occur.
 - ✦ Two NC Act listed threatened fauna species were detected.
- Seven NC Act listed threatened fauna species likely to occur.
- ✦ Ten NC Act listed threatened fauna species may potentially occur.
 - ✦ Category B ESA within the Project Area includes: Ground-truthed Endangered RE
 - ✦ Category C ESA within the Project Area includes: Ground-truthed Essential Habitat Areas and Ground-truthed Of Concern RE.

5 References

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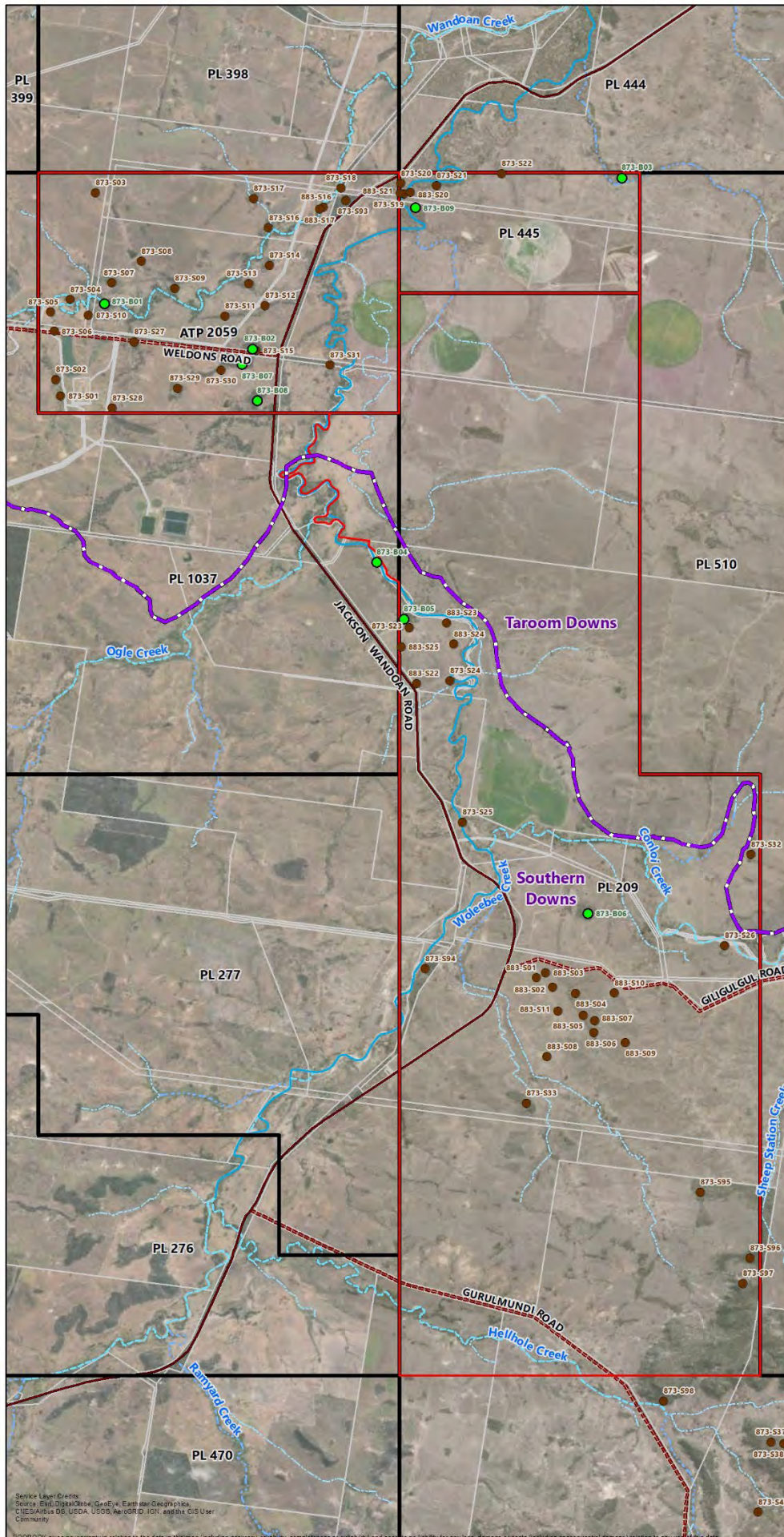
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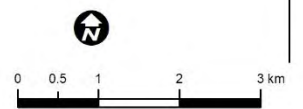
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Appendix A. Overview of Project Area.

Appendix A: Overview of Project Area and Assessment Sites.



- Project Area
- Cadastre
- Tenement
- Assessment Sites**
- Biocondition
- Vegetation & Habitat
- Biogeographic Subregion
- Secondary Road
- Local Road
- Ordered Streams**
- 2
- 3
- 4
- 5



Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppA
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 58,000 @ A3
 Datum: GDA94

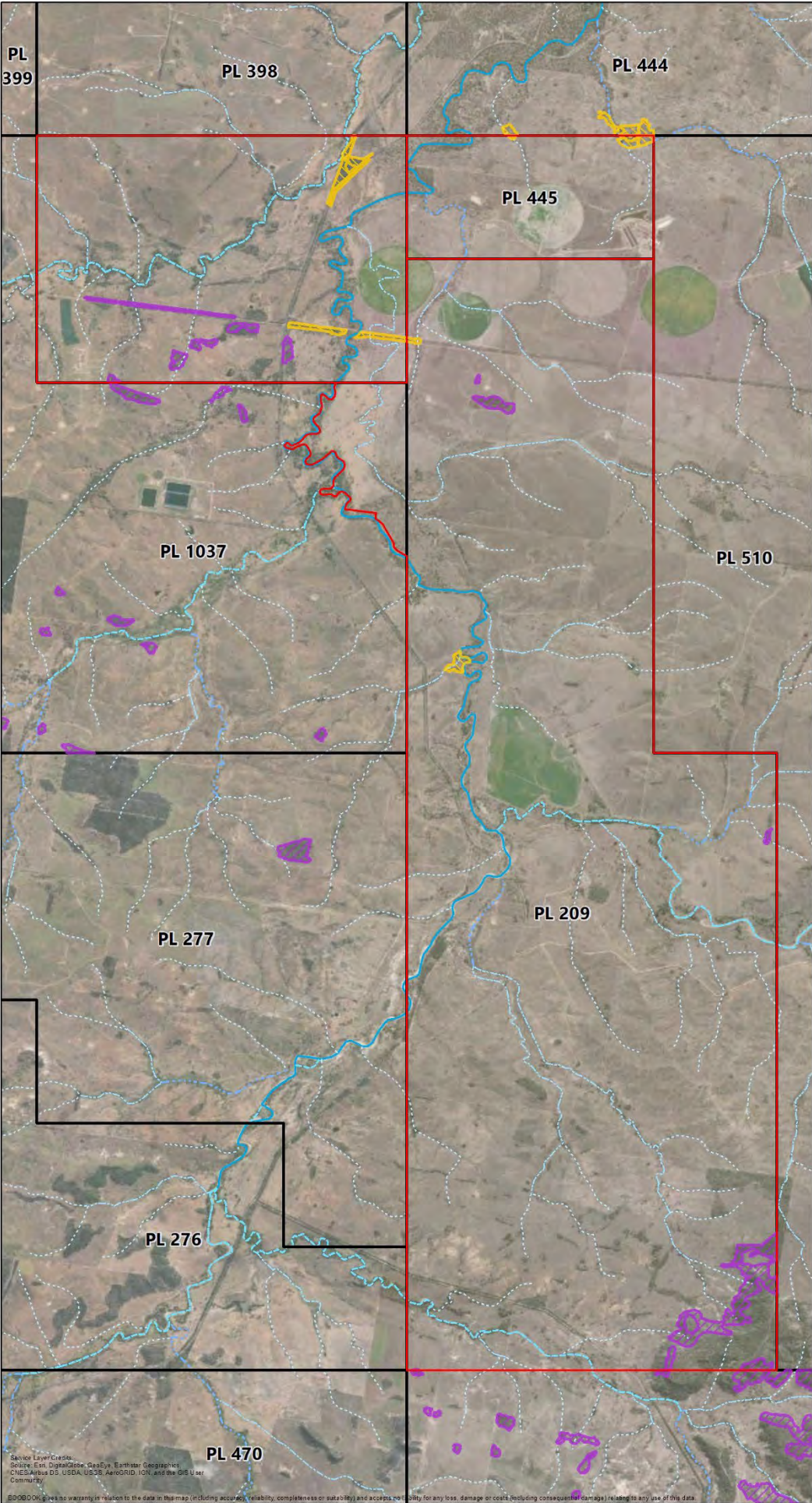


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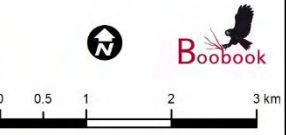
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Appendix B. Threatened Ecological Communities Occurring within the Project Area.

Appendix B: Threatened Ecological Communities (TEC) occurring within the Project Area.



- Project Area
- TEC**
- Brigalow
- Poplar Box grassy woodland
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5



Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppB
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 55,000 @ A3
 Datum: GDA94

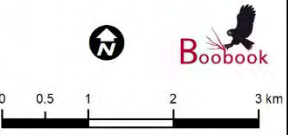


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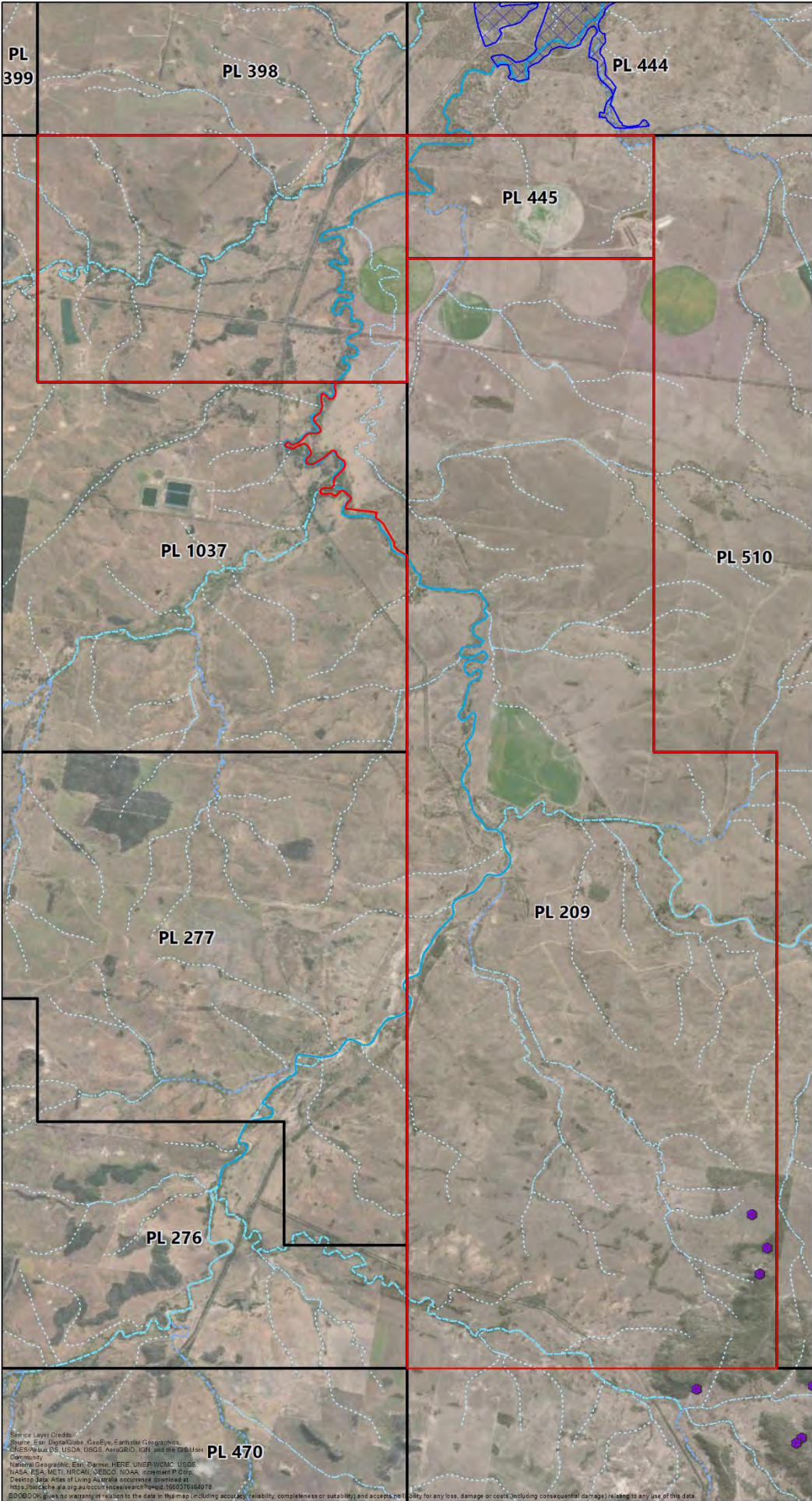
Appendix C. Threatened Flora Occurring within the Project Area

Appendix C: Threatened Flora occurring within the Project Area

- Project Area
- Threatened Flora**
- Survey records**
- Ooline (*Cadellia pentastylis*)
- Protected Plants**
- Flora Trigger**
- High Risk Area
- Ordered Streams**
- 1
- 2
- - - - - 3
- - - - - 4
- 5

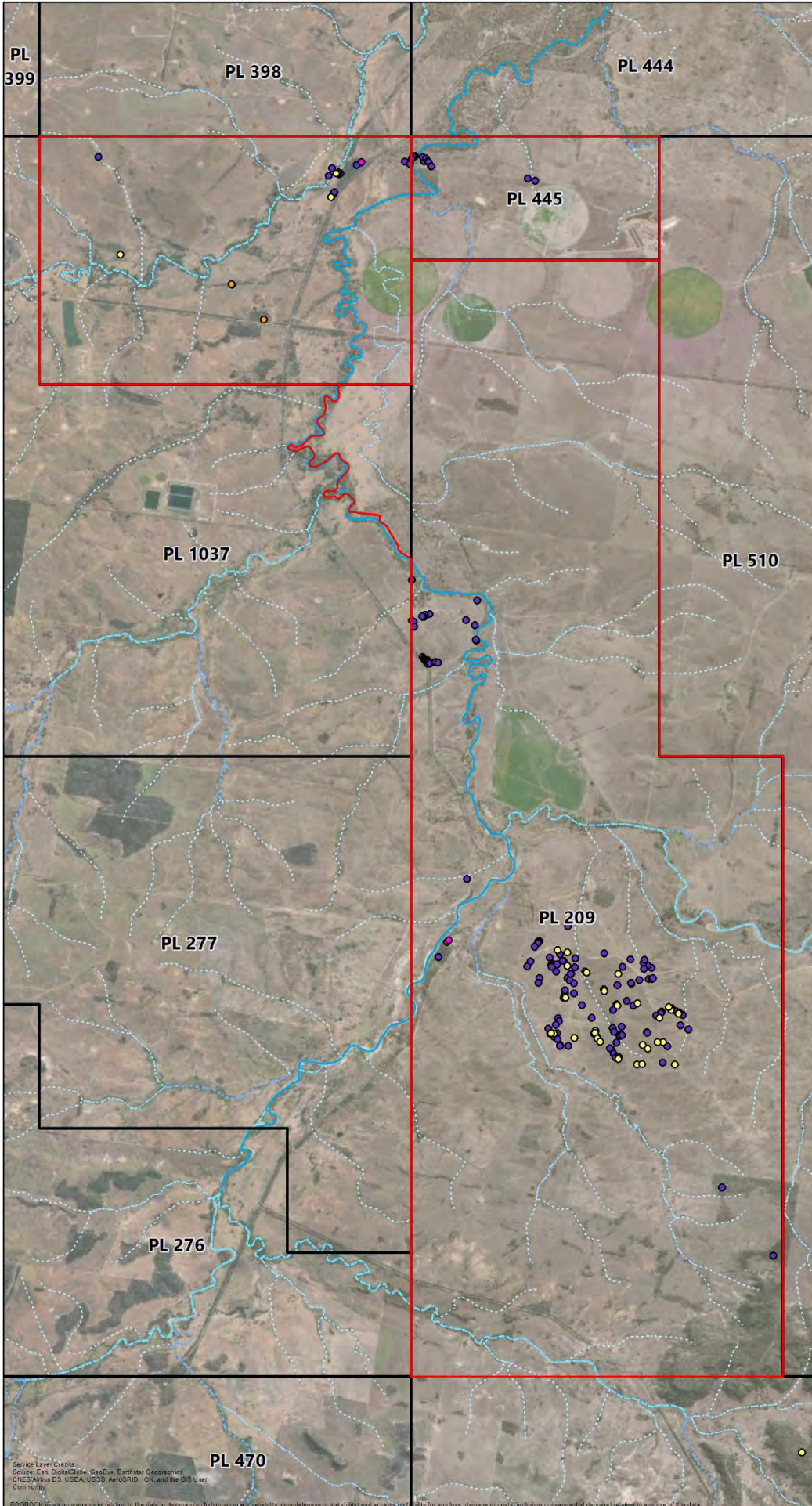


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 Ecological Assessment
 Map No: PC873_AppC
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 55,000 @ A3
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 NASA, ESA, METI, NRCAN, GEBCO, NOAA, iGeoportal, etc.
 Desktop Data: Atlas of Living Australia occurrence downloaded at
 https://biocache.ala.org.au/occurrences/search?query=166237646078
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Appendix D. WoNS and other Pest Flora Occurring within the Project Area.



Appendix D: WoNS and other Pest Flora occurring within the Project Area.

- Project Area
- Category 3 Weeds**
- **Harrisia Cactus** (*Harrisia martinii*)
- **Mother-of-milli...** (*Bryophyllum delagoense*)
- WoNS and Category 3 Weeds**
- **Common Pest Pear** (*Opuntia stricta*)
- **Velvety Tree Pear** (*Opuntia tomentosa*)
- Ordered Streams**
- 1 (dashed light green)
- 2 (dashed light blue)
- 3 (dashed medium blue)
- 4 (dashed dark blue)
- 5 (solid dark blue)



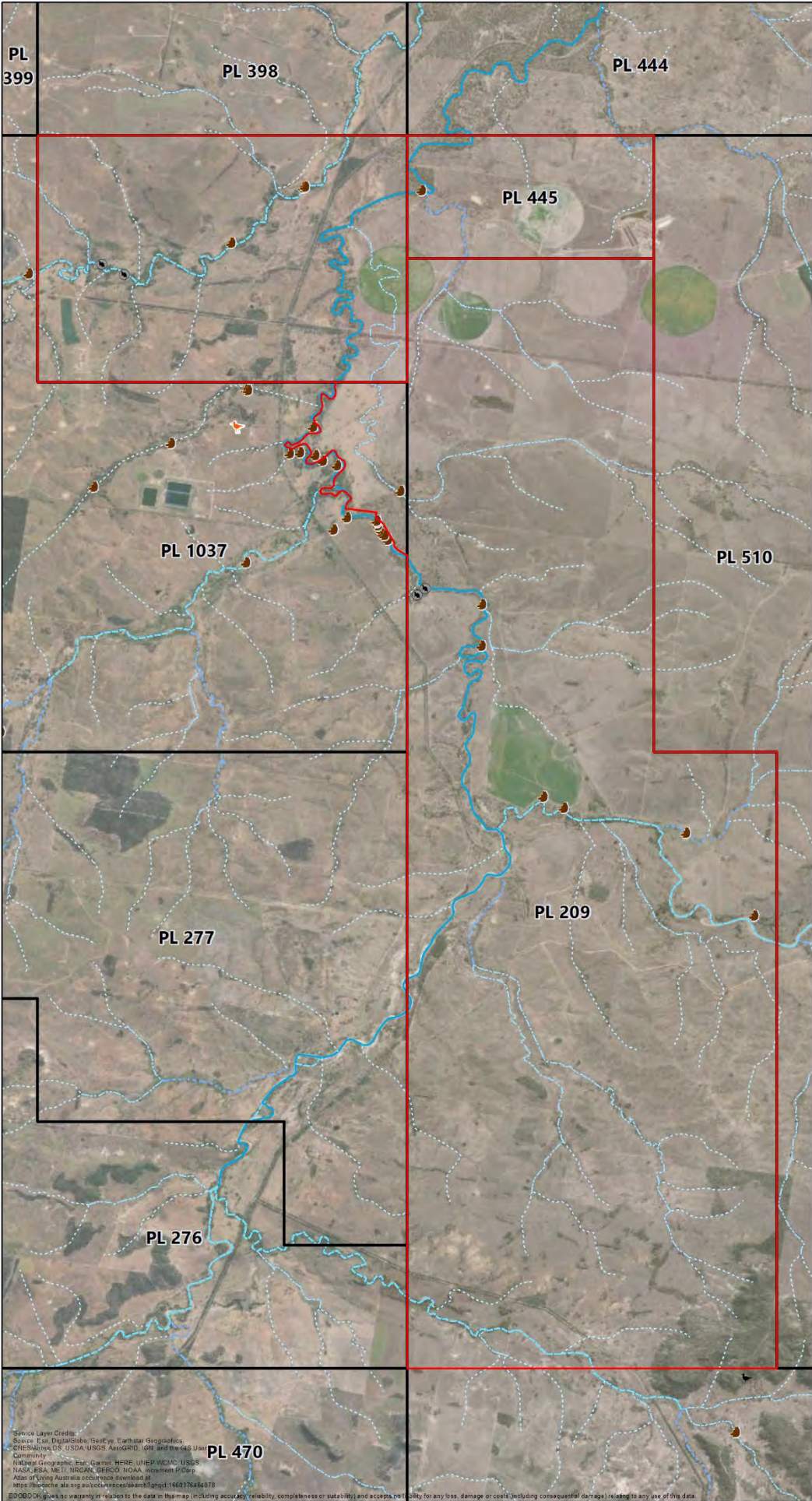
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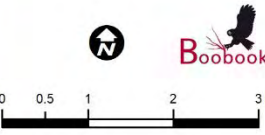
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Appendix E. Threatened Fauna Occurring within the Project Area.

Appendix E: Threatened Fauna occurring within the Project Area.



- Project Area
- Threatened Fauna**
- Survey Records**
- ▲ Glossy Black-Cockatoo (*Calyptrorhynchus lathamii*)
- Central Greater Glider (*Petauroides armillatus*)
- ▲ Koala (*Phascolarctos cinereus*)
- Desktop Records**
- ▲ Glossy Black-Cockatoo (*Calyptrorhynchus lathamii*)
- Ordered Streams**
- 1 (dotted line)
- 2 (dashed line)
- 3 (dashed line)
- 4 (solid light blue line)
- 5 (solid dark blue line)

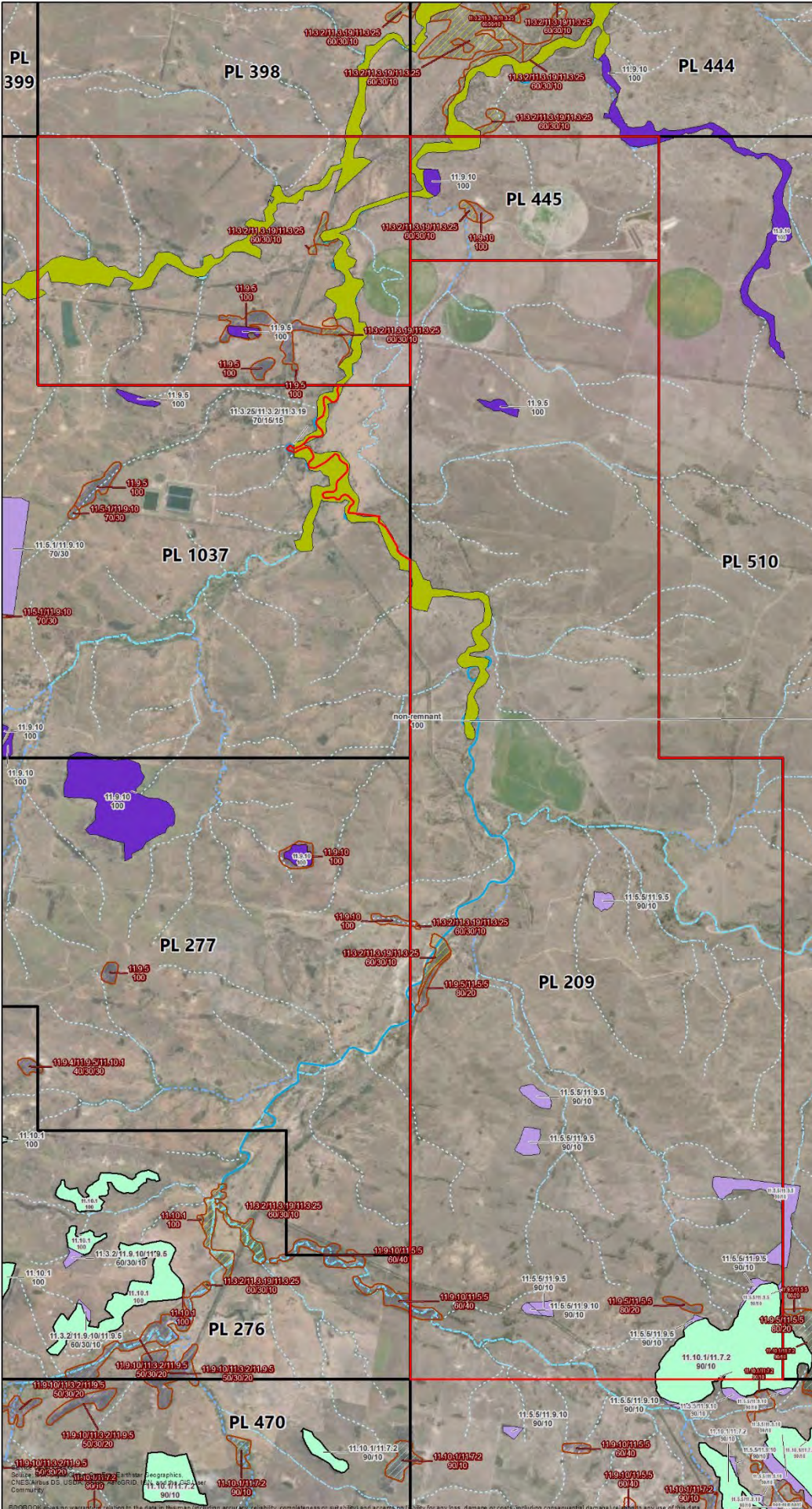


Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppE
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 55,000 @ A3
 Datum: GDA94



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 https://bls-cache.ala.org.au/occurrences/search?geodid=166078&lat=30.9
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Appendix F. Regional Ecosystems Occurring within the Project Area.



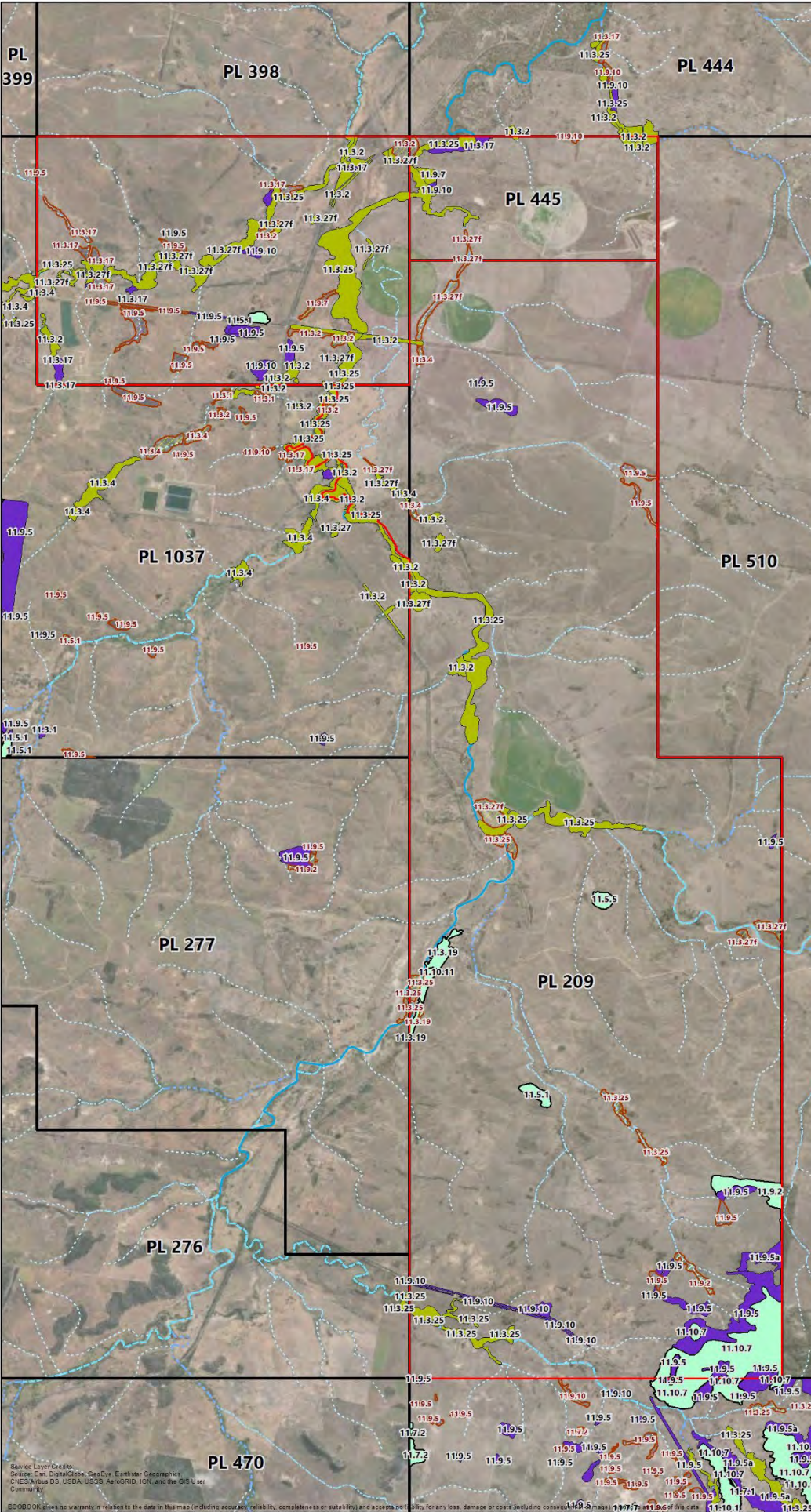
Appendix F1: Desktop Regional Ecosystems occurring within the Project Area.

- Project Area
- Remnant Regional Ecosystems (Biodiversity Status)**
 - Endangered, Dominant
 - Endangered, Sub-dominant
 - Of Concern, Dominant
 - No Concern At Present
- High Value Regrowth (Biodiversity Status)**
 - Endangered, Dominant
 - Endangered, Sub-dominant
 - Of Concern, Dominant
 - No concern At Present
- Ordered Streams**
 - 1
 - 2
 - 3
 - 4
 - 5



Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppF1
 Date: 23/09/2022
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 Scale: 1: 55,000 @ A3
 Datum: GDA94





**Appendix F2:
Ground-truthed
Regional Ecosystems
occurring within the
Project Area.**

- Project Area
- Ground-truthed Remnant Regional Ecosystem**
(Biodiversity Status)
- Endangered, Dominant
- Of Concern, Dominant
- No Concern At Present
- Ground-truthed Advanced Regrowth**
(Biodiversity Status)
- Endangered, Dominant
- Of Concern, Dominant
- No Concern At Present
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5



Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppF2
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 55,000 @ A3
 Datum: GDA94

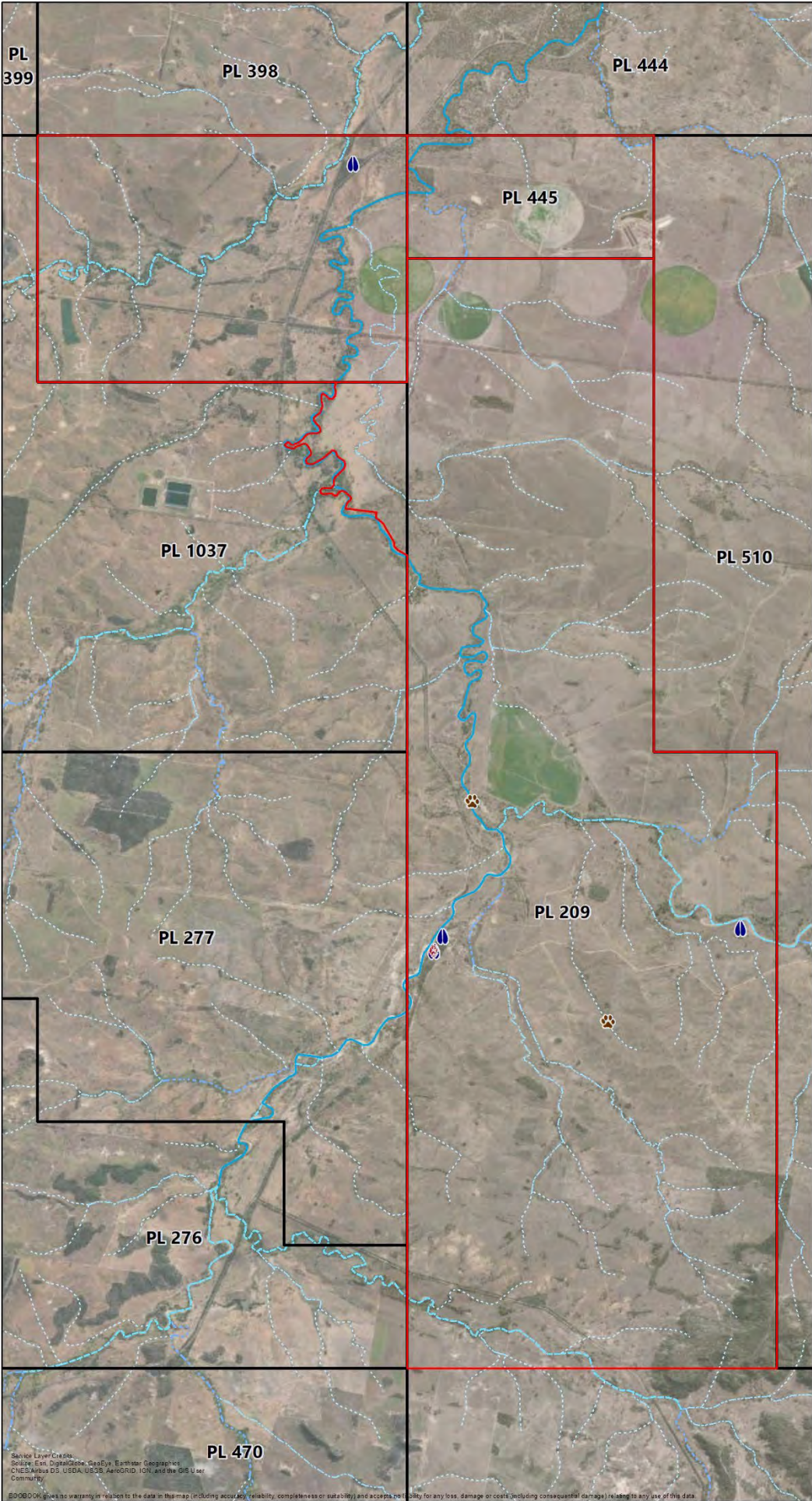


Service Layer Credits:
 Bing, Esri, DigitalGlobe, GeoEye, Earthstar Geographics,
 CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User
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Appendix G. Pest Fauna Occurring within the Project Area.

Appendix G: Pest Fauna occurring within the Project Area



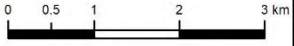
Project Area

Pest Fauna Survey Record

- Dingo (*Canis familiaris*)
- Rabbit (*Oryctolagus cuniculus*)
- Pig (*Sus scrofa*)

Ordered Streams

- 1
- 2
- 3
- 4
- 5



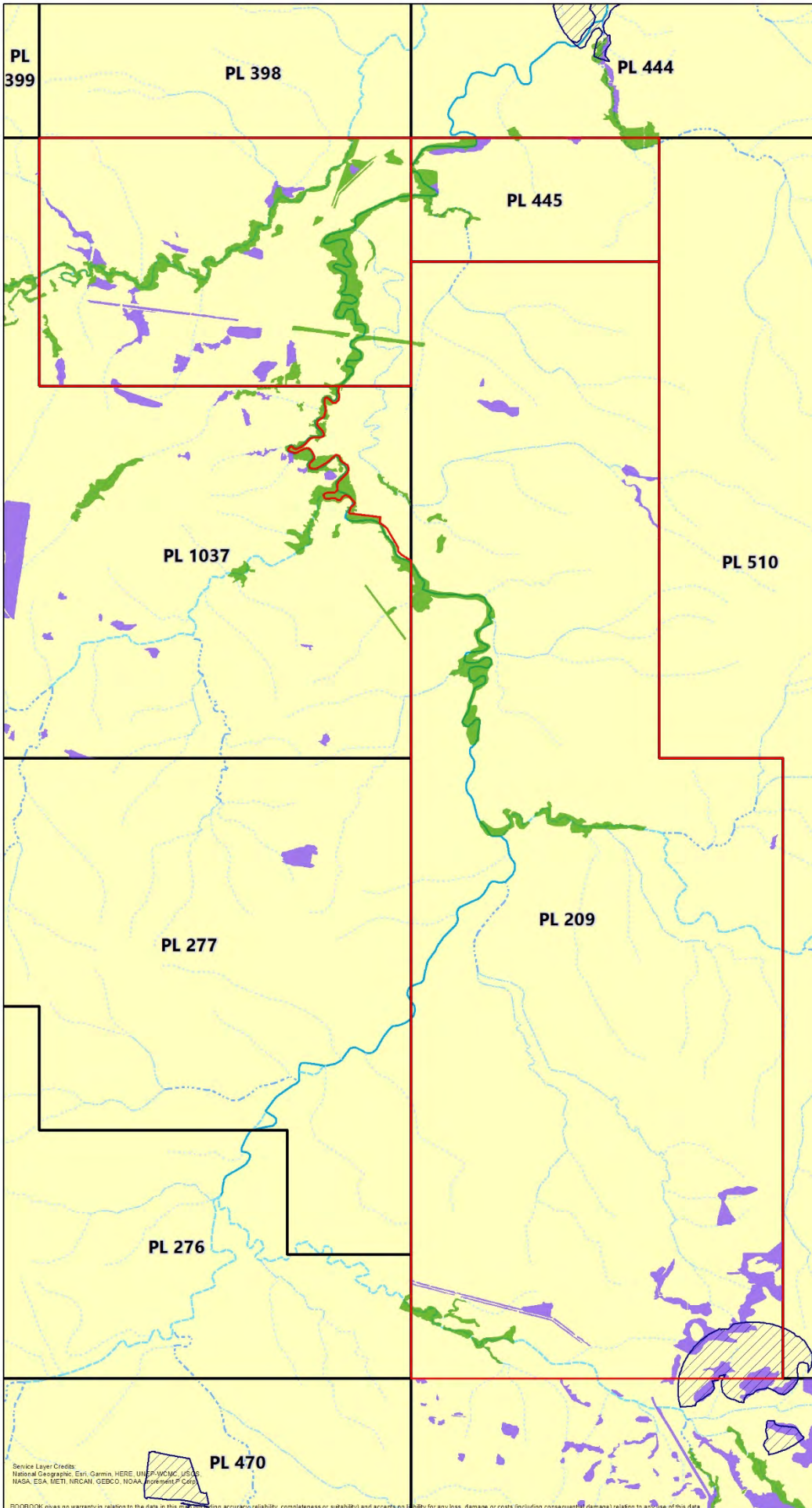
Project:	Atlas3
Ecological Assessment	
Map No:	PC873_AppG
Date:	23/09/2022
Drawn:	L. Hardwick
Approv:	C. Eddie
Scale:	1: 55,000 @ A3
Datum:	GDA94



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 Community

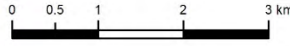
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Appendix H. Environmentally Sensitive Areas Occurring within the Project Area.



**Appendix H:
Environmentally Sensitive
Areas occurring
within the Project Area.**

- Project Area
- CATEGORY B**
- Ground-truthed
- Endangered RE -
Remnant & Regrowth
- CATEGORY C**
- Essential Habitat
- Ground-truthed
- Of Concern RE -
Remnant
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5



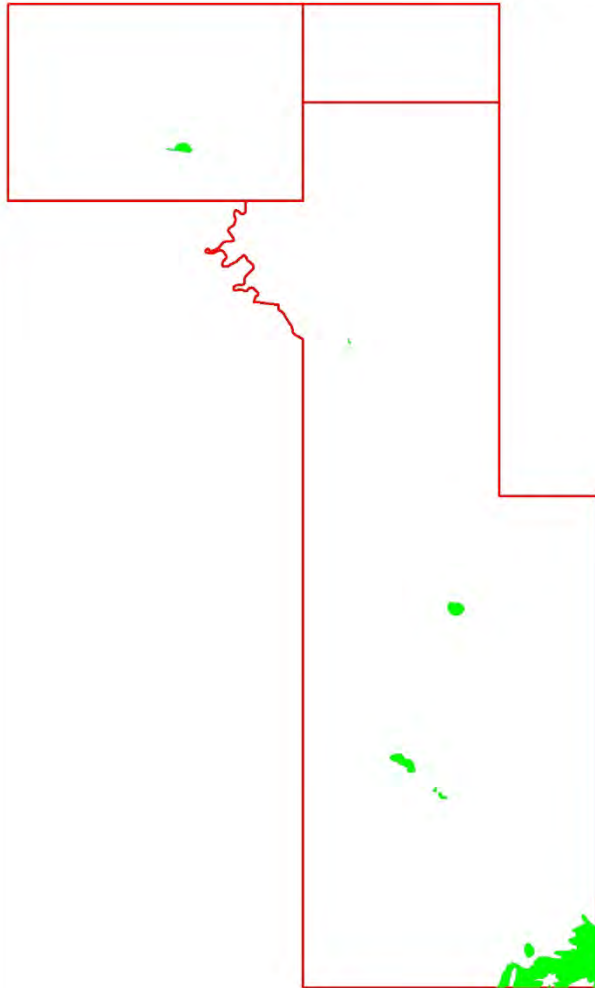
Project:	Atlas3
Ecological Assessment:	
Map No:	PC873_AmpH
Date:	23/09/2022
Drawn:	L. Hardwick
Approved:	C. Eddle
Scale:	1:55,000 @ A3
Datum:	GDA94



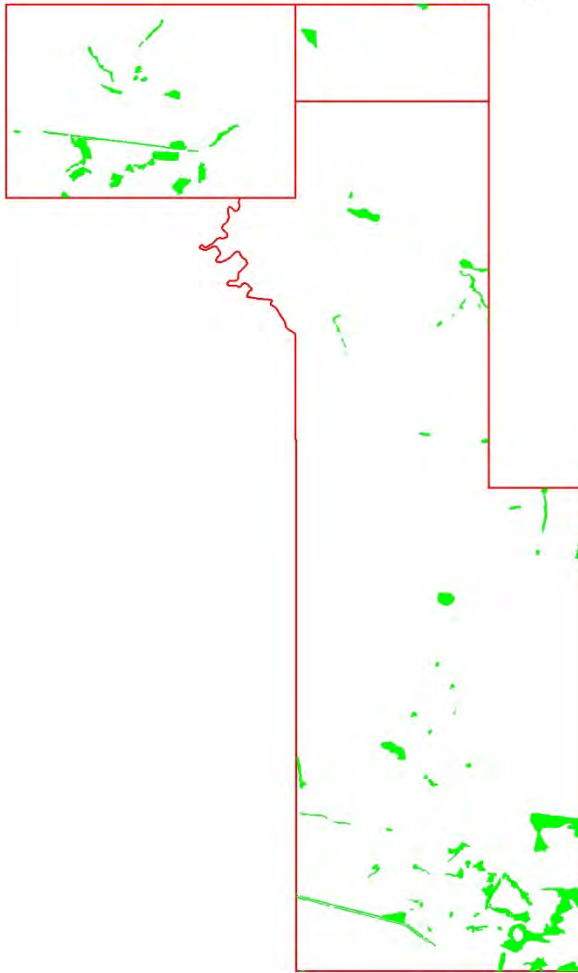
Service Layer Credits:
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Appendix I. Predictive Habitat Mapping of Threatened Flora and Fauna.

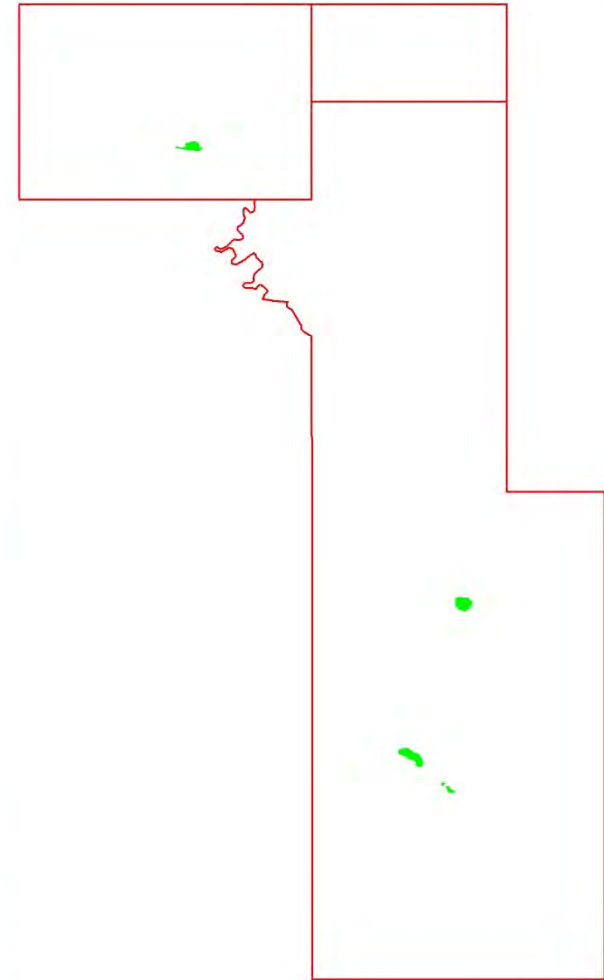
Slender Tylophora



Red-soil Woolly
Wrinklewort



Thomby Range Wattle



Appendix I1a: Predictive Habitat Mapping of Threatened Flora.

- General Habitat
- The Site

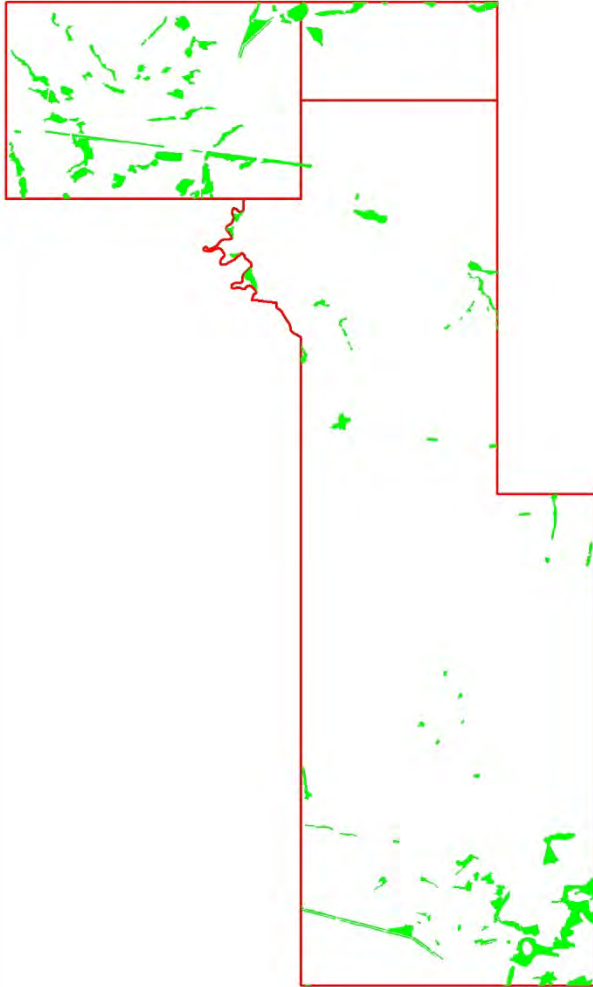
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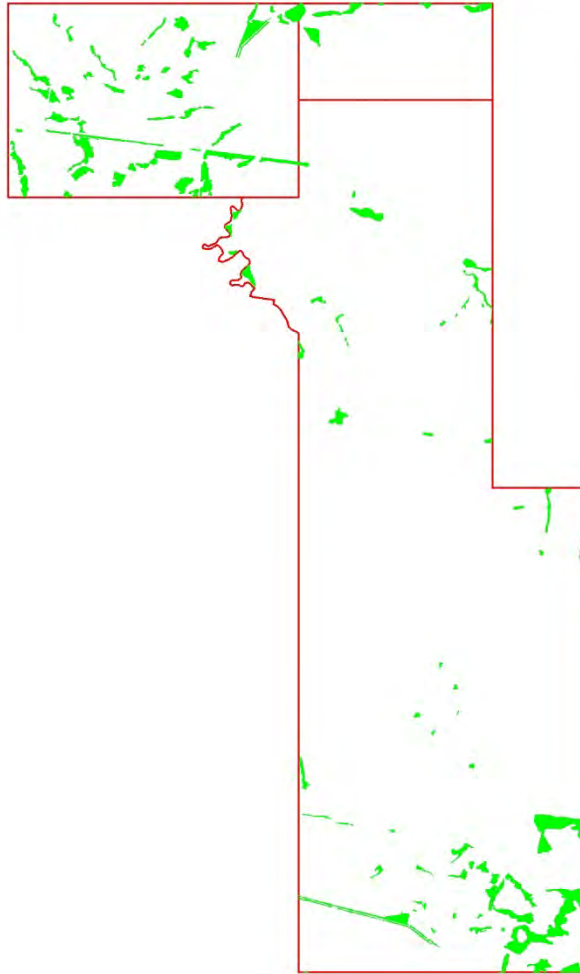
Project: Atlas3
 Ecological Assessment
 Map No: PC873_App11a
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,265 @ A3
 Datum: GDA94



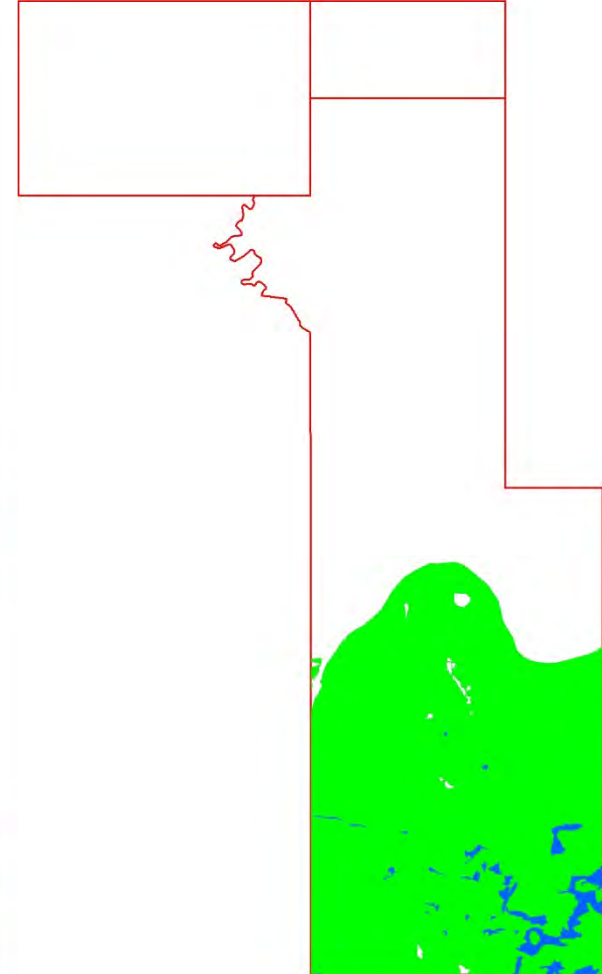
Belsons Panic



Winged Nightshade



Ooline



Appendix 11b: Predictive Habitat Mapping of Threatened Flora.

- Essential Habitat
- General Habitat
- The Site

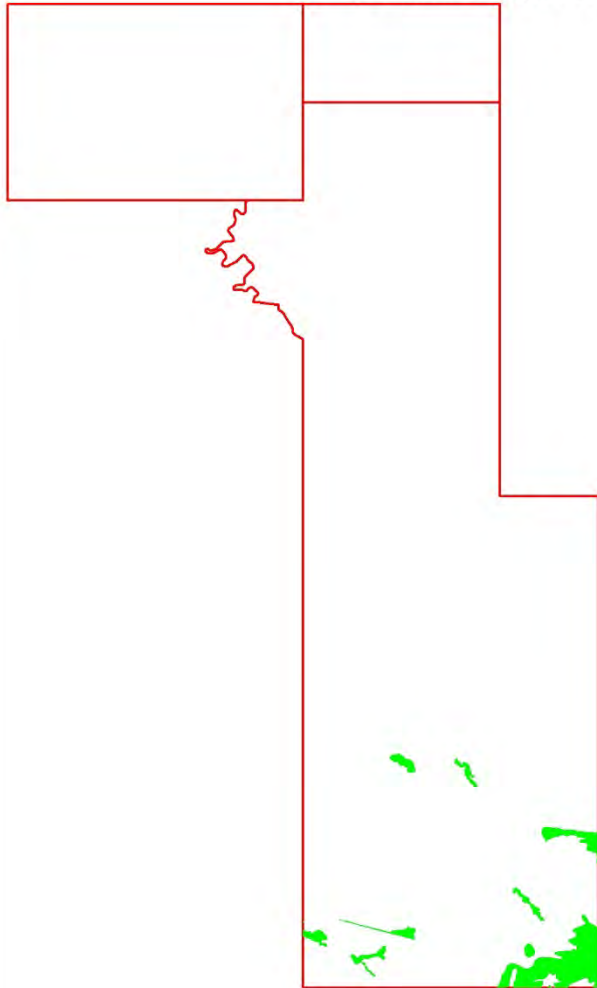
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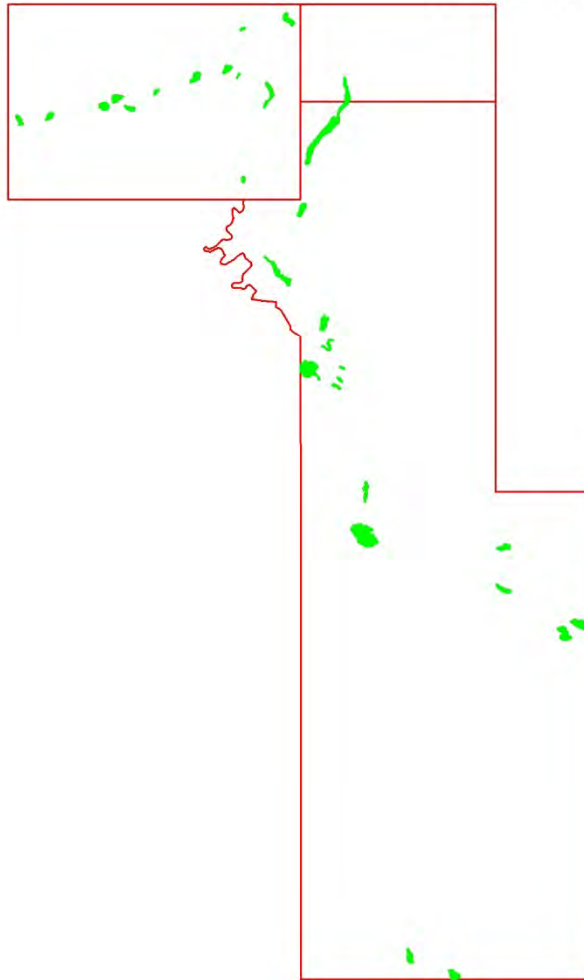
Project: Atlas3
 Ecological Assessment
 Map No: PC873_App11b
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approved: C. Eddie
 Scale: 1: 89,420 @ A3
 Datum: GDA94



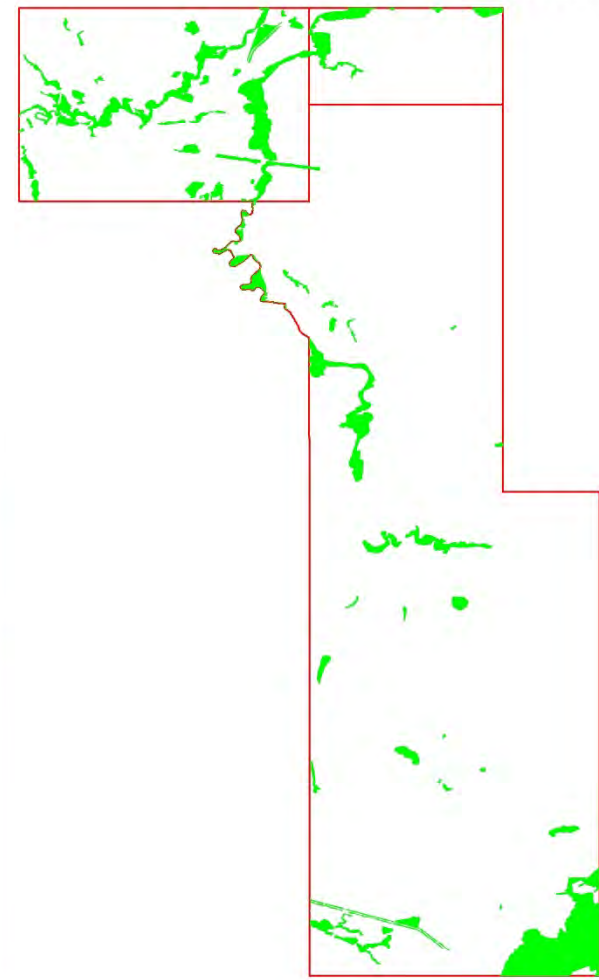
**Squatter Pigeon
(Southern Subspecies)**



**Australian
Painted Snipe**



**Glossy
Black-Cockatoo**

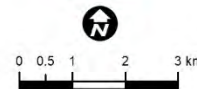


Appendix I2a: Predictive threatened fauna habitat mapping within the Site.

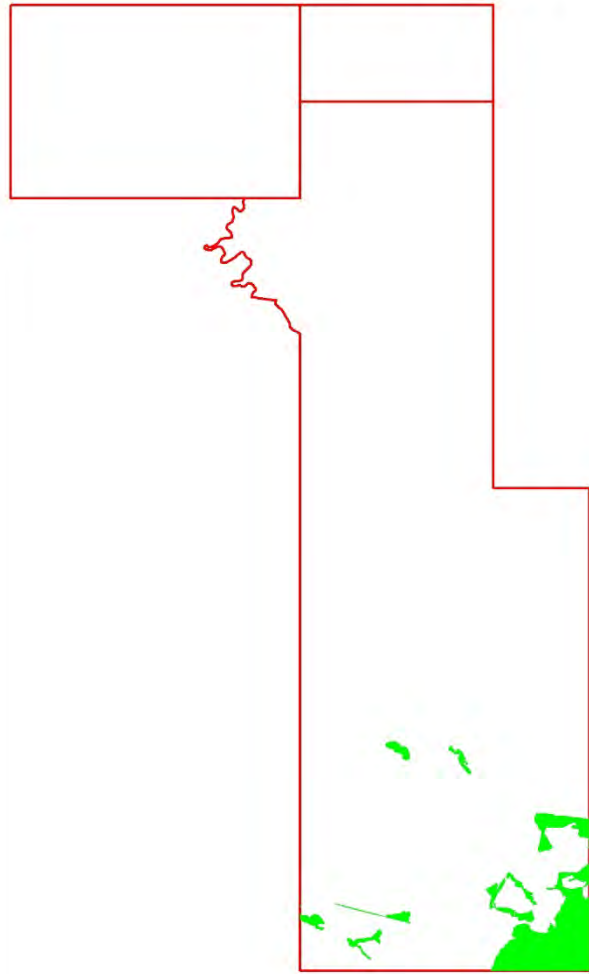
- The Site
- General Habitat



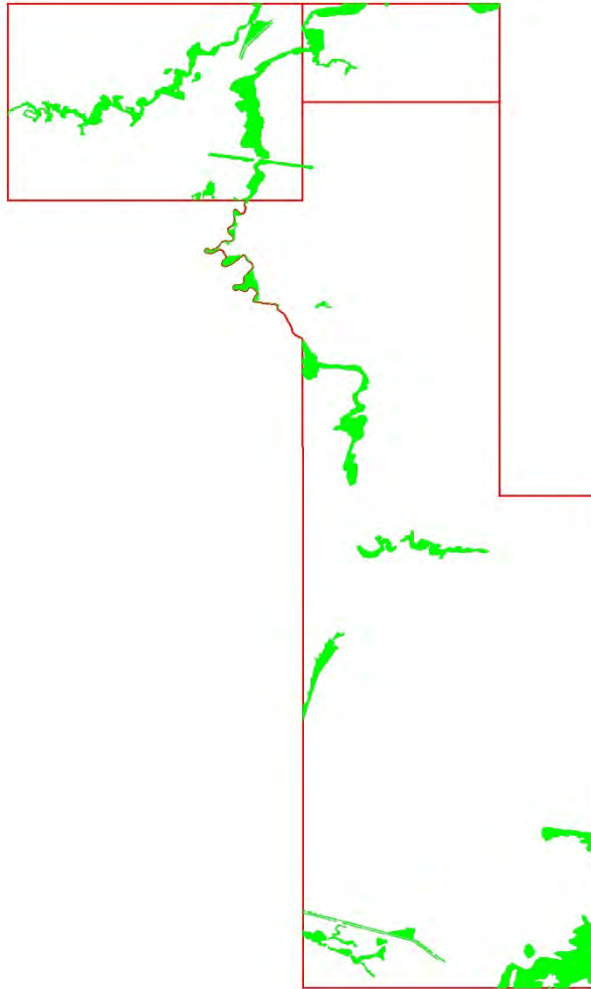
Project: Atlas3
Ecological Assessment
Map No: PC873_AppI2a
Date: 23/09/2022
Drawn: L. Hardwick
Approv: C. Eddie
Scale: 1: 89,983 @ A3
Datum: GDA94



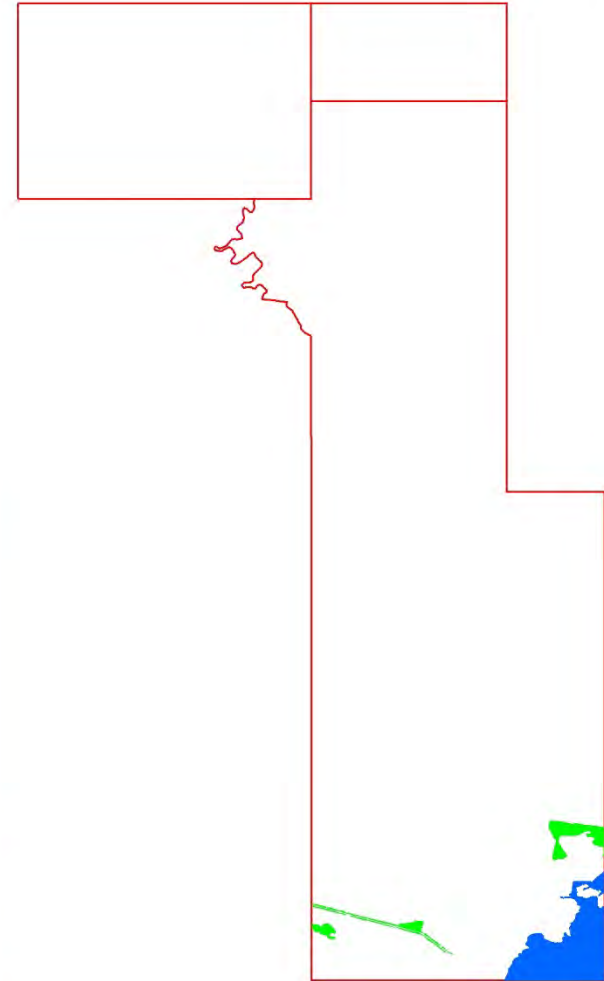
Southeastern Long-eared Bat






Central Greater Glider



Northern Quoll



Appendix I2b: Predictive Habitat Mapping of Threatened Fauna.

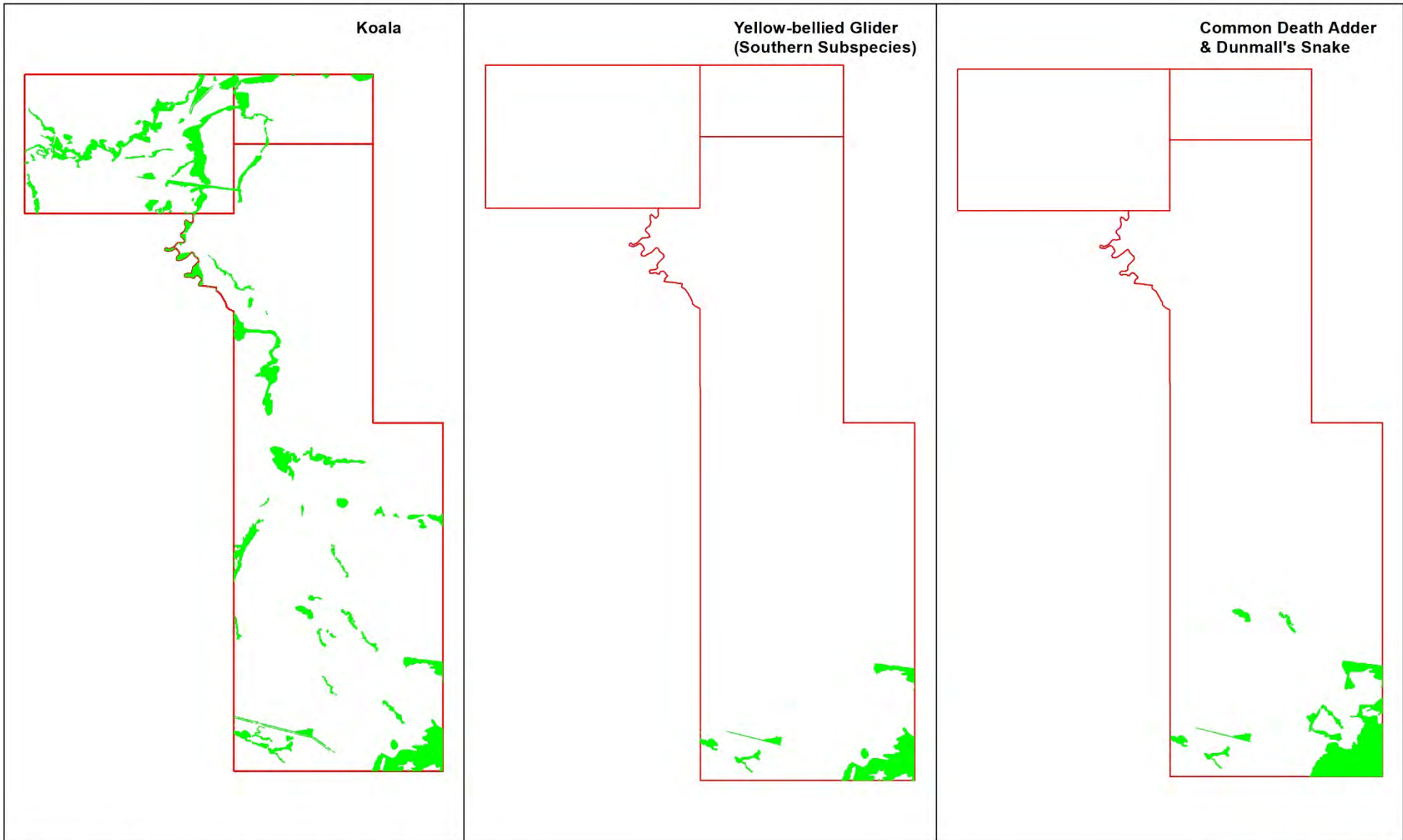
-  The Site
-  Essential habitat
-  General habitat



Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppI2b
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,141 @ A3
 Datum: GDA94



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Appendix I2c: Predictive Habitat Mapping of Threatened Fauna.

- The Site
- General Habitat

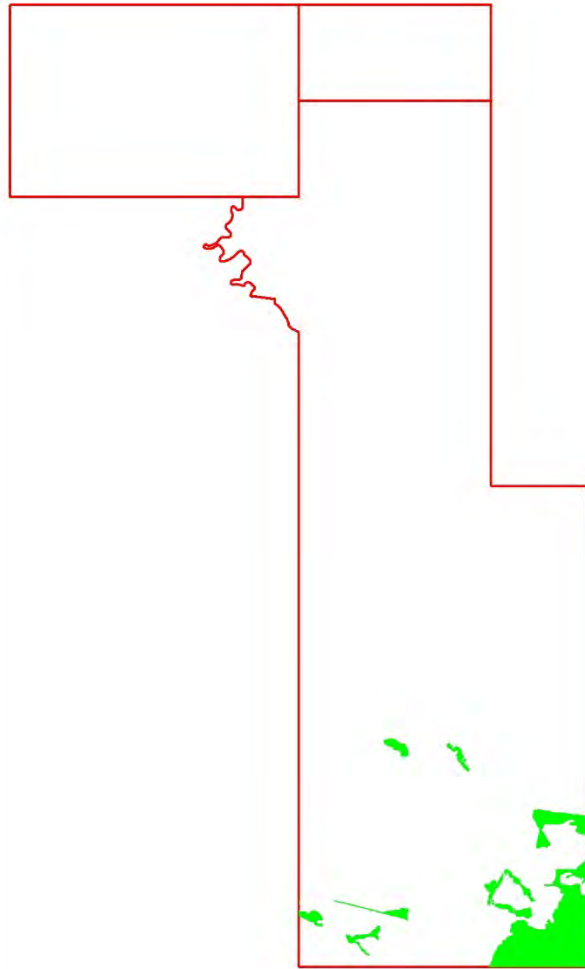


Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppI2c
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,141 @ A3
 Datum: GDA94

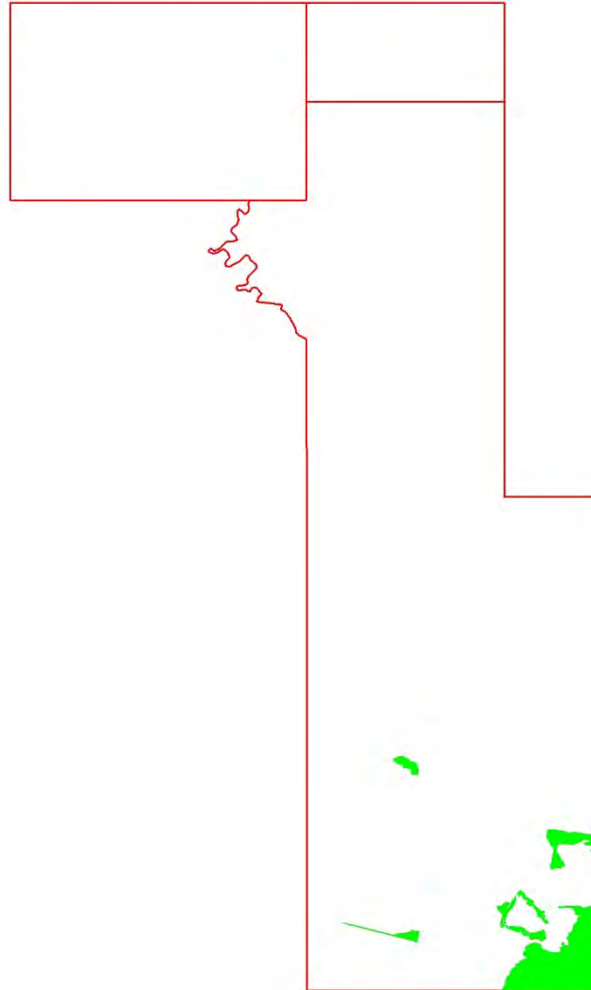


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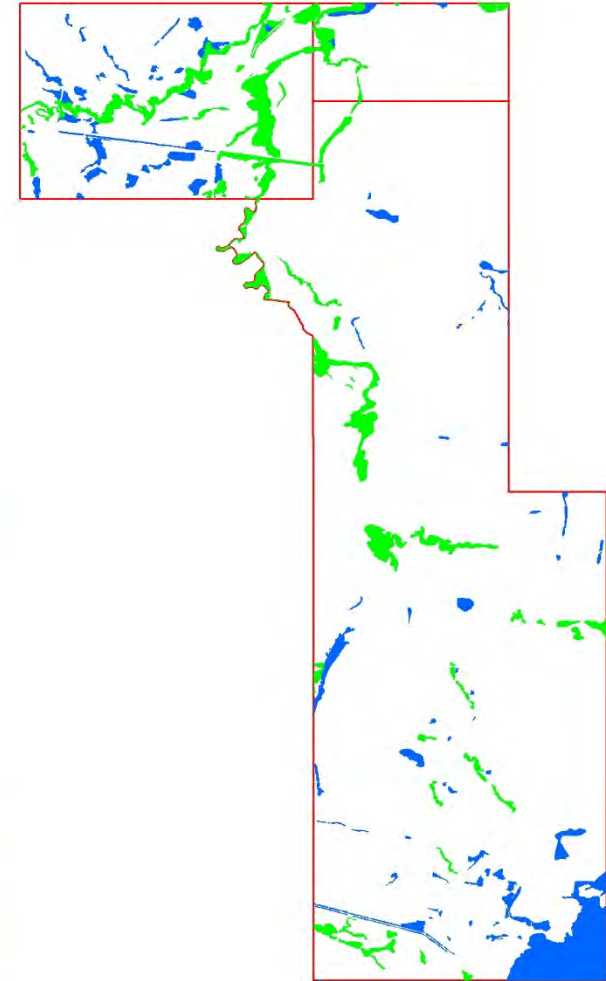
Collared Delma



Yakka Skink



Golden-tailed Gecko



Appendix I2d: Predictive Habitat Mapping of Threatened Fauna.

- Essential Habitat
- General Habitat
- The Site

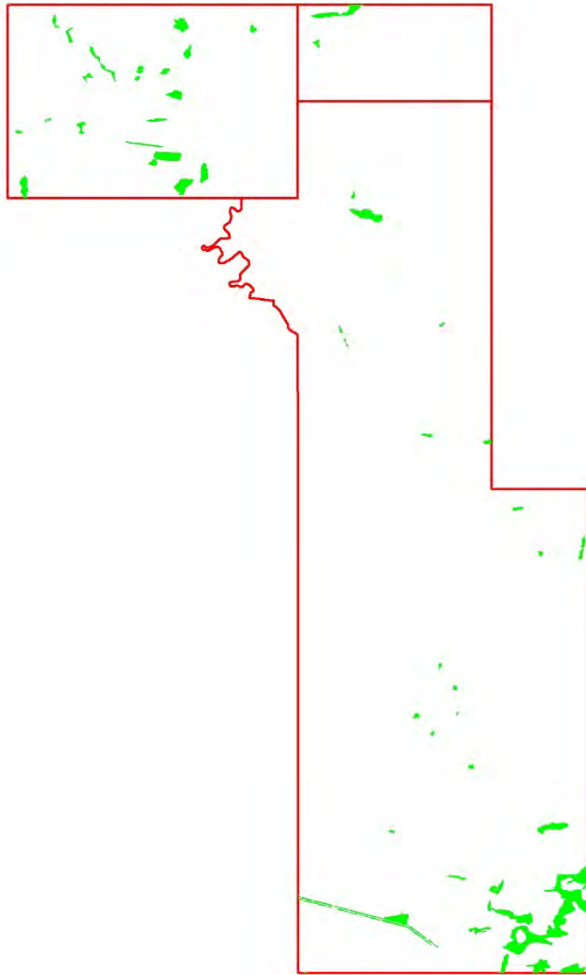


Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppI2d
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,141 @ A3
 Datum: GDA94

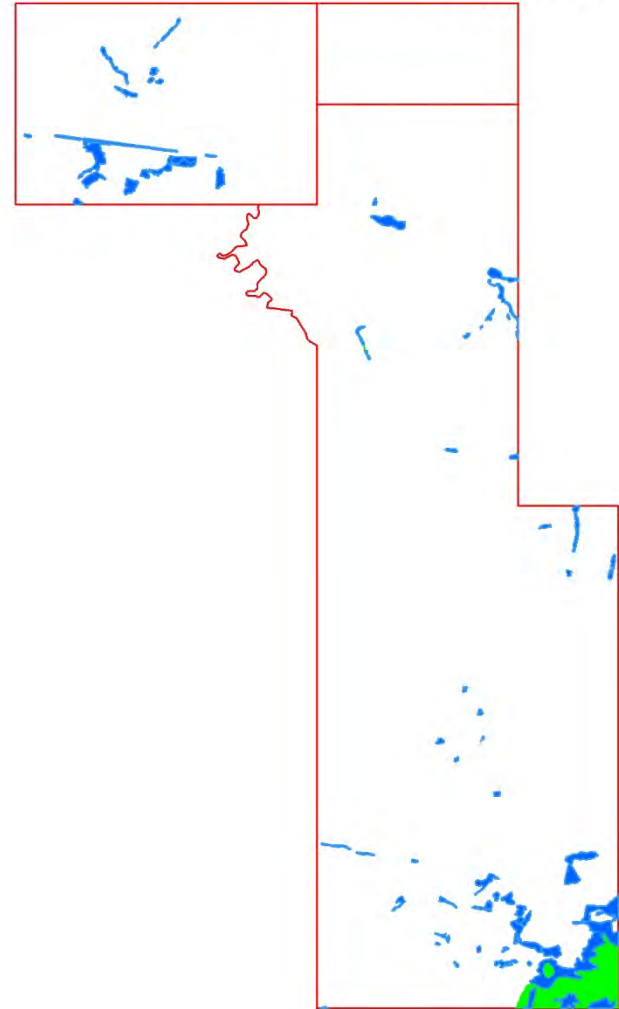


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**Pale Imperial
Hairstreak (butterfly)**



**Dulacca
Woodland Snail**



Appendix I2e: Predictive Habitat Mapping of Threatened Fauna.

- The Site
- Essential Habitat
- General Habitat



Project: Atlas3
Ecological Assessment
Map No: PC873_AppI2e
Date: 23/09/2022
Drawn: L. Hardwick
Approv: C. Eddie
Scale: 1: 90,001 @ A3
Datum: GDA94



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