APPENDIX O

Matters of National Environmental Significance Report

Part 4 of 6

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

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APPENDIX O

Matters of National Environmental Significance Report

Appendix A Additional ecological investigations post submission of the draft EIS

CONTINUED

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Inland Rail is a subsidiary of
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Telstra / Nextgen cable realignment, Gowrie Junction

Protected Plant Survey Report

Prepared for Australian Rail Track Corporation

March 2024

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1 Introduction

1.1 Project background

The Australian Rail Track Corporation (ARTC), in co-operation with InterlinkSQ, is seeking to relocate an existing network of Telstra/Nextgen optic fibre cables to an adjacent road easement associated with Krienkes Road, Gowrie Junction. The purpose of the relocation is to mitigate interaction during the construction phase of both ARTC's Gowrie to Helidon (G2H) rail section and InterlinkSQ developments in the locale. These cables are pivotal assets for both Telstra and Nextgen, particularly the Nextgen fibre serving as the main trunk fibre between Brisbane and Sydney, while the Telstra fibre plays a crucial role in interconnecting Gowrie Junction and Kingsthorpe.

As ecological assessments have been progressed for the G2H Environmental Impact Statement (EIS) associated with the Inland Rail project, ARTC have become aware threatened flora species are present near the proposed cable footprint. As such, with the addition of protected plant trigger mapping intersecting the impact area, and prior knowledge of threatened flora species in the area, it was considered necessary to undertake a protected plant survey.

1.2 Purpose and scope

Under the *Nature Conservation Act 1992*, a protected flora survey is to be completed where proposed works are to occur within areas mapped as a high-risk area on the flora survey trigger map, or where proposed works are located within 100 m of an existing record of a protected flora species. A suitably qualified person needs to undertake a protected plant survey across a 'clearing impact area' and then prepare a flora survey report. If threatened species are observed within the clearing impact area, a flora survey report (this report) summarising the survey findings is required to be submitted, in support of a protected plant clearing application.

This report summarises the results from two protected flora surveys undertaken on 18–19 December 2023 and on 22 February 2024 consistent with the Flora Survey Guidelines – Protected Plants (DES 2020). More specifically, this report will provide the information required to meet the requirements of the Protected Plants Assessment Guidelines (DES 2021).

1.3 Survey area location and description

The proposed cable relocation is 5.78 km in length and situated between Leesons Road, Kingsthorpe and Gowrie Junction Road, Gowrie Junction (see Figure 1.3). The chosen route represents the most optimal solution, ensuring minimal disruption to critical telecommunication infrastructure while aligning as much as possible with environmental and logistical considerations.

Surveys were undertaken east of Leesons Road, near Gowrie Creek south-east of Kingsthorpe, and west of and adjacent to Krienkes Road, Gowrie Junction. Kingsthorpe is located roughly 15 km north-west of Toowoomba, and Gowrie Junction is located roughly 10 km north-west of Toowoomba. Both townships lie within the Brigalow Belt Bioregion. The clearing impact area primarily consists of native grassland in paddocks interspersed with patches of *Eucalyptus orgadophila* (Mountain Coolibah) woodland, road verges, old homesteads, cattle yards, and exotic grasslands heavily disturbed by weeds. The elevation of the site sits between 400 and 500 m above sea level. There are some areas that are highly disturbed due to cropping/being regularly slashed, and bitumen roads.

Table 1.1 summarises the Lot/Plans that occur within the clearing impact area (proposed alignment and 100 m survey buffer) and those that could be accessed. Justification for properties that were not surveyed is provided in Section 2.5.

See Figure 1.2 for location of the disturbance footprint and clearing impact area.

Table 1.1 Lot/Plans within the survey area and access

Lot/Plan	Tenure	Access obtained Yes/No	Comment
61SP122171	Lands Lease	No	Active Queensland Rail corridor
2RP34933	Lands Lease	No	Active Queensland Rail corridor
157AG2455	Freehold	Yes	
478A34873	Freehold	Yes	
477A34873	Freehold	Yes	
472A34873	Freehold	Yes	
473A34873	Freehold	Yes	
476A34873	Freehold	Yes	
475A34873	Freehold	Yes	
474A34873	Freehold	Yes	
133A342650	Freehold	Yes	
485AG3377	Freehold	No	Landholder did not provide permission
479A34873	Freehold	Yes	
480A34873	Freehold	Yes	
4RP34885	Lands Lease	Yes	
1RL3652	Lands Lease	Yes	
100SP270462	Freehold	Yes	
BSP270462	Easement	Yes	
200SP312428	Freehold	Yes	
33SP312428	Freehold	Yes	
35AG4088	Freehold	Yes	
61AG3184	Freehold	No	Highly modified environment
154RP99736	Freehold	Yes	
482A34873	Freehold	Yes	
471A34873	Freehold	Yes	
470AG3378	Freehold	Yes	
466AG3378	Freehold	Yes	
1AG3345	Lands Lease	No	Inactive Queensland Rail corridor
301G1861	Freehold	No	Highly modified environment
305G1861	Freehold	No	Highly modified environment
117AG1535	Reserve	No	Highly modified environment

Table 1.1 Lot/Plans within the survey area and access

Lot/Plan	Tenure	Access obtained Yes/No	Comment
118AG1535	Reserve	No	Highly modified environment
469AG3378	Freehold	Yes	
468AG3378	Freehold	Yes	
467AG3378	Freehold	Yes	
3RP34912	Lands Lease	No	Inactive Queensland Rail corridor
1RL3625	Lands Lease	Yes	
1RL3652	Lands Lease	Yes	
481A34873	Freehold	Yes	
2SP169808	Freehold	No	Highly modified environment
3SP169808	Freehold	No	Highly modified environment
2RP55460	Freehold	No	Highly modified environment
26RP24609	Freehold	Yes	
33SP312428	Freehold	No	Highly modified environment
29SP294200	Freehold	No	Highly modified environment
Leesons / Leeson Rd	Road parcel	Yes	

1.3.1 Project description

The imperative need to relocate the existing Telstra and Nextgen cables arises from their susceptibility to the proposed Inland Rail and InterlinkSQ development works in the area. These cables are pivotal assets for both Telstra and Nextgen; the Telstra cable plays a crucial role in interconnecting the towns of Kingsthorpe and Gowrie Junction, and the Nextgen cable serves as part of the main trunk between Brisbane and Sydney.

Ground disturbance works associated with the Project will include two types of trenching layouts, as well as horizontal directional drilling (under-boring) and associated works. Horizontal directional drilling will involve two minor disturbance footprints (approximately 1 m x 4 m) at either end of the drill with no disturbance in between; the nominal depth of the 'tunnel' will be 1,200 mm to 1,500 mm. Figure 1.1 depicts disturbance footprint extents at each end of the directional drilling locations. Note that only the areas depicted in blue involve ground disturbance. Trenching layouts will have an approximate width of 500 mm and a depth between 900–1,200 mm. The main disturbance to the existing environment will be the stripping of grass and topsoil. Stockpiling of the excavated grass and soil will be immediately adjacent to where it was removed from the ground. As far as practicable, the trenching contractors will attempt to preserve the soil profile, and avoid mixing topsoil and subsoil, which will be stored on opposite sides of the trench while cable is being laid. A small amount of bedding material (sand) will be deposited in the bottom of the trench and infilled around the cables. This will then be buried with excavated subsoil, and the preserved topsoil and grasses will then be backfilled over the cable. Any extra subsoil material will be distributed evenly nearby, avoiding burial of existing ground vegetation.

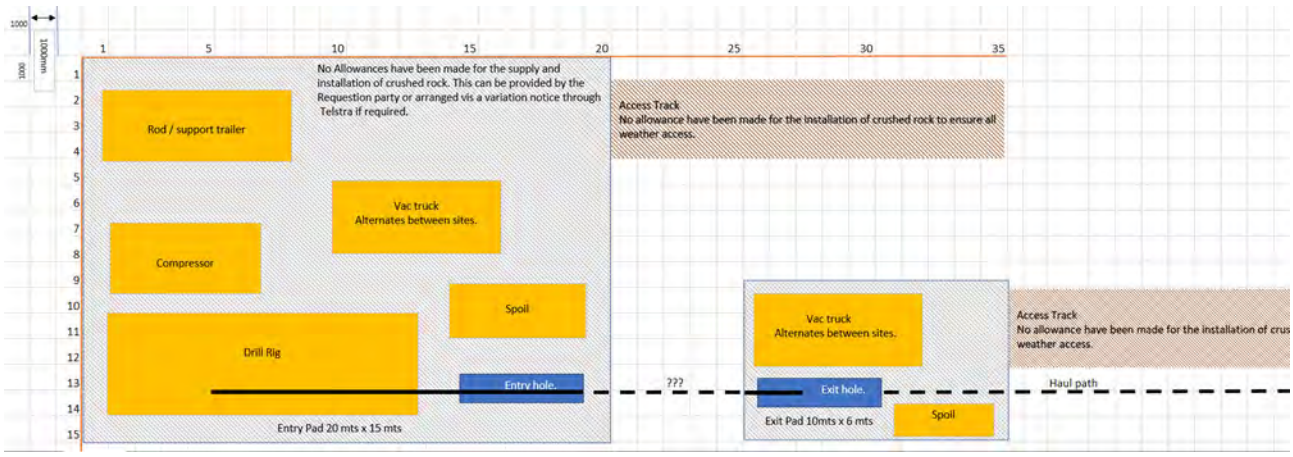


Figure 1.1 Depiction of material arrangement for horizontal directional drilling – note that only the entry hole and exit hole involve ground disturbance

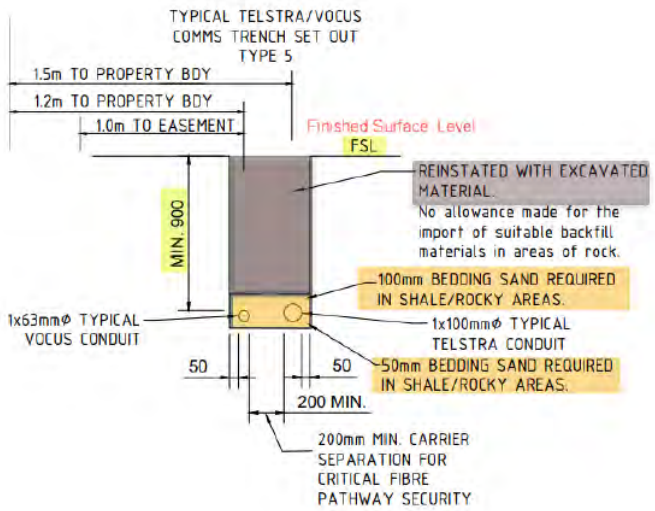


Figure 1.2 Representative trenching layout provided by Telstra

1.3.2 Extent of area surveyed

The 'disturbance footprint' is defined as the 5.78 km, 5 m wide corridor where the disturbance (outlined in Section 1.3.1) is planned to occur (refer Figure 1.3).

Due to the known concentration of a threatened grass species, *Digitaria porrecta* (Finger Panic Grass), in the vicinity of the proposed works, it was decided the survey would be conducted across the entire length of disturbance footprint, except for the area within the Interlink property boundaries, highly disturbed areas such as cropped areas, operating railway, residential areas and roads. The extent of the survey area is shown in Figure 1.3.

A shapefile will be provided separately to the Department of Environment, Science and Innovation (DESI) showing the project area, the clearing impact area, and extent of on-ground surveys.

1.4 Authority to conduct protected plant survey

Collection of plant specimens for submission to the Queensland Herbarium for the purpose of identification was required. Plant collection was undertaken in accordance with Division 3 of the *Nature Conservation (Plants) Regulation 2020*.

1.5 Statement of validation from suitably qualified personnel

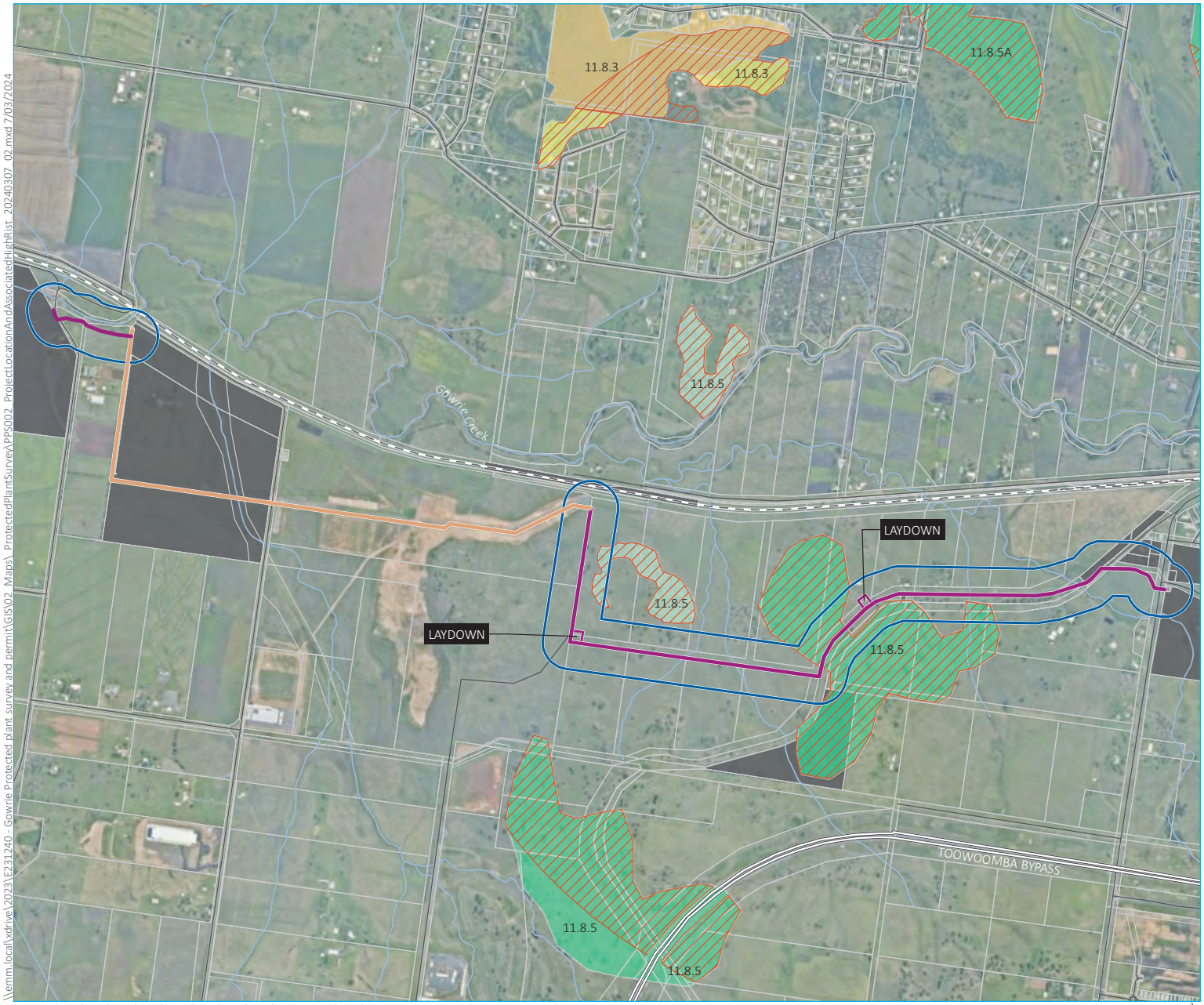
I certify that:

a. I have adhered to all statutory requirements and flora survey guideline requirements; and

b. In the area surveyed I**, Daniel Kelly,** found any plants that are currently listed as extinct, extinct in the wild, critically endangered, endangered, vulnerable or near threatened in the Nature Conservation (Plants) Regulation 2020; and

c. The flora survey report is an accurate and full account of the flora survey.

Date: 07/03/2024
Daniel Kelly - Ecologist



KEY

- Disturbance footprint
- InterlinkSQ section
- Clearing impact area (survey area)
- Protected plant trigger mapping
- Exempt area (no access)

Regulated vegetation (VM status)

- Remnant - of concern
- High value regrowth - of concern
- Remnant - least concern
- High value regrowth - least concern

Existing environment

- Rail line
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary

Source: EMM (2024); GA (2011); DES (2023); DR (2024); Metromap (2024)

0 0.5 1 km

GDA2020 MGA Zone 56

N

Project location and associated high-risk trigger mapping

Telstra/Nextgen Cable Realignment
Gowrie Junction
Protected Plant Survey Report
Figure 1.3

EMM creating opportunities

\\emm.local\xdrive\2023\E231240 - Gowrie Protected plant survey and permit\GIS\02_Maps_ProtectedPlantSurvey\PPS002_ProjectLocationAndAssociatedHighRist_20240307_02.mxd 7/03/2024

2 Methodology

2.1 Desktop assessment

A review of existing information was undertaken to assess ecological characteristics of the study area, including the potential presence of critically endangered, endangered, vulnerable and near threatened (CEEVNT) flora species under NC Act and potential habitat types.

As such, a 5 km buffer was used for the desktop searches to delineate a study area to assess ecological characteristics of the survey area. The following sources were consulted during the desktop assessment phase including the potential presence of CEEVNT flora species associated with the survey area:

- Department of Environment and Science (DES) Protected Plants Flora Survey Trigger Map
- Department of Science, Information Technology and Innovation (DSITI) Wildlife Online
- Department of Climate Change, Energy, the Environment and Water (DCEEEW) Protected Matters Search Tool (PMST)
- Department of Natural Resources, Mines and Energy (DNRME) Detailed Surface Geology – Queensland
- Department of Natural Resources and Mines (DNRM) Vegetation Management Regional Ecosystem (RE) spatial layer
- spatial imagery
- Atlas of Living Australia (ALA)
- Gowrie to Helidon Ecology Technical Report (EMM 2024) (draft)
- Redleaf Environmental protected plant survey data set (Redleaf Environmental 2022).

Desktop searches are provided in Appendix A.

2.2 Field survey methodology

A timed meander survey was conducted in the designated clearing impact area which included the disturbance footprint and a 100 m buffer, as outlined in the *Nature Conservation (Plants) Regulations 2020 – Protected Plants Assessment Guidelines* (the Guidelines). The clearing impact area, as seen in Figure 1.3, includes areas intersecting protected plant trigger mapping.

The clearing impact area, including all habitat types, was traversed by two ecologists, to obtain maximum coverage (refer Figure 1.2). The survey was conducted over three days, with a total estimated survey time of 18 hours. Where a CEEVNT plant, or possible CEEVNT plant was observed, the population extent within the clearing impact area was recorded and a specimen was taken for submission to the Queensland Herbarium to confirm identification. Coordinates for each potential CEEVNT individual or population was recorded.

Desktop search results were also used to identify potential CEEVNT flora species that may be present, and these are summarised in Section 3.1.3. Field ecologists looked for these threatened flora species during the survey. Access was restricted in small areas within the clearing impact area (see Figure 1.3) and justification as to why land access wasn't available is provided in Section 2.5.

2.3 Survey team

In accordance with Section 4.2.1 of the Flora Survey Guidelines – Protected Plants (DES 2020), the survey was led by Suitably Qualified Person (SQP), Ecologist Daniel Kelly, and assisted by ecologists Rachel Scott and Elliot Leach. Curricula Vitae are provided in Appendix B. Daniel's SQP self-assessment can be observed in Table 2.1 below.

Table 2.1 SQP self-assessment – Daniel Kelly

	Conditions	Maximum points allocated	Self-assessment	Rationale
Component 1: Qualification knowledge and ability				
A relevant qualification from a recognised institution (e.g., University, TAFE) that results in a thorough knowledge of plant identification and flora surveys.	General training (not Aust. or Qld focussed); OR	30	50	Bachelor of Environmental Science with honours (Ecology), University of Queensland. Relevant subjects include Rainforest Ecology, Desert Ecology and Plant Systematics and Identification.
	Australian focussed training; OR	40		
	Queensland focussed training	50		
Regional ecosystem training by a recognised and qualified institution, such as the Queensland Herbarium.	Nil	5	5	The QLD Regional Ecosystem Framework and Application (QLD Herbarium 2018)
Member of a recognised group/certificate program relevant to ecology/botany, where skills/knowledge are demonstrated to be granted membership e.g., Certified Environmental Practitioner (CEnvP) Program	Nil	5	0	N/A
Lead author of articles/papers published in peer-reviewed journals concerning Qld flora surveys, Qld plant identification, or Qld *threatened plants or near threatened plants*	10 points per paper to a maximum of 50 points	50	0	N/A
Component 2: Field experience				
Experience within the last 2 years and a total of at least 5 years at leading flora surveys in a field-based environment at a rate of no less than 5 comprehensive botanical surveys that focus on locating and identifying *threatened plant* or *near threatened plants*, per year.	General (not Aust. based); OR	40	60	Daniel has been conducting field-based flora surveys in Queensland and NSW for more than 5 years, beginning in November 2017. Daniel has led at least 5 comprehensive botanical surveys each year.
	Australian based survey experience; OR	50		
	Qld based field flora surveys experience	60		
Number of plant specimens you have collected that have been retained/incorporated into the Queensland Herbarium collection:	5 points per plant specimen retained/incorporated, to a maximum of 40 points	40	40	Daniel has submitted at least 15 specimens retained by the Queensland Herbarium.
TOTAL			**155**	

2.4 Survey timing

ARTC commissioned an initial reconnaissance survey to be undertaken by EMM on 8 March 2023, as a part of the broader G2H project. This survey was done to identify any possible constraints within the proposed disturbance footprint for the cabling. As a result of the surveys, the CEEVNT species *Digitaria porrecta* was observed within the proposed disturbance footprint and surrounding grasslands and a protected plants survey was advised. Surveys were then proposed to be undertaken in the warmer spring/summer survey period to ensure good survey conditions.

Protected plant surveys were conducted on 18 and 19 December 2023, and again on 22 February 2024. All surveys were led by Daniel Kelly. Inadequate rainfall in the Toowoomba area prior to November 2023 resulted in poor growing conditions for the target species within the survey area, particularly during the months of August, September and October where there was a combined 22 mm of rainfall (BOM 2024). During the month of November, a total of 115.2 mm of rain fell at the Toowoomba Airport weather station (station 041529). This allowed for optimal growing conditions for the rain-responsive target grass and forb species (BOM 2024). Conditions between November 2023 and February 2024 were excellent, with many native flora species flowering in the natural grasslands (EMM unpublished data). The likelihood of occurrence for threatened flora species and optimal survey timing for species is discussed in Section 3.1.3.

2.5 Land access

Access was permitted across most of the clearing impact area; however, access was restricted or not sought for the land parcels listed in Table 2.2, with justification.

Table 2.2 Land access

Lot/plan	Justification
485AG3377	This particular lot had not been previously contacted by the project team, leading to the absence of contact details for the landowners on file. Despite searches across various databases, attempts to retrieve their contact information proved unsuccessful. An ARTC land access representative visited this lot and nearby properties in an effort to gather information, although there was no residence on this lot. Information from neighbours indicated that the owner resides elsewhere in Queensland and rarely visits the property. Unfortunately, due to the time constraints of the survey, obtaining a Land Access Agreement for this lot proved to be unattainable.
61SP122171 2RP34933 1AG3345 3RP34912	These lots are situated in the west of the clearing impact area and are a part of an active Queensland Rail (QR) railway. QR require the correct safety inductions and a minimum 40 business days as notice before access can be granted. Finding a window of good growing conditions for the target species was difficult due to the poor rainfall prior to November 2023 (see Section 2.4) and the predicted dryer El Niño conditions. If EMM waited 40 minimum business days, survey conditions may not have been optimal.
61AG3184 117AG1535 118AG1535	EMM considered these land parcels highly modified environments as spatial imagery indicated slashing or cropping occurs. Therefore, access was not requested.
301G1861 305G1861 2SP169808 3SP169808	EMM considered these areas highly modified environments as they are private residencies which are regularly mown and maintained. Therefore, access was not requested for these land parcels.
2RP55460 33SP312428 29SP294200	Access was sought by ARTC representatives, but denied by landholders. EMM considered these land parcels highly modified environments as spatial imagery indicated slashing or cropping occurs. Therefore, access was not pursued further.

3 Results

3.1 Desktop survey results

3.1.1 High risk trigger mapping

Desktop assessments identified a small area of the disturbance footprint falls within high-risk trigger mapping (Figure 1.3 and Appendix A). The CEEVNT species, *Digitaria porrecta*, was known to occur in proximity to the clearing impact area based on knowledge from previous surveys in the area (Redleaf Environmental 2022; EMM 2023). Additionally, locations of the CEEVNT species *Leuzea australis*, *Picris evae* and *Thesium australe* were provided to EMM ecologists by Brad Jeffers (AusEcology), who had been conducting botanical surveys for ARTC in the local area (B. Jeffers pers. comm. 2024).

High-risk trigger mapping occurs in the lots shown in Table 1.1 with 8.31 ha in the clearing impact area and approximately 0.094 ha intersecting the disturbance footprint.

3.1.2 Regional ecosystems and habitats

Regulated vegetation mapping shows one least concern regional ecosystem (RE) occurring within the clearing impact area in two places:

- RE 11.8.5 *Eucalyptus orgadophila open woodland on Cainozoic igneous rocks.*

The extent of the two patches of RE 11.8.5 is shown in Figure 1.3 and Figure 3.1. One patch is mapped as high value regrowth, whilst the other is mapped as remnant. The remaining clearing impact area is currently mapped as non-remnant vegetation. EMM confirmed RE 11.8.5 was present on the hills whilst non-remnant native grassland was located on the lower gradient colluvial/alluvial areas of the survey area (as seen in Photograph 3.1).

It should be noted that additional assessments undertaken as a part of the Inland Rail G2H project by EMM Consulting have identified areas of the '*Natural Grasslands on Basalt and Fine-textured Alluvial Plains of Northern New South Wales and Southern Queensland*' threatened ecological community (TEC). The TEC occurs as remnant patches of RE 11.3.21 and RE 11.8.11; potential impacts to the TEC have been assessed via a self-assessment process (EMM 2024). Due to the proponent agreeing to utilise horizontal directional drilling to tunnel beneath the TEC area, there are no significant impacts to the TEC expected.

Photograph 3.1 Native grassland habitat with RE 11.8.5 on the basaltic rises (EMM 2023)

3.1.3 Potentially occurring CEEVNT flora

Desktop searches (provided in Appendix A) identified 35 CEEVNT flora species. Four categories were used to assess the likelihood of habitat occurrence within the clearing impact area. The criteria used to assign each category are as follows:

- Known – the species is known to occur within the clearing impact area.
- Likely – the species was identified in database searches or through local expertise, records exist within the 5 km database study area, and suitable habitat is present within the clearing impact area.
- Potential – the species was identified in database searches or through local expertise, suitable habitat is present within the clearing impact area, but no records exist within the 5 km database search area.
- Unlikely – the species was identified in database searches, but no records are present within the survey area and no suitable habitat is present within the survey area.

Two species were assessed as known, three species were assessed as likely, and six species were assessed as having the potential to occur within the clearing impact area. These species are hereby referred to as the target species. Table 3.1 lists the 11 target species and includes their status under the EPBC Act and NC Act, the source of the database records, the likelihood of the habitat occurring within the clearing impact area, habitat requirements, and the optimal time of year for survey. Previous surveys undertaken by both Redleaf Environmental in 2022 and EMM Consulting in 2023 identified *Digitaria porrecta* within 100 m of the proposed impact area. This species was the primary target of the protected plant surveys.

Table 3.1 Target threatened flora species

Scientific name	Common name	Source	EPBC Act status[1]	NC Act status[2]	Likelihood and habitat requirements	Target survey period
Bothriochloa bunyensis	Satin-top Grass	PMST & WildNet	VU	V	Potential - Satin-top Grass grows on fertile basaltic soils on the upper slopes and crests of hills at altitudes between 600–1,100 m above sea level (DEWHA 2008a). Although the soil is basaltic, the elevation of the site sits between 400–500 m above sea level.	Flowers January to May (Simon and Alfonso 2011).
Clematis fawcettii	Stream Clematis	PMST & WildNet	VU	V	Potential - This species is associated with dry rainforest, subtropical rainforests, the ecotone of dry rainforests and to a lesser extent eucalypt forests with rainforest species in the understorey. Stream Clematis can be found growing in basalt derived soils where there are suitable canopy gaps, or on the margins of SEVT (DEWHA 2008b).	Surveys for this species can be conducted any time of the year (DEWHA 2008b).
Cyperus clarus	A sedge	WildNet	-	V	Likely - *Cyperus clarus* inhabits open woodlands or grasslands in heavy soils derived from basalt (DES 2024a). This species has been previously recorded in the vicinity of Gowrie as a part of the G2H project.	Flowers over the spring and summer periods (DES 2024a).
Dichanthium queenslandicum	King Bluegrass	PMST	EN	V	Potential - This species is primarily associated with grassland communities (particularly those dominated by other blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.) on black cracking soils (TSSC 2013a).	Flowers November to January (Simon and Alfonso 2011).
Dichanthium setosum	Bluegrass	PMST	V	-	Potential - The species is primarily restricted to heavy volcanics such as red-brown and heavy black soils. However, it can be found in a broad range of habitats from remnant woodlands to roadside vegetation and pasture (DEWHA 2008c).	Flowering occurs between November to June (Simon and Alfonso 2011). However, the species primarily flowers during summer (DEWHA 2008c).

Table 3.1 Target threatened flora species

Scientific name	Common name	Source	EPBC Act status[1]	NC Act status[2]	Likelihood and habitat requirements	Target survey period
Digitaria porrecta	Finger Panic Grass	WildNet	-	NT	Known – Previously observed in proximity to the clearing impact area.	Flowers have been recorded from February to July (Simon and Alfonso 2011).
Homopholis belsonii	Belson's Panic	PMST	VU	E	Potential - *Homopholis belsonii* occurs in dry woodland habitats on a range of soil types at an altitudinal range between 200–520 metres. This species is generally found growing at the base trees and under the shade of branches and other shaded areas (DES 2024b).	Flowers February to May, feasibly also November to December (Simon and Alfonso 2011; Leigh et al. 1984).
Lepidium peregrinum	Wandering Peppercress	PMST & WildNet	EN	-	Potential - This species has been recorded in a range of habitats but prefers riparian forests and the ecotones between rainforest and woodland in elevated areas (DoE 2014b).	Flowering from January to April (Scarlet 1999).
Leuzea australis	Austral Cornflower	PMST & WildNet	VU	V	Known – *Leuzea australis* grows in eucalypt open forest with a grassy understory and in grasslands on black clay soil. It is often found on roadsides and on road or rail reserves (DES 2024c). B. Jeffers provided a GPS location of individuals within the clearing impact area in early 2024 (B. Jeffers pers. comm. 2024).	Flowers Spring to Autumn (Marlow 1998).
Picris evae	Hawkweed	PMST	VU	V	Likely - Hawkweed primarily occurs in association with *Dichanthium* sp., on rich dark or reddish soils, in open Eucalypt woodland with a grassy understorey (DEWHA 2008d). B. Jeffers provided a GPS location of an individual approximately 100 m south of the clearing impact area in early 2024 (B. Jeffers pers. comm. 2024).	Flowers in spring and summer (Leiper et al 2017).
Thesium australe	Austral toadflax	PMST	VU	V	Likely - Austral Toadflax grows in moist areas of grassland or woodland on skeletal soils, or heavy alluvium and black cracking clays (DES 2024d). As the species exhibits broad habitat preferences, it was surveyed for throughout the disturbance footprint. B. Jeffers provided a GPS location of an individual some 200 m north of the clearing impact area in early 2024 (B. Jeffers pers. comm. 2024).	*Thesium australe* has been recorded flowering from October to April (DES 2024d).

Notes: 1. EPBC Act status: CE- critically endangered, E – endangered, V – vulnerable

2. NC Act status: CE – critically endangered, E – endangered, V – vulnerable, NT – near threatened

3.2 Field survey results

A timed meander was completed over two days within the eastern portion of the clearing impact area in December 2023; an additional timed meander was completed in the western portion of the clearing impact area in February 2024. In general, the clearing impact area in the west consisted of non-remnant grassland, with high levels of exotic weed cover. The clearing impact area was surveyed systematically to cover as much ground as possible. A small area of natural grassland, containing several *Digitaria porrecta*, was also identified, potentially representing RE 11.3.21. A large population of *Picris evae* was identified in the clearing impact area during the survey; advice was sought from the Queensland Herbarium while in the field and it was determined that representative counts of the species would be conducted in ten 1 x 1 m quadrats across a 50 m transect (J. Neldner pers. comm. 2024). An average density was then obtained and extrapolated to the entire area of occupancy that fell within the clearing impact area.

The clearing impact area in the east comprised primarily non-remnant grassland, though small areas of remnant native grasslands RE 11.3.21 and RE 11.8.5 (dominated by *Eucalyptus orgadophila*) also occurred. As the ground layer was relatively contiguous in its species composition between the open woodland RE 11.8.5 and non-remnant areas, and the target species were predominantly groundcover species, the site was surveyed systematically to cover as much ground as possible. This was also done to ensure an accurate count of *Digitaria porrecta,* as it is known to occur across the site. Weed cover across the clearing impact area was generally quite low, with the most consistent weed species being *Glandularia aristigera* (Mayne's Pest). A species list consisting of the native and introduced species observed on site can be found in Appendix D.

A total of 105 flora species were identified during the protected plant surveys. Four CEEVNT species were observed in the clearing impact area:

- *Digitaria porrecta* (Near Threatened – NC Act) observed in both western and eastern sections
- *Eucalyptus argophloia* (Vulnerable – NC Act) observed in the eastern section
- *Leuzea australis* (Vulnerable – NC Act) observed in the eastern section
- *Picris evae* (Vulnerable – NC Act) observed in the western section.

Queensland Herbarium confirmations of CEEVNT species identifications can be found in Appendix E.

A spatial package with location data will be provided for all CEEVNT species records within the clearing impact area.

3.2.1 *Digitaria porrecta*

Two hundred and forty-six individual *Digitaria porrecta* were present within the clearing impact area, of which 21 were located within the 5 m-wide disturbance footprint. All recorded individuals were in the process of flowering and were in good health due to the optimal rainfall that occurred the month prior. The *Digitaria porrecta* (Photograph 3.2) were all situated in native grasslands with low weed cover where the dominant species included *Dichanthium sericeum, Panicum queenslandicum, Aristida leptopoda, Bothriochloa biloba, Digitaria divaricatissima* and *Themeda avenacea*.

The surface geology associated with *Digitaria porrecta* was represented by heavy, black, clay soils on a gradual slope (<5%). These areas generally had a northerly aspect, draining towards the floodplain associated with Gowrie Creek. The ground-truthed potential habitat areas and individual records can be observed in Figure 3.1.

Photograph 3.2 *Digitaria porrecta* found in the native grassland (EMM 2023)

3.2.2 *Eucalyptus argophloia*

A plantation of roughly 30 *Eucalyptus argophloia,* planted in rows, were observed on the northern edge of the clearing impact area (see Figure 3.1). Three individuals were present within the clearing impact area. As this species has been intentionally planted (i.e. not occurring 'in the wild') and is outside of its known natural distribution, it has not been considered further in this report.

Photograph 3.3 *Eucalyptus argophloia* planted in evenly spaced rows (EMM 2023).

3.2.3 *Leuzea australis*

A small patch of 15 *Leuzea australis* were observed within the clearing impact footprint, 6 of which were within the disturbance footprint. Different stages of maturity were present in the population, with several plants flowering (Photograph 3.4), several bearing seedheads, young plants growing flower spikes and old, senesced individuals all being present. All plants appeared to be in good health with minimal impacts from disease or insect attack. The individuals were growing on a grassy slope (roughly 10%) dominated by *Themeda triandra* and a patch of *Rubus parvifolius.* The soils were noted as being basalt derived with some large surface rocks present.

Habitat in the immediate surroundings of these records has been impacted by cropping to the east, grazing to the south on Lot 35 AG4088, roadside excavations along Krienkes Road and a weedy drainage line to the north. Therefore, the known habitat area for this patch of *Leuzea australis* as mapped in Figure 3.1 is quite small.

No specimens were submitted to the Queensland Herbarium for this species due to the small size of the population; diagnostic photographs were sent to A.R. Bean (Senior Botanist at the Queensland Herbarium) for confirmation (Appendix E).

Photograph 3.4 *Leuzea australis* growing within the disturbance footprint (EMM 2023).

3.2.4 *Picris evae*

A large population of *Picris evae* was found in the western portion of the clearing impact footprint, with at least 50 individuals, and approximately 0.17 ha of habitat for the species found within the disturbance footprint. As discussed above, the population size within the clearing impact area (approximately 500,000 plants – see Table 3.2) was estimated by calculating the average density from ten 1 x 1 m quadrats along a 50 m transect, approximately 15 m south of Drapers Road, and extrapolating to the area of occupancy (2.08 ha of habitat was present within the clearing impact area (shown on Figure 3.1)). Details from each quadrat are presented in Table 3.2. Different stages of maturity were present in the population, with many plants flowering and bearing seed (Photograph 3.4), younger plants approaching maturity and growing flowers, hundreds of seedlings and old, senesced individuals all being present. The individuals were growing in a relatively flat (<5% slope) area of disturbed grassland, with many exotic weeds present.

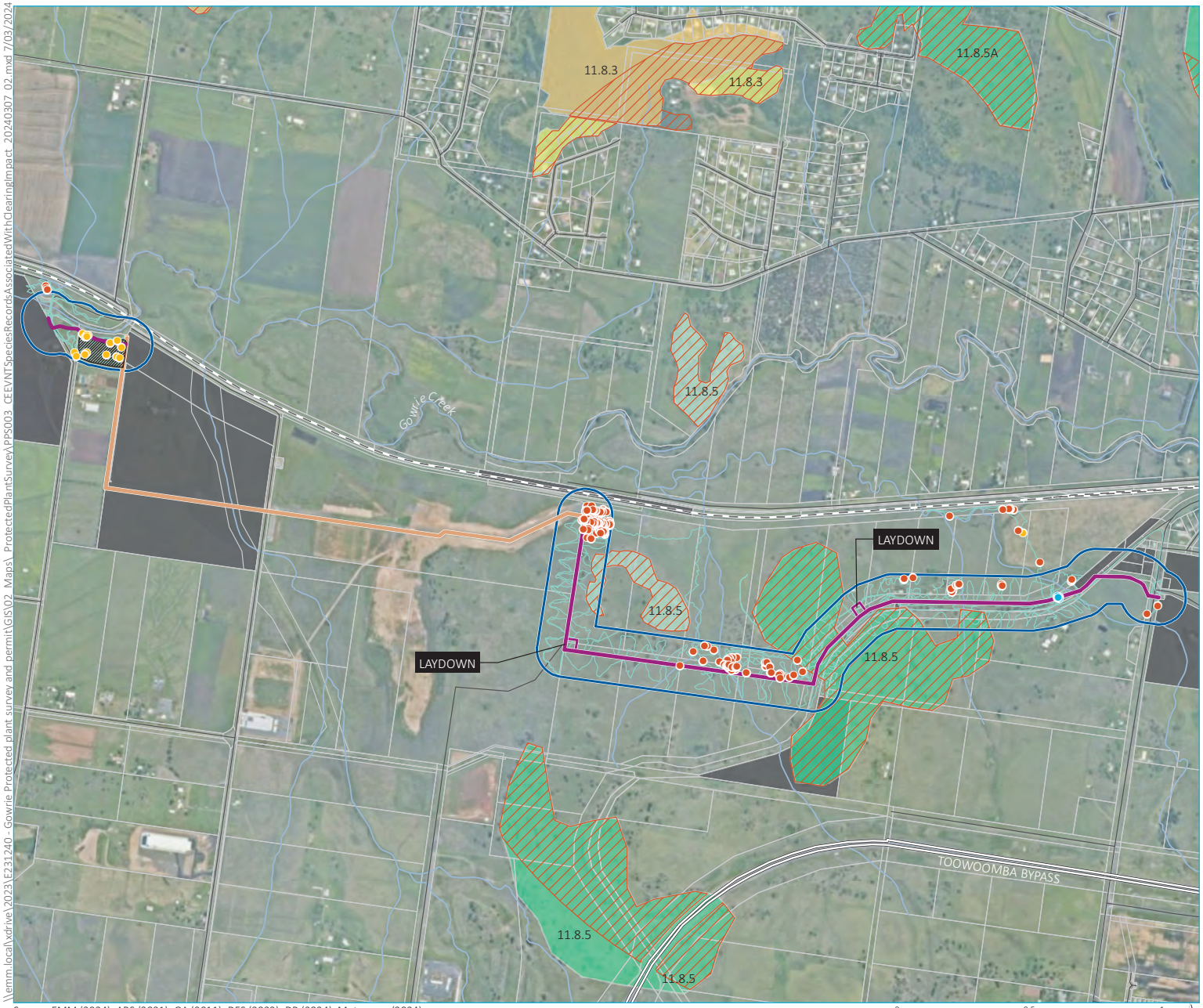
Photograph 3.5 Mature *Picris evae* growing within the disturbance footprint

Table 3.2 Representative density of *Picris evae* along a 50 m transect

1 x 1 m Quadrat ID	Number of *Picris evae* per m^2	Notes
PICRIS 1	8	Mature flowering plants
PICRIS 2	16	Mature flowering plants
PICRIS 3	10	Mature flowering plants
PICRIS 4	26	Mature flowering plants and seedlings
PICRIS 5	30	Mature flowering plants and seedlings
PICRIS 6	25	Mature flowering plants and seedlings
PICRIS 7	80	Mature flowering plants, many seedlings
PICRIS 8	10	Mature flowering plants
PICRIS 9	16	Mature flowering plants
PICRIS 10	18	Mature flowering plants, some seedlings
Average number	23.9 individuals per m^2	Average density x extent of population in clearing impact area (20,947.3 m^2) = estimated population of ~500,000 individuals.

Habitat in the immediate surroundings of the population has been impacted by Drapers Road (which runs through the population), slashing of the roadside verge of Leesons Road and extensive cropping to the west. The locations of individual plants recorded in spatial software, as well as the total extent of the population, is visible in Figure 3.1.

No specimens were submitted to the Queensland Herbarium for this species; diagnostic photographs were sent to A.R. Bean (Senior Botanist at the Queensland Herbarium) for confirmation (Appendix E).



KEY

- Disturbance footprint
- InterlinkSQ section
- Clearing impact area (survey area)
- Protected plant trigger mapping
- Exempt area (no access)
- *Picris evae* habitat
- Protected plant meander

CEEVNT species

- *Digitaria porrecta*
- *Leuzea australis*
- *Picris evae*

Regulated vegetation (VM status)

- Remnant - of concern
- High value regrowth - of concern
- Remnant - least concern
- High value regrowth - least concern

Existing environment

- Rail line
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary

Source: EMM (2024); ABS (2021); GA (2011); DES (2023); DR (2024); Metromap (2024)

0 0.5 1 km

GDA2020 MGA Zone 56

N

CEEVNT species records associated with the clearing impact area

Telstra/Nextgen Cable Realignment
Gowrie Junction
Protected Plant Survey Report
Figure 3.1

EMM creating opportunities

\\emm.local\xdrive\2023\E231240 - Gowrie Protected plant survey and permit\GIS\02_Maps_ProtectedPlantSurvey\PPS003_CEEVNTSpeciesRecordsAssociatedWithClearingImpact_20240307_02.mxd 7/03/2024

4 Species profiles

4.1 *Digitaria porrecta* – Finger Panic Grass

Digitaria porrecta occurs in four disjunct areas extending over 1,000 km. In Queensland, it occurs in the Nebo district, south-west of Mackay; the Central Highlands between Springsure and Rolleston; and from Jandowae south to Warwick. In NSW, it occurs from near Inverell south to the Liverpool Plains near Coonabarabran and Werris Creek (Figure 4.1). It is a perennial, erect grass growing to 70 cm tall with a compound inflorescence upwards of 27 cm in size. The inflorescence consists of a panicle of racemes each bearing 10–20 florets. Florets are generally paired with the spikelet consisting of a sterile basal floret (or rarely male) and a fertile floret. This species is closely related to both *Digitaria coenicloa* and *Digitaria divaricatissima*, however, differs by its rebranching inflorescence (Simon & Alfonso 2011).

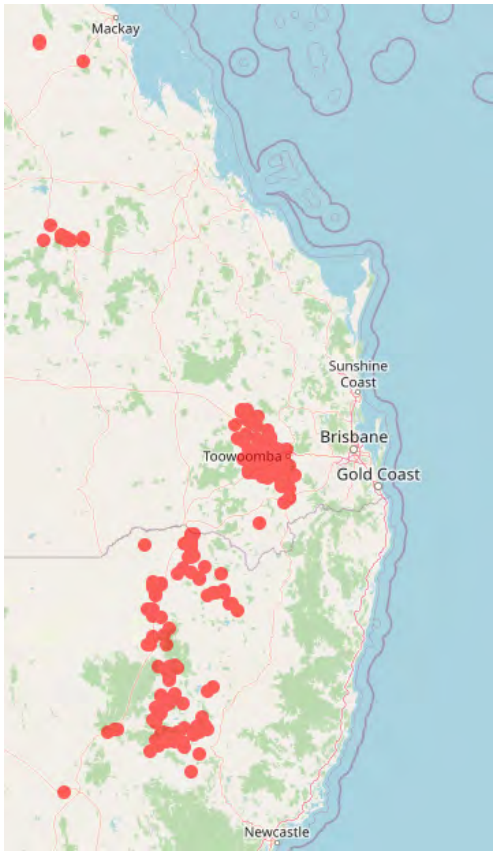


Figure 4.1 Public records indicating the distribution of *Digitaria porrecta* (ALA 2024)

4.1.1 Important populations

As this species is not listed as threatened under the EPBC Act there are no important populations listed for *Digitaria porrecta*.

4.1.2 Reproduction

Digitaria porrecta seeds from February to July but also reproduces vegetatively by dying back to the tussock base, from which it resprouts in summer. As the tussock ages, the central portion dies, and the resultant ring of plantlets eventually separate and become independent tussocks (Simon & Alfonso 2011; DES 2024e). EMM has recorded the species flowering in December.

4.1.3 Ecology and habitat

Digitaria porrecta occurs in several disjunct population centres with appropriate heavy soils. In Queensland these localities are all within the Brigalow Belt bioregion. The species occurs in tussock grassland or open woodland of *Eucalyptus populnea* or *E. tereticornis*, invariably on heavy, cracking clays, sometimes of alluvial origin. The climate is subtropical and seasonal, often with extended periods of drought (DES 2024e).

4.1.4 Threatening processes

The main identified threats to *Digitaria porrecta* are clearing and habitat fragmentation, fire, trampling and grazing by livestock, physical disturbance by machinery, and urban expansion. Competition from introduced grasses such as *Chloris gayana* and *Urochloa panicoides* also present potential threats (DES 2024e).

4.2 *Leuzea australis* – Austral Cornflower

Leuzea australis is listed as Vulnerable under the Federal EPBC Act and the Queensland NC Act. It is an erect, herbaceous perennial growing to 60 cm high. Stems are covered with woolly hairs. Leaves are toothed to deeply pinnatifid (cut about half the width of the leaf blade into lobes that are spaced out along the midrib), lower leaves are 18 cm long, 6 cm wide, reducing in size along the stem with the upper leaves few, smaller and nearly stalkless. Flowers are clustered into terminal heads, 36 cm in diameter, the outer and intermediate bracts are ovate and rough to touch (DEWHA 2008e).

4.2.1 Important populations

DCCEEW does not define locations of important populations for the species. The total population size and extent of occurrence of this species are unknown; there are historical records of the species from as far south as Victoria, but its current distribution appears to be limited to Queensland, from areas west of Gladstone to areas close to the Queensland-New South Wales border (Figure 4.2).

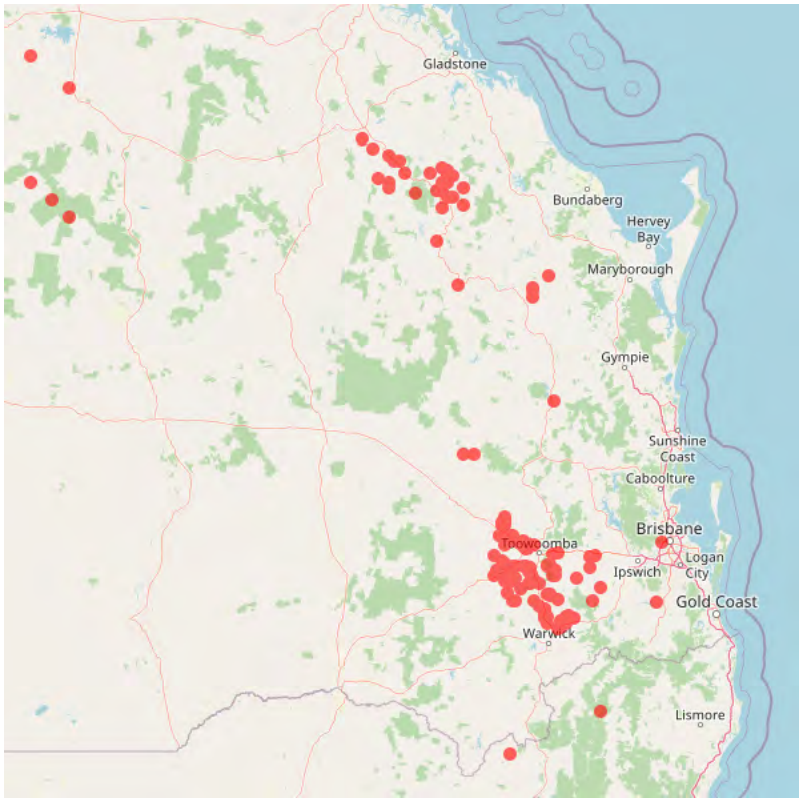


Figure 4.2 Public records indicating the distribution of *Leuzea australis* (ALA 2024)

4.2.2 Reproduction

Flowering occurs in February, October, November and December. Seedlings have been recorded in November (DEWHA 2008e).

4.2.3 Ecology and habitat

Leuzea australis grows in eucalypt open forest with grassy understory on roadsides and on road reserves with *Chloris gayana, Cirsium vulgare, Eucalyptus tereticornis* and *Angophora floribunda* on black clay soil (DEWHA 2008e).

4.2.4 Threatening processes

The main potential threats to *Leuzea australis* include broad-scale vegetation clearing, invasion by exotic weeds, grazing pressure and roadworks (DEWHA 2008e).

4.3 *Picris evae* - Hawkweed

Picris evae is listed as Vulnerable under the Federal EPBC Act and the Queensland NC Act. It is an erect annual herb growing 1.3–1.7 m high. Leaves are 2.5–15 cm long, 4–30 mm wide, margins entire to toothed, stalkless, sparsely covered with split-ended hairs, and mostly grow around the base of the plant. Flower heads are yellow, 8–10 mm wide, with hairs along the midrib of the bracts. The fruits are 5–8 mm long and the beak is long and mostly curved (DEWHA 2008d). The center of the species distribution appears to be located in the area around Toowoomba, in Queensland (Figure 4.3).

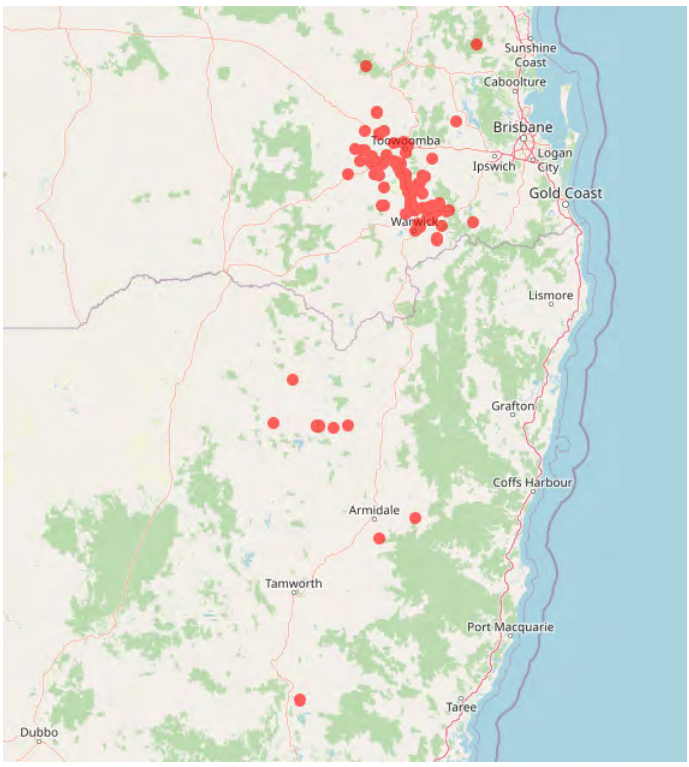


Figure 4.3 Public records indicating the distribution of *Picris evae* (ALA 2024)

4.3.1 Important populations

DCCEEW does not define locations of important populations for the species. The total population size and extent of occurrence of this species are unknown.

4.3.2 Reproduction

Flowering occurs in February, October, November and December. Seedlings have been recorded in November (DEWHA 2008e). EMM recorded flowering individuals and seedlings in February 2024.

4.3.3 Ecology and habitat

Picris evae occurs in Eucalyptus open woodland with a grassy understorey composed of *Dichanthium spp*. Upper stratum species include *Eucalyptus melliodora*, *E. crebra*, *E. populnea*, *E. albens*, *Angophora subvelutina*, *Allocasuarina torulosa*, and *Casuarina cunninghamiana*. Collections have been made along roadsides and in cultivated areas, such as paddocks, on black, dark grey or red-brown soils, reddish clay-loam or medium clay soils (DEWHA 2008d, and references therein).

4.3.4 Threatening processes

The main identified threats to *Picris evae* include weed invasion, inappropriate fire regimes, habitat fragmentation and clearing of vegetation for cropping and grazing (DEWHA 2008d).

5 Impact management plan

This section of the report has been prepared in accordance with Section 6.2 of the Assessment Guidelines (DES 2021), requiring the provision of an Impact Management Plan with a clearing permit application. The Impact Management Plan has been developed to demonstrate how avoidance and mitigation measures have been applied and assess potential for residual impacts to occur. The following information is included:

- the nature of the impacts
- avoidance and minimisation of impacts
- the proposed management of potential impacts
- justification for proposed management of impacts.

5.1 Nature of the proposed impact

Potential impacts associated with the Project include:

- disturbance of surface vegetation and excavation of the soil during trenching operations
- slashing of native vegetation, including grasses
- temporary stockpiling of soil adjacent to the trench
- vehicles and machinery driving along a 5 m wide corridor, and personnel moving on foot in the same area
- the introduction and/or spread of weeds.

Ground disturbance works will occur over an estimated 11-week period. The main disturbance relevant to the CEEVNT species will be the temporary removal of grasses and topsoil, and the excavation of the trench required to install the new cable. Stockpiling of the excavated grass and soil will be immediately adjacent to where it was removed from the ground, avoiding known locations of threatened species. As far as practicable, the trenching contractors will attempt to preserve the soil profile, and avoid mixing topsoil and subsoil, which will be stored on opposite sides of the trench while cables are being laid. A small amount of bedding material (sand) will be deposited in the bottom of the trench and infilled around the cables. This will then be buried with excavated subsoil, and the preserved topsoil and grasses will then be backfilled over the cable in such a way as to replicate the original conditions as closely as possible. Any extra subsoil material will be distributed evenly nearby, avoiding burial of existing ground vegetation. The trench will be progressively backfilled to ensure it isn't left open overnight.

The known populations of *Leuzea australis* and *Picris evae* will be avoided using horizontal directional drilling (HDD) to tunnel beneath the locations in which they occur. Contractors will be provided with GPS locations of CEEVNT species and also suitable entry and exit points for HDD works on site.

Given the temporary nature of the disturbance, it is not expected the CEEVNT species will have any long-term decline in population once the avoidance, minimisation and management of the impacts are undertaken.

Total maximum impacts are outlined in Table 5.1.

Table 5.1 Maximum clearing impacts (excluding Interlink property section)

Impact type	Clearing impact
Total disturbance footprint area (including all areas subject to horizontal directional drilling)	~1.72 ha
Total ground disturbance from trench excavation	~0.17 ha
Total area of disturbance footprint in known threatened species habitat (note disturbance to *Leuzea australis* and *Picris evae* habitat will be avoided using horizontal directional drilling)	*Digitaria porrecta* – 0.50 ha Total – 0.50 ha
Total disturbance from trench excavation in known threatened species habitat	*Digitaria porrecta* – 0.05 ha Total – 0.05 ha
Number of *Digitaria porrecta* in disturbance footprint	21
Number of *Leuzea australis* in disturbance footprint	9
Number of *Picris evae* in disturbance footprint	~50

5.2 Avoidance, minimisation and management of impacts

- The disturbance footprint will be clearly demarcated using high visibility tape, survey pegs or other appropriate methods.
- Exclusion zones will be clearly delineated prior to works starting to identify ecologically sensitive areas, and locations for horizontal directional drilling. Vegetation clearing (slashing) will be limited as much as possible, especially in ecologically sensitive areas.
- Excavated subsoil, topsoil and grasses will be retained whilst trenching, and topsoil and grasses kept separately from subsoil. Preserved subsoil, topsoil and grasses will be backfilled over the cable in such a way as to replicate the original on-site conditions as closely as possible. This will maximise the viability of the existing seedbank and allow for natural regeneration of the native vegetation. Direct seeding of suitable native grasses that occur in adjacent areas will be conducted; EMM will provide ARTC with a list of suitable species prior to construction.
- The disturbance footprint will be narrowed where possible to avoid *Digitaria porrecta* individuals. As the plants are widely dispersed both within the 5 m wide corridor and adjacent areas it will not be possible for all individuals to be avoided. Therefore, a permit is being sought for the maximum extent of 21 individuals.
- The population of *Leuzea australis* at the eastern end of the alignment will be avoided by HDD; the cable at their location will tunnel beneath the entire population. These plants will be clearly identified and fenced off to ensure both direct and indirect impacts do not occur.
- Similarly, the population of *Picris evae* at the western end of the alignment will be avoided by HDD; the cable at their location will tunnel beneath the entire population. These plants will be clearly identified and fenced off to ensure both direct and indirect impacts do not occur.
- EMM will provide Telstra contractors with a 'field guide' to the CEEVNT species (including photographs and a written description for each) they may encounter during construction operations. Telstra contractors will add this information to their construction methodology and discuss these matters during pre-start meetings (G Foelz, pers comm).

- Hygiene protocols (weed washdowns of vehicles and machinery) will be implemented to reduce the potential for introduction or spread of weeds. The number of vehicles entering the clearing impact area will be minimised as much as possible.
- Sediment and erosion control measures will be put in place to ensure no sediment runoff goes into adjacent waterways.
- Construction equipment is to be well maintained to minimise risk of chemical spill or leakage.
- Refuelling will not take place within 50 m of a watercourse or an ecologically sensitive area.
- Trenches will not be left open overnight and sections that are open during the day will be backfilled immediately after works are completed. Entry and exit holes for the bores will have fencing surrounding them whilst they are open. Any open excavations will be checked for wildlife first thing in the morning.
- Monitoring will occur one month and three months post backfilling and rehabilitation of the trench to check that the grasslands are re-establishing, and no erosion is occurring. If regeneration has not commenced, then more direct management will be required, such as further reseeding and watering.

5.2.1 Weed management

Disturbance of vegetation (including existing weeds) is required, therefore appropriate control measures will be put in place to avoid the spread of weeds occurring. Weeds will be managed under protocols set out under the Queensland *Biosecurity Act 2014*.

5.3 Justification of the impact

As stated in Section 1.3.1, the imperative need to relocate the existing Telstra and Nextgen cables arises from their susceptibility to the proposed Inland Rail and InterlinkSQ development works in the area. Given the critical nature of these networks, additional challenges such as cable length were encountered during the design and route selection. The efficiency of these cables is significantly impacted by any increase in length, prompting both Telstra and Nextgen to resist proposed routes that would add substantial length to their cables.

The proposed route for the Project underwent three revisions before finalisation. Alternative options were deemed to be unfeasible for various reasons, including:

- conflicts with the planned Inland Rail works and adjoining Interlink development future stages causing the majority of the route to be within private property if simply shifted to the south,
- substantial increases in cable length when following only road corridors to the north of the existing alignment, and
- clashes with the previously relocated native grasses from the Interlink site during water/sewer relocations.

The chosen route represents the most optimal solution, ensuring minimal disruption to critical telecommunication infrastructure while aligning with environmental and logistical considerations. As much as possible, the disturbance footprint avoids sensitive environmental areas, avoids the clearing of trees and follows existing road reserves.

As potential impacts to CEEVNT species are minor in scope and temporary in nature. If the proposed mitigation measures are followed, it is considered that the planned works will not have a significant impact on any CEEVNT flora species, and no net loss will occur.

6 Conclusion

Timed meanders were undertaken in December 2023 and February 2024 to cover all habitat types within the clearing impact area and survey for the presence of the target threatened flora species. 246 individual *Digitaria porrecta*, 15 *Leuzea australis* and a large population of *Picris evae* were observed in the clearing impact area. Therefore, this report has been prepared in support of a clearing application and measures to avoid and/or mitigate impacts on these threatened flora species have been presented above.

Based on a worst-case 5 m wide disturbance footprint that will include the trenching and associated activities, it is estimated up to 21 *D. porrecta* may be impacted. Avoidance measures for this species will include narrowing the corridor where possible to avoid the protected plants; a section of natural grassland in the eastern portion of the clearing impact area will also be avoided using horizontal directional drilling. Populations of *Leuzea australis* and *Picris evae* will be avoided using horizontal directional drilling; the cable in these locations will tunnel beneath the entire population. These plants will be clearly identified and fenced off to avoid both direct and indirect impacts to the populations.

Excavated subsoil, topsoil and grasses will be retained whilst trenching, and topsoil and grasses kept separately from subsoil. Preserved subsoil, topsoil and grasses will be backfilled over the cable in such a way as to replicate the original on-site conditions as closely as possible. This will maximise the viability of the existing seedbank and allow for natural regeneration of the native vegetation. Direct seeding of suitable native grasses that occur in adjacent areas will also be conducted to facilitate recovery post disturbance.

Monitoring will occur one month and then three months post the rehabilitation of the trench to confirm species are regenerating and the soil surface is stable with no erosion occurring.

Overall, no net loss of threatened flora species will occur as a result of the Project.

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Appendix A
Desktop searches

EMM
creating opportunities

A.1 PMST

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 21-Feb-2024

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	46
Listed Migratory Species:	14

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	12
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Banrock station wetland complex	1300 - 1400km upstream from Ramsar site
Narran lake nature reserve	400 - 500km upstream from Ramsar site
Riverland	1200 - 1300km upstream from Ramsar site
The coorong, and lakes alexandrina and albert wetland	1400 - 1500km upstream from Ramsar site

Listed Threatened Ecological Communities		[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat known to occur within area
MAMMAL		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
PLANT		
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Bothriochloa bunyensis		
Satin-top Grass [15961]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis		
Ooline [9828]	Vulnerable	Species or species habitat may occur within area
Clematis fawcettii		
Stream Clematis [4311]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dichanthium queenslandicum King Blue-grass [5481]	Endangered	Species or species habitat may occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Lepidium peregrinum Wandering Pepper-cress [14035]	Endangered	Species or species habitat likely to occur within area
Picris evae Hawkweed [10839]	Vulnerable	Species or species habitat likely to occur within area
Rhaponticum australe Austral Cornflower, Native Thistle [22647]	Vulnerable	Species or species habitat known to occur within area
Sarcochilus weinthalii Blotched Sarcochilus, Weinthals Sarcanth [12673]	Vulnerable	Species or species habitat may occur within area
Sophora fraseri [8836]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat likely to occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area
Tympanocryptis condaminensis Condamine Earless Dragon [87888]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Symposiachrus trivirgatus as Monarcha trivirgatus		
Spectacled Monarch [83946]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Bubulcus ibis as Ardea ibis		
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans		
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status

Title of referral	Reference	Referral Outcome	Assessment Status
Toowoomba to Warwick Raw Water Pipeline	2023/09644		Assessment
Controlled action			
ARG Border Rail Project Moree to Toowoomba QLD	2013/7061	Controlled Action	Further Information Request
Gowrie-Grandchester Rail Corridor Upgrade Investigation	2001/349	Controlled Action	Completed
Gowrie to Grandchester Rail Corridor - Section A Gowrie to Helidon	2002/823	Controlled Action	Completed
Inland Rail Border to Gowrie Project, QLD	2018/8165	Controlled Action	Assessment Approach
Inland Rail Gowrie to Helidon Project, Qld	2017/7882	Controlled Action	Assessment Approach
Toowoomba Bypass Highway Corridor	2003/1143	Controlled Action	Post-Approval
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Inland Rail Border to Gowrie Geotechnical Investigations	2021/8911	Not Controlled Action	Completed
Inland Rail Gowrie to Kagaru Geotechnical Project, QLD	2018/8263	Not Controlled Action	Completed
Wetalla Recycled Water Pipeline - Acland Coal Mine	2008/4045	Not Controlled Action	Completed
Not controlled action (particular manner)			
Construction & Operation 275/330kV Transmission Line	2006/2820	Not Controlled Action (Particular Manner)	Post-Approval

Bioregional Assessments

SubRegion	BioRegion	Website
Maranoa-Balonne-Condamine	Northern Inland Catchments	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact us page.

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A.2 Protected Plant trigger map

15/12/2023 07:48:04
Longitude: 151.8756 Latitude: -27.5017

Protected Plants Flora Survey Trigger Map

Legend

- Coordinates
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets

N

0 480 960 1,440 1,920 2,400 m

This product is projected into:
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

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Queensland Government

Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where threatened and near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see section 89 of the Act.

Please see the Department of Environment and Science webpage on the clearing of protected plants for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the clearing of protected plants for more information.

Queensland Government

A.3 Wildnet search

Queensland Government

WildNet species list

Search Criteria:	Species List for a Specified Point
	Species: All
	Type: All
	Queensland status: All
	Records: All
	Date: All
	Latitude: -27.5017
	Longitude: 151.8756
	Distance: 10
	Email: kvercoe@emmconsulting.com.au
	Date submitted: Friday 15 Dec 2023 07:50:56
	Date extracted: Friday 15 Dec 2023 08:00:03

The number of records retrieved = 1629

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			31
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		2
animals	amphibians	Hylidae	*Litoria balatus*	slender bleating treefrog		C		11
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		34
animals	amphibians	Hylidae	*Litoria chloris*	orange eyed treefrog		C		1
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		45
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		5
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		1
animals	amphibians	Hylidae	*Litoria peronii*	emerald spotted treefrog		C		13
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		7
animals	amphibians	Hylidae	*Litoria wilcoxii*	eastern stony creek frog		C		2
animals	amphibians	Limnodynastidae	*Limnodynastes dumerilii*	grey bellied pobblebonk		C		4
animals	amphibians	Limnodynastidae	*Limnodynastes fletcheri*	barking frog		C		2
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		80
animals	amphibians	Limnodynastidae	*Limnodynastes salmini*	salmon striped frog		C		3
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		12
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		22/1
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		4
animals	amphibians	Myobatrachidae	*Crinia signifera*	clicking froglet		C		11
animals	amphibians	Myobatrachidae	*Mixophyes fasciolatus*	great barred frog		C		1
animals	amphibians	Myobatrachidae	*Pseudophryne raveni*	copper backed broodfrog		C		1
animals	amphibians	Myobatrachidae	*Uperoleia fusca*	dusky gungan		C		3
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		673
animals	birds	Acanthizidae	*Acanthiza lineata*	striated thornbill		C		9
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		308
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		395
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		15
animals	birds	Acanthizidae	*Acanthiza sp.*			C		2
animals	birds	Acanthizidae	*Gerygone fusca*	western gerygone		C		1
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		20
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		406
animals	birds	Acanthizidae	*Pyrrholaemus sagittatus*	speckled warbler		C		20
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		330
animals	birds	Acanthizidae	*Sericornis magnirostra*	large-billed scrubwren		C		7
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		155
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		15
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		52
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		C		24
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		124
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		20
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		30
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		297
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		22
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		40
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		11
animals	birds	Accipitridae	*Lophoictinia isura*	square-tailed kite		C		24

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		38
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		83
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		7/1
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		68
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		7
animals	birds	Alcedinidae	*Dacelo leachii*	blue-winged kookaburra		C		1
animals	birds	Alcedinidae	*Dacelo novaeguineae*	laughing kookaburra		C		879
animals	birds	Alcedinidae	*Todiramphus macleayii*	forest kingfisher		C		6
animals	birds	Alcedinidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		6
animals	birds	Alcedinidae	*Todiramphus sanctus*	sacred kingfisher		C		131
animals	birds	Anatidae	*Anas castanea*	chestnut teal		C		2
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		125
animals	birds	Anatidae	*Anas platyrhynchos*	northern mallard	Y			13
animals	birds	Anatidae	*Anas sp.*			C		1
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		566
animals	birds	Anatidae	*Aythya australis*	hardhead		C		61
animals	birds	Anatidae	*Biziura lobata*	musk duck		C		4
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		460
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		56
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		34
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		2
animals	birds	Anatidae	*Spatula rhynchotis*	Australasian shoveler		C		1
animals	birds	Anatidae	*Stictonetta naevosa*	freckled duck		C		4
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		55
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		3
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		SL		4
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	16
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		57
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		19
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		38
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		140
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		13
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		280
animals	birds	Ardeidae	*Egretta sacra*	eastern reef egret		C		1
animals	birds	Ardeidae	*Ixobrychus dubius*	Australian little bittern		C		2
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		35
animals	birds	Artamidae	*Artamus cinereus*	black-faced woodswallow		C		1
animals	birds	Artamidae	*Artamus cyanopterus*	dusky woodswallow		C		4
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		2
animals	birds	Artamidae	*Artamus personatus*	masked woodswallow		C		2
animals	birds	Artamidae	*Artamus superciliosus*	white-browed woodswallow		C		9
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		864
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		754
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		1419
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		1082
animals	birds	Artamidae	*Strepera graculina graculina*	pied currawong (eastern Australia)		C		39

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		7
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		372
animals	birds	Cacatuidae	*Cacatua leadbeateri leadbeateri*	Major Mitchell's cockatoo		E	E	2
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		81
animals	birds	Cacatuidae	*Cacatua tenuirostris*	long-billed corella	Y	C		8
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		153
animals	birds	Cacatuidae	*Calyptorhynchus banksii banksii*	red-tailed black-cockatoo (Cape York & Eastern Aust)		C		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		2
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	5
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		1169
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		192
animals	birds	Cacatuidae	*Zanda funerea*	yellow-tailed black-cockatoo		C		61
animals	birds	Campephagidae	*Coracina lineata*	barred cuckoo-shrike		C		4
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		5
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		924
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		11
animals	birds	Campephagidae	*Edolisoma tenuirostre*	common cicadabird		C		59
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		14
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		44
animals	birds	Charadriidae	*Charadrius ruficapillus*	red-capped plover		C		1
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		70
animals	birds	Charadriidae	*Erythrogonys cinctus*	red-kneed dotterel		C		16
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		342
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		450
animals	birds	Charadriidae	*Vanellus tricolor*	banded lapwing		C		9
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		410
animals	birds	Climacteridae	*Climacteris picumnus*	brown treecreeper		C		2
animals	birds	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper		C		7
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		33
animals	birds	Columbidae	*Chalcophaps longirostris*	Pacific emerald dove		C		6
animals	birds	Columbidae	*Columba leucomela*	white-headed pigeon		C		56
animals	birds	Columbidae	*Columba livia*	rock dove	Y			397
animals	birds	Columbidae	*Geopelia cuneata*	diamond dove		C		2
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		446
animals	birds	Columbidae	*Geopelia placida*	peaceful dove		C		73
animals	birds	Columbidae	*Leucosarcia melanoleuca*	wonga pigeon		C		14
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		10
animals	birds	Columbidae	*Macropygia phasianella*	brown cuckoo-dove		C		46
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		1152
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		27
animals	birds	Columbidae	*Ptilinopus magnificus*	wompoo fruit-dove		C		1
animals	birds	Columbidae	*Ptilinopus regina*	rose-crowned fruit-dove		C		4/1
animals	birds	Columbidae	*Ptilinopus superbus*	superb fruit-dove		C		3/1
animals	birds	Columbidae	*Spilopelia chinensis*	spotted dove	Y			798
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		254

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Corcoracidae	*Corcorax melanorhamphos*	white-winged chough		C		7
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		28
animals	birds	Corvidae	*Corvus bennetti*	little crow		C		6
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		4
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		1202
animals	birds	Corvidae	*Corvus sp.*			C		1
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		54
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		10
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		11
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		339
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		46
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		24/1
animals	birds	Cuculidae	*Chalcites minutillus barnardi*	Eastern little bronze-cuckoo		C		1
animals	birds	Cuculidae	*Chalcites osculans*	black-eared cuckoo		C		1
animals	birds	Cuculidae	*Cuculus optatus*	oriental cuckoo		SL		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		410
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		255
animals	birds	Dicaeidae	*Dicaeum hirundinaceum*	mistletoebird		C		399
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		90
animals	birds	Dicruridae	*Dicrurus bracteatus bracteatus*	spangled drongo (eastern Australia)		C		2
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		124
animals	birds	Estrildidae	*Neochmia modesta*	plum-headed finch		C		14
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		107
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		457
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		195
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		5
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		64
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		483
animals	birds	Falconidae	*Falco hypoleucos*	grey falcon		V	V	2
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		57
animals	birds	Falconidae	*Falco peregrinus macropus*	Australian peregrine falcon		C		31
animals	birds	Falconidae	*Falco subniger*	black falcon		C		10
animals	birds	Falcunculidae	*Falcunculus frontatus*	crested shrike-tit		C		3
animals	birds	Hirundinidae	*Cheramoeca leucosterna*	white-backed swallow		C		10
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		287
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		75
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		17
animals	birds	Laridae	*Chlidonias hybrida*	whiskered tern		C		3
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		6
animals	birds	Laridae	*Onychoprion fuscatus*	sooty tern		C		1
animals	birds	Laridae	*Thalasseus bergii*	crested tern		SL		1
animals	birds	Locustellidae	*Cincloramphus cruralis*	brown songlark		C		8
animals	birds	Locustellidae	*Cincloramphus mathewsi*	rufous songlark		C		7
animals	birds	Locustellidae	*Cincloramphus timoriensis*	tawny grassbird		C		10
animals	birds	Locustellidae	*Poodytes gramineus*	little grassbird		C		1
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		752/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		10
animals	birds	Maluridae	*Malurus lamberti sensu lato*	variegated fairy-wren		C		125
animals	birds	Maluridae	*Malurus leucopterus*	white-winged fairy-wren		C		3
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		60
animals	birds	Maluridae	*Malurus sp.*			C		1
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		52/1
animals	birds	Meliphagidae	*Acanthagenys rufogularis*	spiny-cheeked honeyeater		C		366
animals	birds	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill		C		127
animals	birds	Meliphagidae	*Anthochaera carunculata*	red wattlebird		C		163
animals	birds	Meliphagidae	*Anthochaera chrysoptera*	little wattlebird		C		3
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		174
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		230
animals	birds	Meliphagidae	*Gavicalis virescens*	singing honeyeater		C		1
animals	birds	Meliphagidae	*Grantiella picta*	painted honeyeater		V	V	4
animals	birds	Meliphagidae	*Lichenostomus melanops*	yellow-tufted honeyeater		C		2
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		901
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		6
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		977
animals	birds	Meliphagidae	*Manorina melanophrys*	bell miner		C		6
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		660
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		7
animals	birds	Meliphagidae	*Melithreptus brevirostris*	brown-headed honeyeater		C		2
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		33
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		67
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		140
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		456
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		404
animals	birds	Meliphagidae	*Ptilotula fusca*	fuscous honeyeater		C		1
animals	birds	Meliphagidae	*Ptilotula penicillata*	white-plumed honeyeater		C		1
animals	birds	Meliphagidae	*Sugomel nigrum*	black honeyeater		C		2
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		55
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		1112
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		29
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		SL		2
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		95
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		102
animals	birds	Monarchidae	*Symposiachrus trivirgatus*	spectacled monarch		SL		7
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		71
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		8
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		288
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		544
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		160
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		75
animals	birds	Pachycephalidae	*Pachycephala pectoralis youngi*	golden whistler (south-eastern Australia)		C		3
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		308

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animals	birds	Pandionidae	*Pandion haliaetus cristatus*	eastern osprey		SL		1
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		103
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		592
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			506
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		64
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		101
animals	birds	Petroicidae	*Melanodryas cucullata*	hooded robin		C		1
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		8
animals	birds	Petroicidae	*Petroica boodang*	scarlet robin		C		2
animals	birds	Petroicidae	*Petroica goodenovii*	red-capped robin		C		11
animals	birds	Petroicidae	*Petroica rosea*	rose robin		C		9
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		244
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		52
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		130
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		8
animals	birds	Phasianidae	*Coturnix pectoralis*	stubble quail		C		14
animals	birds	Phasianidae	*Pavo cristatus*	Indian peafowl	Y			1
animals	birds	Phasianidae	*Synoicus chinensis*	king quail		C		1
animals	birds	Phasianidae	*Synoicus ypsilophorus*	brown quail		C		395
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		416
animals	birds	Podicipedidae	*Podiceps cristatus*	great crested grebe		C		4
animals	birds	Podicipedidae	*Poliocephalus poliocephalus*	hoary-headed grebe		C		1
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		82
animals	birds	Pomatostomidae	*Pomatostomus superciliosus*	white-browed babbler		C		1
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		127
animals	birds	Pomatostomidae	*Pomatostomus temporalis temporalis*	grey-crowned babbler (eastern)		C		11
animals	birds	Psittaculidae	*Alisterus scapularis*	Australian king-parrot		C		275
animals	birds	Psittaculidae	*Aprosmictus erythropterus*	red-winged parrot		C		4
animals	birds	Psittaculidae	*Barnardius zonarius barnardi*	mallee ringneck		C		1
animals	birds	Psittaculidae	*Glossopsitta concinna*	musk lorikeet		C		83
animals	birds	Psittaculidae	*Lathamus discolor*	swift parrot		E	CE	5
animals	birds	Psittaculidae	*Melopsittacus undulatus*	budgerigar		C		12
animals	birds	Psittaculidae	*Neophema pulchella*	turquoise parrot		C		1
animals	birds	Psittaculidae	*Northiella haematogaster*	blue bonnet		C		7
animals	birds	Psittaculidae	*Northiella haematogaster haematorrhoa*	blue bonnet (red-vented)		C		5/1
animals	birds	Psittaculidae	*Parvipsitta pusilla*	little lorikeet		C		88
animals	birds	Psittaculidae	*Platycercus adscitus*	pale-headed rosella		C		1057
animals	birds	Psittaculidae	*Platycercus adscitus palliceps*	pale-headed rosella (southern form)		C		33
animals	birds	Psittaculidae	*Platycercus elegans*	crimson rosella		C		9
animals	birds	Psittaculidae	*Platycercus eximius*	eastern rosella		C		15
animals	birds	Psittaculidae	*Psephotus haematonotus*	red-rumped parrot		C		261
animals	birds	Psittaculidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		882
animals	birds	Psittaculidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		878
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		291
animals	birds	Ptilonorhynchidae	*Chlamydera maculata*	spotted bowerbird		C		1
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus violaceus*	satin bowerbird		C		139

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animals	birds	Ptilonorhynchidae	*Sericulus chrysocephalus*	regent bowerbird		C		7
animals	birds	Rallidae	*Amaurornis moluccana*	pale-vented bush-hen		C		1
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		91
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		109
animals	birds	Rallidae	*Gallirallus philippensis*	buff-banded rail		C		23
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		110
animals	birds	Rallidae	*Zapornia pusilla*	Baillon's crake		C		1
animals	birds	Rallidae	*Zapornia tabuensis*	spotless crake		C		1
animals	birds	Recurvirostridae	*Cladorhynchus leucocephalus*	banded stilt		C		1
animals	birds	Recurvirostridae	*Himantopus leucocephalus*	pied stilt		C		43
animals	birds	Recurvirostridae	*Recurvirostra novaehollandiae*	red-necked avocet		C		2
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		348
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		724
animals	birds	Rhipiduridae	*Rhipidura leucophrys leucophrys*	willie wagtail (southern)		C		19
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		55
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		SL		14
animals	birds	Scolopacidae	*Calidris ferruginea*	curlew sandpiper		CR	CE	2
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		SL		16
animals	birds	Scolopacidae	*Gallinago sp.*			C		1
animals	birds	Scolopacidae	*Numenius minutus*	little curlew		SL		2
animals	birds	Scolopacidae	*Tringa nebularia*	common greenshank		SL		1
animals	birds	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper		SL		20
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		337
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		1
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		33
animals	birds	Sturnidae	*Acridotheres tristis*	common myna	Y			952
animals	birds	Sturnidae	*Sturnus vulgaris*	common starling	Y			693
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		11
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		39
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		3
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		328
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		477
animals	birds	Turdidae	*Turdus merula*	common blackbird	Y			24
animals	birds	Turdidae	*Zoothera heinei*	russet-tailed thrush		C		5
animals	birds	Turnicidae	*Turnix maculosus*	red-backed button-quail		C		4/2
animals	birds	Turnicidae	*Turnix melanogaster*	black-breasted button-quail		V	V	12/2
animals	birds	Turnicidae	*Turnix varius*	painted button-quail		C		8/1
animals	birds	Tytonidae	*Tyto javanica*	eastern barn owl		C		24
animals	birds	Tytonidae	*Tyto novaehollandiae*	masked owl		C		1
animals	birds	Tytonidae	*Tyto novaehollandiae novaehollandiae*	masked owl (southern subspecies)		C		1
animals	birds	Tytonidae	*Tyto tenebricosa tenebricosa*	sooty owl		C		9
animals	birds	Zosteropidae	*Zosterops lateralis*	silvereye		C		699
animals	birds	Zosteropidae	*Zosterops lateralis cornwalli*	silvereye (eastern)		C		4
animals	insects	Aeshnidae	*Adversaeschna brevistyla*	blue-spotted hawker				10
animals	insects	Aeshnidae	*Anax papuensis*	Australian Emperor				57
animals	insects	Aeshnidae	*Austrogynacantha heterogena*	Australian duskhawker				9

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	insects	Coenagrionidae	*Austroagrion watsoni*	eastern billabongfly				1
animals	insects	Coenagrionidae	*Ischnura aurora*	aurora bluetail				3
animals	insects	Coenagrionidae	*Ischnura heterosticta heterosticta*	common bluetail				29
animals	insects	Coenagrionidae	*Pseudagrion aureofrons*	gold-fronted riverdamsel				28
animals	insects	Coenagrionidae	*Pseudagrion microcephalum*	blue riverdamsel				2
animals	insects	Coenagrionidae	*Xanthagrion erythroneurum*	red & blue damsel				29
animals	insects	Corduliidae	*Hemicordulia australiae*	Australian emerald				45
animals	insects	Corduliidae	*Hemicordulia intermedia*	yellow-spotted emerald				2
animals	insects	Corduliidae	*Hemicordulia tau*	tau emerald				27
animals	insects	Diphlebiidae	*Diphlebia coerulescens*	sapphire rockmaster				5
animals	insects	Diphlebiidae	*Diphlebia nymphoides*	arrowhead rockmaster				2
animals	insects	Formicidae	*Iridomyrmex purpureus*					1
animals	insects	Formicidae	*Ochetellus glaber group*					1
animals	insects	Formicidae	*Pheidole megacephala*	African big-headed ant	Y			1
animals	insects	Formicidae	*Solenopsis invicta*	red imported fire ant	Y			1
animals	insects	Gomphidae	*Austrogomphus amphiclitus*	pale hunter				1
animals	insects	Gomphidae	*Austrogomphus cornutus*	unicorn hunter				6
animals	insects	Gomphidae	*Austrogomphus ochraceus*	jade hunter				1
animals	insects	Gomphidae	*Hemigomphus heteroclytus*	stout vicetail				5
animals	insects	Hesperiidae	*Cephrenes augiades sperthias*	orange palm-dart				3
animals	insects	Hesperiidae	*Chaetocneme beata*	eastern dusk-flat				1
animals	insects	Hesperiidae	*Hasora khoda haslia*	narrow-banded awl				1
animals	insects	Hesperiidae	*Netrocoryne repanda*					1
animals	insects	Hesperiidae	*Ocybadistes walkeri sothis*	green grass-dart				5
animals	insects	Hesperiidae	*Suniana sunias rectivitta*	wide-brand grass-dart				1
animals	insects	Hesperiidae	*Telicota colon argea*	pale-orange darter				1
animals	insects	Hesperiidae	*Toxidia doubledayi*	lilac grass-skipper				1
animals	insects	Isostictidae	*Rhadinosticta simplex*	powdered wiretail				1
animals	insects	Lestidae	*Austrolestes aridus*	inland ringtail				1
animals	insects	Lestidae	*Austrolestes leda*	wandering ringtail				22
animals	insects	Libellulidae	*Crocothemis nigrifrons*	black-headed skimmer				2
animals	insects	Libellulidae	*Diplacodes bipunctata*	wandering percher				26
animals	insects	Libellulidae	*Diplacodes haematodes*	scarlet percher				45
animals	insects	Libellulidae	*Orthetrum caledonicum*	blue skimmer				63
animals	insects	Libellulidae	*Orthetrum villosovittatum*	fiery skimmer				24
animals	insects	Libellulidae	*Pantala flavescens*	wandering glider				16
animals	insects	Libellulidae	*Rhyothemis graphiptera*	graphic flutterer				3
animals	insects	Libellulidae	*Tramea loewii*	common glider				7
animals	insects	Libellulidae	*Zyxomma elgneri*	short-tailed duskdarter				4
animals	insects	Lindeniidae	*Ictinogomphus australis*	Australian tiger				8
animals	insects	Lycaenidae	*Acrodipsas illidgei*	Illidge's ant-blue		V		1
animals	insects	Lycaenidae	*Candalides absimilis*	common pencilled-blue				2
animals	insects	Lycaenidae	*Candalides xanthospilos*	yellow-spotted blue				1
animals	insects	Lycaenidae	*Erysichton lineatus lineatus*	hairy line-blue				1
animals	insects	Lycaenidae	*Erysichton sp.*					1
animals	insects	Lycaenidae	*Jalmenus evagoras*	imperial hairstreak				8

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	insects	Lycaenidae	*Lampides boeticus*	long-tailed pea-blue				3
animals	insects	Lycaenidae	*Leptotes plinius pseudocassius*	plumbago blue				14
animals	insects	Lycaenidae	*Lucia limbaria*	chequered copper				3
animals	insects	Lycaenidae	*Neolucia agricola agricola*	fringed heath-blue				1
animals	insects	Lycaenidae	*Psychonotis caelius taygetus*	small green-banded blue				4
animals	insects	Lycaenidae	*Theclinesthes onycha*					1
animals	insects	Lycaenidae	*Theclinesthes onycha capricornia*	cycad blue (northern subspecies)				26
animals	insects	Lycaenidae	*Zizina otis labradus*	common grass-blue (Australian subspecies)				53
animals	insects	Megapodagrionidae	*Austroargiolestes icteromelas*	common flatwing				23
animals	insects	Megapodagrionidae	*Austroargiolestes icteromelas icteromelas*	pale-mouth common flatwing				6
animals	insects	Nymphalidae	*Acraea andromacha andromacha*	glasswing				43
animals	insects	Nymphalidae	*Charaxes sempronius sempronius*	tailed emperor				15
animals	insects	Nymphalidae	*Danaus petilia*	lesser wanderer				50
animals	insects	Nymphalidae	*Danaus plexippus*	monarch	Y			69
animals	insects	Nymphalidae	*Euploea corinna*	common crow				55
animals	insects	Nymphalidae	*Heteronympha merope merope*	common brown				7
animals	insects	Nymphalidae	*Hypolimnas bolina nerina*	varied eggfly				15
animals	insects	Nymphalidae	*Junonia villida villida*	meadow argus				99
animals	insects	Nymphalidae	*Melanitis leda bankia*	evening brown				4
animals	insects	Nymphalidae	*Phaedyma shepherdi shepherdi*	white-banded plane (southern subspecies)				11
animals	insects	Nymphalidae	*Tirumala hamata hamata*	blue tiger				38
animals	insects	Nymphalidae	*Vanessa itea*	yellow admiral				19
animals	insects	Nymphalidae	*Vanessa kershawi*	Australian painted lady				15
animals	insects	Nymphalidae	*Ypthima arctous arctous*	dusky knight				1
animals	insects	Papilionidae	*Cressida cressida cressida*	clearwing swallowtail				6
animals	insects	Papilionidae	*Graphium choredon*	blue triangle				57
animals	insects	Papilionidae	*Graphium eurypylus lycaon*	pale triangle				2
animals	insects	Papilionidae	*Graphium macleayanum macleayanum*	Macleay's swordtail				8
animals	insects	Papilionidae	*Papilio aegeus*					5
animals	insects	Papilionidae	*Papilio aegeus aegeus*	orchard swallowtail (Australian subspecies)				47
animals	insects	Papilionidae	*Papilio anactus*	dainty swallowtail				38
animals	insects	Papilionidae	*Papilio demoleus sthenelus*	chequered swallowtail				7
animals	insects	Papilionidae	*Papilio fuscus*					2
animals	insects	Papilionidae	*Papilio fuscus capaneus*	fuscous swallowtail (Australian subspecies)				3
animals	insects	Papilionidae	*Protographium leosthenes leosthenes*	four-barred swordtail				2
animals	insects	Pieridae	*Appias paulina ega*	yellow albatross				1
animals	insects	Pieridae	*Belenois java teutonia*	caper white				63
animals	insects	Pieridae	*Catopsilia gorgophone gorgophone*	yellow migrant				8
animals	insects	Pieridae	*Catopsilia pomona*	lemon migrant				17
animals	insects	Pieridae	*Catopsilia pyranthe crokera*	white migrant				15
animals	insects	Pieridae	*Catopsilia scylla etesia*	orange migrant				1
animals	insects	Pieridae	*Cepora perimale*					3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	insects	Pieridae	*Delias aganippe*	spotted jezebel				4
animals	insects	Pieridae	*Delias argenthona argenthona*	scarlet jezebel				22
animals	insects	Pieridae	*Delias harpalyce*	imperial jezebel				1
animals	insects	Pieridae	*Delias nigrina*	black jezebel				10
animals	insects	Pieridae	*Delias nysa nysa*	yellow-spotted jezebel (Australian subspecies)				1
animals	insects	Pieridae	*Elodina angulipennis*	southern pearl-white				1
animals	insects	Pieridae	*Elodina padusa*	narrow-winged pearl-white				1
animals	insects	Pieridae	*Elodina parthia*	striated pearl-white				1
animals	insects	Pieridae	*Eurema hecabe*	large grass-yellow				10
animals	insects	Pieridae	*Eurema smilax*	small grass-yellow				5
animals	insects	Pieridae	*Eurema sp.*					1
animals	insects	Pieridae	*Pieris rapae*	cabbage white	Y			62
animals	insects	Platycnemididae	*Nososticta solida*	orange threadtail				11
animals	insects	Synlestidae	*Synlestes selysi*	forest needle				4
animals	insects	Synthemistidae	*Choristhemis flavoterminata*	yellow-tipped tigertail				18
animals	insects	Synthemistidae	*Eusynthemis nigra xanthosticta*	black tigertail				2
animals	insects	Synthemistidae	*Parasynthemis regina*	royal tigertail				1
animals	insects	Telephlebiidae	*Austroaeschna sigma*	sigma darner				1
animals	insects	Telephlebiidae	*Austroaeschna unicornis*	unicorn darner				2
animals	malacostracans	Parastacidae	*Cherax destructor*	common yabbie				13
animals	mammals	Acrobatidae	*Acrobates pygmaeus*	feathertail glider		C		1
animals	mammals	Canidae	*Canis familiaris*	dog	Y			1
animals	mammals	Canidae	*Canis familiaris (dingo)*	dingo				3
animals	mammals	Canidae	*Vulpes vulpes*	red fox	Y			8
animals	mammals	Cervidae	*Axis axis*	chital	Y			1
animals	mammals	Dasyuridae	*Antechinus flavipes flavipes*	yellow-footed antechinus (south-east Queensland)		C		3/1
animals	mammals	Dasyuridae	*Antechinus flavipes sensu lato*	yellow-footed antechinus		C		1
animals	mammals	Dasyuridae	*Phascogale tapoatafa tapoatafa*	brush-tailed phascogale		C		2
animals	mammals	Dasyuridae	*Planigale maculata*	common planigale		C		8/1
animals	mammals	Dasyuridae	*Sminthopsis murina*	common dunnart		C		5
animals	mammals	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat		C		1
animals	mammals	Felidae	*Felis catus*	cat	Y			3
animals	mammals	Leporidae	*Lepus europaeus*	European brown hare	Y			89
animals	mammals	Leporidae	*Oryctolagus cuniculus*	rabbit	Y			19
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		22
animals	mammals	Macropodidae	*Notamacropus parryi*	whiptail wallaby		C		4
animals	mammals	Macropodidae	*Notamacropus rufogriseus*	red-necked wallaby		C		16
animals	mammals	Macropodidae	*Petrogale penicillata*	brush-tailed rock-wallaby		V	V	1
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		9
animals	mammals	Miniopteridae	*Miniopterus australis*	little bent-wing bat		C		2
animals	mammals	Miniopteridae	*Miniopterus schreibersii oceanensis*	eastern bent-wing bat		C		10
animals	mammals	Molossidae	*Austronomus australis*	white-striped freetail bat		C		3
animals	mammals	Molossidae	*Mormopterus ridei*	eastern free-tailed bat		C		3
animals	mammals	Molossidae	*Mormopterus sp.*			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		1
animals	mammals	Muridae	*Mus musculus*	house mouse	Y			12
animals	mammals	Muridae	*Pseudomys gracilicaudatus*	eastern chestnut mouse		C		6
animals	mammals	Muridae	*Rattus norvegicus*	brown rat	Y			1
animals	mammals	Muridae	*Rattus rattus*	black rat	Y			56
animals	mammals	Muridae	*Rattus tunneyi*	pale field-rat		C		1
animals	mammals	Ornithorhynchidae	*Ornithorhynchus anatinus*	platypus		SL		2
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		11
animals	mammals	Peramelidae	*Perameles nasuta*	long-nosed bandicoot		C		7
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		5
animals	mammals	Petauridae	*Petaurus notatus*	Krefft's glider		C		8
animals	mammals	Phalangeridae	*Trichosurus caninus*	short-eared possum		C		2
animals	mammals	Phalangeridae	*Trichosurus sp.*			C		1
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		96
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	62
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		1
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	1
animals	mammals	Pseudocheiridae	*Pseudocheirus peregrinus*	common ringtail possum		C		33
animals	mammals	Pteropodidae	*Pteropus alecto*	black flying-fox		C		14
animals	mammals	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox		C	V	26
animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		3
animals	mammals	Suidae	*Sus scrofa*	pig	Y			1
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		19
animals	mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat		C		9
animals	mammals	Vespertilionidae	*Chalinolobus picatus*	little pied bat		C		2
animals	mammals	Vespertilionidae	*Nyctophilus gouldi*	Gould's long-eared bat		C		2
animals	mammals	Vespertilionidae	*Nyctophilus sp.*			C		1
animals	mammals	Vespertilionidae	*Scoteanax rueppellii*	greater broad-nosed bat		C		1
animals	mammals	Vespertilionidae	*Scotorepens greyii*	little broad-nosed bat		C		2
animals	mammals	Vespertilionidae	*Scotorepens orion*	south-eastern broad-nosed bat		C		3
animals	mammals	Vespertilionidae	*Vespadelus vulturnus*	little forest bat		C		2
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				2
animals	ray-finned fishes	Cyprinidae	*Carassius auratus*	goldfish	Y			1
animals	ray-finned fishes	Eleotridae	*Hypseleotris klunzingeri*	western carp gudgeon				1
animals	ray-finned fishes	Eleotridae	*Hypseleotris sp.*					3
animals	ray-finned fishes	Eleotridae	*Hypseleotris species 1*	Midgley's carp gudgeon				5
animals	ray-finned fishes	Eleotridae	*Mogurnda adspersa*	southern purplespotted gudgeon				7
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia fluviatilis*	Murray River rainbowfish				9
animals	ray-finned fishes	Percichthyidae	*Maccullochella peelii*	Murray cod			V	2
animals	ray-finned fishes	Percichthyidae	*Macquaria novemaculeata*	Australian bass				2
animals	ray-finned fishes	Plotosidae	*Tandanus tandanus*	freshwater catfish				32
animals	ray-finned fishes	Poeciliidae	*Gambusia holbrooki*	mosquitofish	Y			31
animals	ray-finned fishes	Terapontidae	*Bidyanus bidyanus*	silver perch			CE	2
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				34
animals	reptiles	Agamidae	*Amphibolurus muricatus*	jacky lizard		C		1
animals	reptiles	Agamidae	*Intellagama lesueurii*	eastern water dragon		C		75

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animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		30
animals	reptiles	Boidae	*Antaresia maculosa*	spotted python		C		1
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		15
animals	reptiles	Carphodactylidae	*Underwoodisaurus milii*	thick-tailed gecko		C		6
animals	reptiles	Chelidae	*Chelodina expansa*	broad-shelled river turtle		C		23
animals	reptiles	Chelidae	*Chelodina longicollis*	eastern snake-necked turtle		C		31
animals	reptiles	Chelidae	*Elseya albagula*	white-throated snapping turtle		CR	CE	2
animals	reptiles	Chelidae	*Elseya irwini*	Irwin's turtle		C		1
animals	reptiles	Chelidae	*Emydura macquarii krefftii*	Krefft's river turtle		C		10
animals	reptiles	Chelidae	*Emydura macquarii macquarii*	Murray turtle		C		118
animals	reptiles	Chelidae	*Wollumbinia latisternum*	saw-shelled turtle		C		26
animals	reptiles	Colubridae	*Boiga irregularis*	brown tree snake		C		1
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		2
animals	reptiles	Diplodactylidae	*Amalosia jacovae*	clouded gecko		C		2
animals	reptiles	Diplodactylidae	*Amalosia robusta*	robust velvet gecko		C		7
animals	reptiles	Diplodactylidae	*Oedura tryoni*	southern spotted velvet gecko		C		1
animals	reptiles	Elapidae	*Cacophis harriettae*	white-crowned snake		C		10
animals	reptiles	Elapidae	*Cacophis squamulosus*	golden crowned snake		C		14
animals	reptiles	Elapidae	*Cryptophis boschmai*	Carpentaria whip snake		C		1
animals	reptiles	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake		C		2
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whipsnake		C		19
animals	reptiles	Elapidae	*Furina diadema*	red-naped snake		C		1/1
animals	reptiles	Elapidae	*Hemiaspis signata*	black-bellied swamp snake		C		4
animals	reptiles	Elapidae	*Hoplocephalus bitorquatus*	pale-headed snake		C		5/2
animals	reptiles	Elapidae	*Pseudechis guttatus*	spotted black snake		C		8
animals	reptiles	Elapidae	*Pseudechis porphyriacus*	red-bellied black snake		C		8
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		23/3
animals	reptiles	Elapidae	*Suta dwyeri*	Dwyer's snake		C		1
animals	reptiles	Elapidae	*Vermicella annulata*	bandy-bandy		C		1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		2
animals	reptiles	Gekkonidae	*Hemidactylus frenatus*	house gecko	Y			32
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		1
animals	reptiles	Pygopodidae	*Delma plebeia*	common delma		C		3
animals	reptiles	Pygopodidae	*Delma tincta*	excitable delma		C		4
animals	reptiles	Pygopodidae	*Delma torquata*	collared delma		V	V	30
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		4
animals	reptiles	Scincidae	*Anomalopus leuckartii*	two-clawed worm-skink		C		1
animals	reptiles	Scincidae	*Anomalopus verreauxii*	three-clawed worm-skink		C		21
animals	reptiles	Scincidae	*Bellatorias frerei*	major skink		C		2
animals	reptiles	Scincidae	*Calyptotis scutirostrum*	scute-snouted calyptotis		C		45
animals	reptiles	Scincidae	*Carlia schmeltzii*	robust rainbow-skink		C		1
animals	reptiles	Scincidae	*Carlia tetradactyla*	southern rainbow-skink		C		6
animals	reptiles	Scincidae	*Carlia vivax*	tussock rainbow-skink		C		1
animals	reptiles	Scincidae	*Concinnia martini*	dark bar-sided skink		C		1
animals	reptiles	Scincidae	*Concinnia tenuis*	bar-sided skink		C		6
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		82

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		11
animals	reptiles	Scincidae	*Egernia cunninghami*	Cunningham's skink		C		16/1
animals	reptiles	Scincidae	*Egernia mcpheei*	eastern crevice-skink		C		1
animals	reptiles	Scincidae	*Egernia striolata*	tree skink		C		1
animals	reptiles	Scincidae	*Eulamprus quoyii*	eastern water skink		C		1
animals	reptiles	Scincidae	*Lampropholis delicata*	dark-flecked garden sunskink		C		60
animals	reptiles	Scincidae	*Lampropholis guichenoti*	pale-flecked garden sunskink		C		4
animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		2
animals	reptiles	Scincidae	*Menetia greyii*	common dwarf skink		C		2
animals	reptiles	Scincidae	*Morethia taeniopleura*	fire-tailed skink		C		2
animals	reptiles	Scincidae	*Saiphos equalis*	three-toed skink		C		6
animals	reptiles	Scincidae	*Saproscincus rosei*	Rose's shadeskink		C		8
animals	reptiles	Scincidae	*Tiliqua rugosa*	shingle-back		C		1
animals	reptiles	Scincidae	*Tiliqua scincoides scincoides*	eastern bluetongue		C		50
animals	reptiles	Typhlopidae	*Anilios ligatus*	robust blind snake		C		3
animals	reptiles	Typhlopidae	*Anilios nigrescens*	blackish blind snake		C		3
animals	reptiles	Typhlopidae	*Anilios proximus*	proximus blind snake		C		1
animals	reptiles	Typhlopidae	*Anilios sp.*			C		1
animals	reptiles	Typhlopidae	*Anilios wiedii*	brown-snouted blind snake		C		4/1
animals	reptiles	Varanidae	*Varanus varius*	lace monitor		C		5
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending				423/4
fungi	Agaricomycetes	Agaricaceae	*Agaricus*					2/2
fungi	Agaricomycetes	Agaricaceae	*Agaricus austrovinaceus*			C		1
fungi	Agaricomycetes	Agaricaceae	*Agaricus campestris var. campestris*			C		2
fungi	Agaricomycetes	Agaricaceae	*Calvatia lilacina*			C		2
fungi	Agaricomycetes	Agaricaceae	*Calvatia rugosa*			C		7
fungi	Agaricomycetes	Agaricaceae	*Chlorophyllum hortense*			C		1
fungi	Agaricomycetes	Agaricaceae	*Chlorophyllum molybdites*	green-spored parasol		C		8
fungi	Agaricomycetes	Agaricaceae	*Coprinus atramentarius*			C		9
fungi	Agaricomycetes	Agaricaceae	*Coprinus comatus*			C		1
fungi	Agaricomycetes	Agaricaceae	*Coprinus truncorum*			C		3
fungi	Agaricomycetes	Agaricaceae	*Cyathus stercoreus*			C		2/1
fungi	Agaricomycetes	Agaricaceae	*Cyathus striatus*			C		1
fungi	Agaricomycetes	Agaricaceae	*Leucocoprinus birnbaumii*			C		1/1
fungi	Agaricomycetes	Agaricaceae	*Lycoperdon pyriforme*			C		2
fungi	Agaricomycetes	Agaricaceae	*Macrolepiota*					1/1
fungi	Agaricomycetes	Agaricaceae	*Macrolepiota clelandii*			C		1
fungi	Agaricomycetes	Agaricaceae	*Macrolepiota dolichaula*			C		2
fungi	Agaricomycetes	Amanitaceae	*Amanita farinacea*			C		2
fungi	Agaricomycetes	Amanitaceae	*Amanita muscaria*		Y			1/1
fungi	Agaricomycetes	Amanitaceae	*Amanita punctata*			C		2
fungi	Agaricomycetes	Amanitaceae	*Amanita pyramidifera*			C		1
fungi	Agaricomycetes	Amanitaceae	*Amanita xanthocephala*			C		1
fungi	Agaricomycetes	Auriculariaceae	*Auricularia cornea*			C		3/1
fungi	Agaricomycetes	Bolbitiaceae	*Bolbitius titubans*			C		2
fungi	Agaricomycetes	Boletaceae	*Phylloporus*					1/1

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fungi	Agaricomycetes	Corticiaceae	*Corticium*			C		2/2
fungi	Agaricomycetes	Cortinariaceae	*Cortinarius australiensis*			C		1
fungi	Agaricomycetes	Cortinariaceae	*Gymnopilus*					1/1
fungi	Agaricomycetes	Geastraceae	*Geastrum minimum*			C		1
fungi	Agaricomycetes	Geastraceae	*Geastrum pectinatum*			C		5/1
fungi	Agaricomycetes	Geastraceae	*Geastrum saccatum*			C		2
fungi	Agaricomycetes	Geastraceae	*Geastrum triplex*			C		4
fungi	Agaricomycetes	Hymenochaetaceae	*Hymenochaete*					1/1
fungi	Agaricomycetes	Marasmiaceae	*Armillaria fumosa*			C		1
fungi	Agaricomycetes	Marasmiaceae	*Campanella olivaceonigra*			C		1
fungi	Agaricomycetes	Marasmiaceae	*Gerronema*					2/2
fungi	Agaricomycetes	Marasmiaceae	*Marasmius*					6/6
fungi	Agaricomycetes	Marasmiaceae	*Marasmius elegans*			C		1
fungi	Agaricomycetes	Mycenaceae	*Cruentomycena viscidocruenta*			C		1
fungi	Agaricomycetes	Omphalotaceae	*Marasmiellus*					1/1
fungi	Agaricomycetes	Panaeolaceae	*Panaeolina foenisecii*			C		2
fungi	Agaricomycetes	Panaeolaceae	*Panaeolus*					1/1
fungi	Agaricomycetes	Panaeolaceae	*Panaeolus antillarum*			C		1/1
fungi	Agaricomycetes	Phallaceae	*Aseroe rubra*			C		15
fungi	Agaricomycetes	Phallaceae	*Colus pusillus*			C		2
fungi	Agaricomycetes	Phallaceae	*Ileodictyon gracile*			C		1
fungi	Agaricomycetes	Phallaceae	*Lysurus mokusin*			C		6
fungi	Agaricomycetes	Phallaceae	*Phallus rubicundus*			C		12
fungi	Agaricomycetes	Phallaceae	*Pseudocolus fusiformis*			C		1
fungi	Agaricomycetes	Physalacriaceae	*Armillaria luteobubalina*			C		1/1
fungi	Agaricomycetes	Pluteaceae	*Pluteus*					2/2
fungi	Agaricomycetes	Polyporaceae	*Laetiporus portentosus*			C		3
fungi	Agaricomycetes	Polyporaceae	*Lentinus sajor-caju*			C		1
fungi	Agaricomycetes	Polyporaceae	*Lenzites*					1/1
fungi	Agaricomycetes	Polyporaceae	*Pycnoporus coccineus*			C		1
fungi	Agaricomycetes	Polyporaceae	*Trametes*					1/1
fungi	Agaricomycetes	Psathyrellaceae	*Coprinellus disseminatus*			C		2
fungi	Agaricomycetes	Psathyrellaceae	*Psathyrella*					1/1
fungi	Agaricomycetes	Russulaceae	*Russula*			C		1/1
fungi	Agaricomycetes	Russulaceae	*Russula persanguinea*			C		1
fungi	Agaricomycetes	Schizophyllaceae	*Schizophyllum commune*			C		2
fungi	Agaricomycetes	Sclerodermataceae	*Astraeus hygrometricus*			C		1/1
fungi	Agaricomycetes	Sclerodermataceae	*Pisolithus albus*			C		2
fungi	Agaricomycetes	Sclerodermataceae	*Pisolithus marmoratus*			C		3
fungi	Agaricomycetes	Sclerodermataceae	*Scleroderma cepa*			C		3
fungi	Agaricomycetes	Sclerodermataceae	*Scleroderma polyrhizum*			C		1
fungi	Agaricomycetes	Serpulaceae	*Serpula lacrymans*			C		1/1
fungi	Agaricomycetes	Stereaceae	*Stereum ostrea*			C		1/1
fungi	Agaricomycetes	Strophariaceae	*Leratiomyces ceres*			C		7
fungi	Agaricomycetes	Strophariaceae	*Psilocybe cubensis*			C		2/1
fungi	Agaricomycetes	Tricholomataceae	*Lepista sublilacina*			C		1

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fungi	Dacrymycetes	Dacrymycetaceae	*Dacryopinax spathularia*			C		4
fungi	Pezizomycetes	Morchellaceae	*Morchella*					1
fungi	Pezizomycetes	Morchellaceae	*Morchella esculenta*			C		2
fungi	Pezizomycetes	Pyronemataceae	*Scutellinia scutellata*			C		1/1
fungi	eurotiomycetes	Pyrenulaceae	*Anthracothecium gregale*			C		1/1
fungi	eurotiomycetes	Thermoascaceae	*Paecilomyces*					1/1
fungi	lecanoromycetes	Acarosporaceae	*Piccolia conspersa*			C		1/1
fungi	lecanoromycetes	Caliciaceae	*Buellia demutans*			C		1/1
fungi	lecanoromycetes	Caliciaceae	*Dirinaria applanata*			C		2/2
fungi	lecanoromycetes	Caliciaceae	*Dirinaria confluens*			C		2/2
fungi	lecanoromycetes	Caliciaceae	*Pyxine*					1
fungi	lecanoromycetes	Cladoniaceae	*Cladia aggregata*			C		1/1
fungi	lecanoromycetes	Cladoniaceae	*Cladia muelleri*			C		1/1
fungi	lecanoromycetes	Cladoniaceae	*Cladonia cervicornis subsp. verticillata*			C		1/1
fungi	lecanoromycetes	Cladoniaceae	*Cladonia floerkeana*			C		1/1
fungi	lecanoromycetes	Cladoniaceae	*Pulchrocladia retipora*			C		1/1
fungi	lecanoromycetes	Collemataceae	*Collema*					2/2
fungi	lecanoromycetes	Lecanoraceae	*Lecanora*					1/1
fungi	lecanoromycetes	Lecanoraceae	*Lecanora helva*			C		1/1
fungi	lecanoromycetes	Letrouitiaceae	*Letrouitia coralloidea*			C		1/1
fungi	lecanoromycetes	Lobariaceae	*Crocodia aurata*			C		1/1
fungi	lecanoromycetes	Lobariaceae	*Pseudocyphellaria neglecta*			C		1/1
fungi	lecanoromycetes	Lobariaceae	*Pseudocyphellaria rubrina*			C		1/1
fungi	lecanoromycetes	Ochrolechiaceae	*Ochrolechia*					1/1
fungi	lecanoromycetes	Ochrolechiaceae	*Ochrolechia africana*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Canoparmelia texana*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema*					1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema austrosinense*			C		2/2
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema crinitum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema perlatum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema praesorediosum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema reparatum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema reticulatum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema saccatilobum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema tinctorum*			C		3/2
fungi	lecanoromycetes	Parmeliaceae	*Punctelia subflava*			C		2/2
fungi	lecanoromycetes	Parmeliaceae	*Usnea angulata*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Usnea dasaea*			C		5/5
fungi	lecanoromycetes	Parmeliaceae	*Usnea molliuscula subsp. queenslandica*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Usnea scabrida*			C		1
fungi	lecanoromycetes	Parmeliaceae	*Usnea scabrida subsp. elegans*			C		8/7
fungi	lecanoromycetes	Parmeliaceae	*Xanthoparmelia pulla*			C		1/1
fungi	lecanoromycetes	Physciaceae	*Heterodermia angustiloba*			C		1/1
fungi	lecanoromycetes	Physciaceae	*Heterodermia obscurata*			C		1/1
fungi	lecanoromycetes	Physciaceae	*Heterodermia speciosa*			C		1/1
fungi	lecanoromycetes	Physciaceae	*Physcia jackii*			C		1/1

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fungi	lecanoromycetes	Ramalinaceae	*Ramalina*					2/2
fungi	lecanoromycetes	Ramalinaceae	*Ramalina celastri subsp. celastri*			C		6/6
fungi	lecanoromycetes	Ramalinaceae	*Ramalina inflata subsp. inflata*			C		1/1
fungi	lecanoromycetes	Ramalinaceae	*Ramalina inflata subsp. perpusilla*			C		10/10
fungi	lecanoromycetes	Ramalinaceae	*Ramalina peruviana*			C		3/3
fungi	lecanoromycetes	Ramalinaceae	*Ramalina subfraxinea*			C		1/1
fungi	lecanoromycetes	Ramalinaceae	*Ramalina subfraxinea var. subfraxinea*			C		1
fungi	lecanoromycetes	Teloschistaceae	*Teloschistes sieberianus*			C		2/1
fungi	lecanoromycetes	Teloschistaceae	*Teloschistes xanthoroides*			C		1/1
fungi	sordariomycetes	Xylariaceae	*Xylaria polymorpha*			C		1
plants	Charophyceae	Characeae	*Nitella cristata*			C		1/1
plants	land plants	Acanthaceae	*Brunoniella australis*	blue trumpet		C		2
plants	land plants	Acanthaceae	*Hypoestes floribunda*			C		2/2
plants	land plants	Acanthaceae	*Hypoestes phyllostachya*		Y			1
plants	land plants	Acanthaceae	*Pseuderanthemum variabile*	pastel flower		C		1
plants	land plants	Acanthaceae	*Rostellularia adscendens*			C		3
plants	land plants	Acanthaceae	*Rostellularia adscendens var. adscendens*			C		1/1
plants	land plants	Acanthaceae	*Rostellularia obtusa*			C		1/1
plants	land plants	Acanthaceae	*Ruellia simplex*		Y			1/1
plants	land plants	Acanthaceae	*Ruellia squarrosa*		Y			1/1
plants	land plants	Acanthaceae	*Thunbergia alata*	black-eyed Susan	Y			5/1
plants	land plants	Agavaceae	*Agave americana var. americana*		Y			2/1
plants	land plants	Agavaceae	*Furcraea foetida*		Y			1
plants	land plants	Agavaceae	*Yucca aloifolia*		Y			2/2
plants	land plants	Aizoaceae	*Mesembryanthemum cordifolium*		Y			2
plants	land plants	Aizoaceae	*Tetragonia tetragonoides*	New Zealand spinach		C		8
plants	land plants	Aizoaceae	*Trianthema portulacastrum*	black pigweed	Y			3
plants	land plants	Aizoaceae	*Zaleya galericulata subsp. galericulata*			C		1
plants	land plants	Alismataceae	*Alisma plantago-aquatica*		Y			4/1
plants	land plants	Alismataceae	*Sagittaria platyphylla*	sagittaria	Y			1
plants	land plants	Alliaceae	*Nothoscordum borbonicum*		Y			5
plants	land plants	Amaranthaceae	*Alternanthera nana*	hairy joyweed		C		3/1
plants	land plants	Amaranthaceae	*Alternanthera pungens*	khaki weed	Y			5
plants	land plants	Amaranthaceae	*Alternanthera sessilis*		Y			1/1
plants	land plants	Amaranthaceae	*Amaranthus hybridus*	redshank	Y			3/3
plants	land plants	Amaranthaceae	*Amaranthus viridis*	green amaranth	Y			2
plants	land plants	Amaranthaceae	*Deeringia amaranthoides*	redberry		C		1/1
plants	land plants	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			6
plants	land plants	Amaranthaceae	*Guilleminea densa*	small matweed	Y			3/1
plants	land plants	Amaranthaceae	*Nyssanthes diffusa*	barbed-wire weed		C		3/2
plants	land plants	Amaryllidaceae	*Proiphys cunninghamii*	Moreton Bay lily		SL		1
plants	land plants	Anacardiaceae	*Euroschinus falcatus*			C		1
plants	land plants	Anacardiaceae	*Euroschinus falcatus var. falcatus*			C		1/1
plants	land plants	Anacardiaceae	*Rhodosphaera rhodanthema*	tulip satinwood		C		2/1
plants	land plants	Anacardiaceae	*Schinus molle*		Y			1
plants	land plants	Anacardiaceae	*Schinus molle var. areira*	pepper tree	Y			2/1

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plants	land plants	Aphanopetalaceae	*Aphanopetalum resinosum*	gumvine		C		1
plants	land plants	Apiaceae	*Berula erecta*	water parsnip	Y			2/1
plants	land plants	Apiaceae	*Centella asiatica*			C		2
plants	land plants	Apiaceae	*Conium maculatum*	poison hemlock	Y			2/2
plants	land plants	Apiaceae	*Cyclospermum leptophyllum*		Y			4/1
plants	land plants	Apiaceae	*Daucus carota*	wild carrot	Y			2
plants	land plants	Apiaceae	*Daucus glochidiatus*	Australian carrot		C		1
plants	land plants	Apiaceae	*Foeniculum vulgare*	fennel	Y			10/2
plants	land plants	Apocynaceae	*Alstonia constricta*	bitterbark		C		4/1
plants	land plants	Apocynaceae	*Alyxia ruscifolia*			C		2/1
plants	land plants	Apocynaceae	*Araujia sericifera*	white moth vine	Y			18/2
plants	land plants	Apocynaceae	*Asclepias curassavica*	red-head cottonbush	Y			2
plants	land plants	Apocynaceae	*Carissa ovata*	currantbush		C		2/1
plants	land plants	Apocynaceae	*Gomphocarpus physocarpus*	balloon cottonbush	Y			12/1
plants	land plants	Apocynaceae	*Gymnema pleiadenium*			C		1/1
plants	land plants	Apocynaceae	*Hoya australis*			C		1
plants	land plants	Apocynaceae	*Leichhardtia coronata*			V		1/1
plants	land plants	Apocynaceae	*Leichhardtia viridiflora subsp. viridiflora*			C		1/1
plants	land plants	Apocynaceae	*Parsonsia leichhardtii*	black silkpod		C		2/2
plants	land plants	Apocynaceae	*Parsonsia straminea*	monkey rope		C		3
plants	land plants	Apocynaceae	*Vincetoxicum grandiflorum*			C		1/1
plants	land plants	Apocynaceae	*Vincetoxicum ovatum*			C		2
plants	land plants	Araceae	*Gymnostachys anceps*	settler's flax		C		2
plants	land plants	Araceae	*Lemna aequinoctialis*	common duckweed		C		1
plants	land plants	Araceae	*Typhonium brownii*	black arum lily		C		2
plants	land plants	Araliaceae	*Heptapleurum actinophyllum*			C		1
plants	land plants	Araliaceae	*Hydrocotyle acutiloba*			C		2
plants	land plants	Araliaceae	*Hydrocotyle laxiflora*	stinking pennywort		C		10/5
plants	land plants	Araliaceae	*Hydrocotyle verticillata*	shield pennywort		C		1/1
plants	land plants	Araliaceae	*Polyscias elegans*	celery wood		C		2/1
plants	land plants	Asparagaceae	*Asparagus africanus*	ornamental asparagus	Y			3/2
plants	land plants	Asparagaceae	*Asparagus asparagoides*	bridal creeper	Y			2/2
plants	land plants	Asphodelaceae	*Aloe arborescens*		Y			1
plants	land plants	Asphodelaceae	*Asphodelus fistulosus*	asphodel	Y			3/1
plants	land plants	Asphodelaceae	*Bulbine bulbosa*	golden lily		C		1
plants	land plants	Asphodelaceae	*Bulbine fraseri*			C		1/1
plants	land plants	Aspleniaceae	*Asplenium australasicum*			C		4
plants	land plants	Aspleniaceae	*Asplenium subglandulosum subsp. subglandulosum*			C		1/1
plants	land plants	Asteraceae	*Apowollastonia spilanthoides*			C		4/1
plants	land plants	Asteraceae	*Arctotheca calendula*	Cape weed	Y			7/2
plants	land plants	Asteraceae	*Artemisia verlotiorum*		Y			2
plants	land plants	Asteraceae	*Baccharis halimifolia*	groundsel bush	Y			2
plants	land plants	Asteraceae	*Bidens bipinnata*	bipinnate beggar's ticks	Y			15
plants	land plants	Asteraceae	*Bidens pilosa*		Y			6/1
plants	land plants	Asteraceae	*Brachyscome*					2/1
plants	land plants	Asteraceae	*Brachyscome dentata*			C		3/3

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plants	land plants	Asteraceae	*Brachyscome microcarpa subsp. microcarpa*			C		1/1
plants	land plants	Asteraceae	*Calotis dentex*	white burr daisy		C		2/2
plants	land plants	Asteraceae	*Calotis lappulacea*	yellow burr daisy		C		10/1
plants	land plants	Asteraceae	*Calyptocarpus vialis*	creeping cinderella weed	Y			2
plants	land plants	Asteraceae	*Carduus pycnocephalus*		Y			4/2
plants	land plants	Asteraceae	*Carduus thoermeri*	nodding thistle	Y			2/2
plants	land plants	Asteraceae	*Carthamus lanatus*	saffron thistle	Y			3/2
plants	land plants	Asteraceae	*Cassinia laevis*			C		2
plants	land plants	Asteraceae	*Centaurea melitensis*	Maltese cockspur	Y			4/4
plants	land plants	Asteraceae	*Chondrilla juncea*	skeleton weed	Y			1/1
plants	land plants	Asteraceae	*Chrysocephalum apiculatum*	yellow buttons		C		12/1
plants	land plants	Asteraceae	*Chrysocephalum apiculatum subsp. exile*			C		2
plants	land plants	Asteraceae	*Cichorium intybus*	chicory	Y			2
plants	land plants	Asteraceae	*Cirsium vulgare*	spear thistle	Y			20
plants	land plants	Asteraceae	*Coreopsis lanceolata*		Y			2
plants	land plants	Asteraceae	*Crassocephalum crepidioides*	thickhead	Y			2/1
plants	land plants	Asteraceae	*Cyanthillium cinereum*			C		3/1
plants	land plants	Asteraceae	*Dimorphotheca ecklonis*		Y			3/2
plants	land plants	Asteraceae	*Emilia sonchifolia var. javanica*		Y			1/1
plants	land plants	Asteraceae	*Erigeron bonariensis*		Y			14/1
plants	land plants	Asteraceae	*Erigeron karvinskianus*		Y			2/1
plants	land plants	Asteraceae	*Erigeron pusillus*		Y			1/1
plants	land plants	Asteraceae	*Erigeron sumatrensis*		Y			4/1
plants	land plants	Asteraceae	*Euchiton involucratus*			C		1
plants	land plants	Asteraceae	*Euchiton sphaericus*			C		3/1
plants	land plants	Asteraceae	*Gamochaeta americana*		Y			1
plants	land plants	Asteraceae	*Gamochaeta pensylvanica*		Y			3/1
plants	land plants	Asteraceae	*Glossocardia bidens*	native cobbler's pegs		C		2/1
plants	land plants	Asteraceae	*Guizotia abyssinica*	niger seed	Y			1/1
plants	land plants	Asteraceae	*Hypochaeris albiflora*		Y			3
plants	land plants	Asteraceae	*Hypochaeris glabra*	smooth catsear	Y			4
plants	land plants	Asteraceae	*Hypochaeris radicata*	catsear	Y			9/1
plants	land plants	Asteraceae	*Lactuca saligna*	wild lettuce	Y			1
plants	land plants	Asteraceae	*Lactuca serriola forma serriola*		Y			10
plants	land plants	Asteraceae	*Leiocarpa brevicompta*			C		8/2
plants	land plants	Asteraceae	*Leiocarpa leptolepis*			C		1
plants	land plants	Asteraceae	*Leiocarpa websteri*			C		2/1
plants	land plants	Asteraceae	*Leuzea australis*			V	V	17/5
plants	land plants	Asteraceae	*Olearia elliptica*			C		2
plants	land plants	Asteraceae	*Olearia fulgens*			C		2/2
plants	land plants	Asteraceae	*Ozothamnus cassinioides*			C		1/1
plants	land plants	Asteraceae	*Picris angustifolia*			C		1
plants	land plants	Asteraceae	*Picris angustifolia subsp. carolorum-henricorum*			C		1
plants	land plants	Asteraceae	*Picris evae*			V	V	5/1
plants	land plants	Asteraceae	*Schkuhria pinnata*		Y			2
plants	land plants	Asteraceae	*Senecio bipinnatisectus*	Commonwealth weed		C		1

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plants	land plants	Asteraceae	*Senecio brigalowensis*			C		3/2
plants	land plants	Asteraceae	*Senecio daltonii*	dalton weed		C		1/1
plants	land plants	Asteraceae	*Senecio hispidulus*			C		2/1
plants	land plants	Asteraceae	*Senecio madagascariensis*	fireweed	Y			14/3
plants	land plants	Asteraceae	*Senecio minimus*			C		1
plants	land plants	Asteraceae	*Senecio pinnatifolius*			C		1
plants	land plants	Asteraceae	*Senecio pinnatifolius var. pinnatifolius*			C		19/4
plants	land plants	Asteraceae	*Senecio quadridentatus*	cotton fireweed		C		4
plants	land plants	Asteraceae	*Senecio tenuiflorus*			C		1/1
plants	land plants	Asteraceae	*Sigesbeckia orientalis*	Indian weed		C		1/1
plants	land plants	Asteraceae	*Silybum marianum*	variegated thistle	Y			3
plants	land plants	Asteraceae	*Soliva sessilis*		Y			4
plants	land plants	Asteraceae	*Sonchus asper*	rough sowthistle	Y			9/2
plants	land plants	Asteraceae	*Sonchus oleraceus*	common sowthistle	Y			11/1
plants	land plants	Asteraceae	*Sphagneticola trilobata*		Y			1
plants	land plants	Asteraceae	*Tagetes minuta*	stinking roger	Y			8/2
plants	land plants	Asteraceae	*Tanacetum vulgare*	tansy	Y			1/1
plants	land plants	Asteraceae	*Taraxacum officinale*	dandelion	Y			13/1
plants	land plants	Asteraceae	*Tragopogon porrifolius*	salsify	Y			4/1
plants	land plants	Asteraceae	*Tridax procumbens*	tridax daisy	Y			2
plants	land plants	Asteraceae	*Vittadinia*					1
plants	land plants	Asteraceae	*Vittadinia cuneata var. hirsuta*			C		1
plants	land plants	Asteraceae	*Vittadinia dissecta var. hirta*			C		1/1
plants	land plants	Asteraceae	*Vittadinia pterochaeta*	rough fuzzweed		C		2/1
plants	land plants	Asteraceae	*Vittadinia pustulata*			C		1
plants	land plants	Asteraceae	*Vittadinia sulcata*	native daisy		C		3
plants	land plants	Asteraceae	*Xerochrysum*					1
plants	land plants	Asteraceae	*Xerochrysum bracteatum*	golden everlasting daisy		C		2
plants	land plants	Asteraceae	*Youngia japonica*			C		1/1
plants	land plants	Asteraceae	*Zinnia peruviana*	wild zinnia	Y			13/2
plants	land plants	Aulacomniaceae	*Mesochaete undulata*			C		1/1
plants	land plants	Aytoniaceae	*Asterella drummondii*			C		2/1
plants	land plants	Basellaceae	*Anredera cordifolia*	Madeira vine	Y			2/1
plants	land plants	Bignoniaceae	*Dolichandra unguis-cati*	cat's claw creeper	Y			1
plants	land plants	Bignoniaceae	*Jacaranda mimosifolia*	jacaranda	Y			3/1
plants	land plants	Bignoniaceae	*Pandorea pandorana*	wonga vine		C		4
plants	land plants	Bignoniaceae	*Tecomaria capensis subsp. capensis*		Y			1
plants	land plants	Blechnaceae	*Blechnum neohollandicum*			C		3
plants	land plants	Blechnaceae	*Blechnum spinulosum*			SL		1
plants	land plants	Boraginaceae	*Buglossoides arvensis*	corn cromwell	Y			2/1
plants	land plants	Boraginaceae	*Cynoglossum torvum*			C		2/2
plants	land plants	Boraginaceae	*Echium plantagineum*	Paterson's curse	Y			3/1
plants	land plants	Boraginaceae	*Ehretia membranifolia*	weeping koda		C		1
plants	land plants	Boraginaceae	*Hackelia suaveolens*			C		2
plants	land plants	Boraginaceae	*Heliotropium amplexicaule*	blue heliotrope	Y			9/1
plants	land plants	Brassicaceae	*Brassica rapa subsp. campestris*		Y			1

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plants	land plants	Brassicaceae	*Capsella bursa-pastoris*	shepherd's purse	Y			8/1
plants	land plants	Brassicaceae	*Erucastrum austroafricanum*		Y			2
plants	land plants	Brassicaceae	*Hirschfeldia incana*	buchan weed	Y			2/1
plants	land plants	Brassicaceae	*Lepidium bonariense*	Argentine peppercress	Y			1/1
plants	land plants	Brassicaceae	*Lepidium didymum*		Y			1
plants	land plants	Brassicaceae	*Lepidium peregrinum*			C	E	2/2
plants	land plants	Brassicaceae	*Lepidium virginicum*	Virginian peppercress	Y			1
plants	land plants	Brassicaceae	*Raphanus raphanistrum*	wild radish	Y			7/3
plants	land plants	Brassicaceae	*Rapistrum rugosum*		Y			7/2
plants	land plants	Brassicaceae	*Rorippa dietrichiana*			C		1/1
plants	land plants	Brassicaceae	*Rorippa nasturtium-aquaticum*	watercress	Y			6/1
plants	land plants	Brassicaceae	*Sisymbrium irio*	london rocket	Y			1
plants	land plants	Brassicaceae	*Sisymbrium officinale*	hedge mustard	Y			1/1
plants	land plants	Brassicaceae	*Sisymbrium orientale*	Indian hedge mustard	Y			2/1
plants	land plants	Bryaceae	*Bryum*					1/1
plants	land plants	Bryaceae	*Plagiobryoides cellularis*			C		1/1
plants	land plants	Cactaceae	*Cereus uruguayanus*		Y			1
plants	land plants	Cactaceae	*Opuntia ficus-indica*	Indian fig	Y			2
plants	land plants	Cactaceae	*Opuntia monacantha*		Y			1
plants	land plants	Cactaceae	*Opuntia stricta*		Y			7
plants	land plants	Cactaceae	*Opuntia tomentosa*	velvety tree pear	Y			41
plants	land plants	Campanulaceae	*Lobelia concolor*			SL		1
plants	land plants	Campanulaceae	*Lobelia purpurascens*	white root		SL		4/1
plants	land plants	Campanulaceae	*Wahlenbergia capillaris*			SL		6
plants	land plants	Campanulaceae	*Wahlenbergia glabra*	native bluebell		SL		1/1
plants	land plants	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell		SL		3/1
plants	land plants	Campanulaceae	*Wahlenbergia stricta*			SL		1
plants	land plants	Cannabaceae	*Aphananthe philippinensis*			C		1
plants	land plants	Cannabaceae	*Celtis sinensis*	Chinese elm	Y			5
plants	land plants	Cannabaceae	*Trema tomentosa*			C		2
plants	land plants	Cannaceae	*Canna indica*	Indian shot	Y			1
plants	land plants	Capparaceae	*Capparis anomala*			C		1
plants	land plants	Capparaceae	*Capparis arborea*	brush caper berry		C		3/1
plants	land plants	Capparaceae	*Capparis mitchellii*			C		1
plants	land plants	Capparaceae	*Capparis sarmentosa*	scrambling caper		C		1
plants	land plants	Caprifoliaceae	*Lonicera japonica*	Japanese honeysuckle	Y			1
plants	land plants	Caryophyllaceae	*Gypsophila australis*			C		1/1
plants	land plants	Caryophyllaceae	*Petrorhagia nanteuilii*	proliferous pink	Y			2/1
plants	land plants	Caryophyllaceae	*Spergularia levis*		Y			1/1
plants	land plants	Caryophyllaceae	*Stellaria media*	chickweed	Y			5/2
plants	land plants	Casuarinaceae	*Allocasuarina torulosa*			C		5/1
plants	land plants	Casuarinaceae	*Casuarina cunninghamiana*			C		1
plants	land plants	Casuarinaceae	*Casuarina cunninghamiana subsp. cunninghamiana*			C		1
plants	land plants	Celastraceae	*Celastrus subspicata*	large-leaved staffvine		C		4/4
plants	land plants	Celastraceae	*Denhamia bilocularis*			C		2/1
plants	land plants	Celastraceae	*Denhamia celastroides*	broad-leaved boxwood		C		1

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plants	land plants	Celastraceae	*Denhamia pittosporoides subsp. pittosporoides*			C		1/1
plants	land plants	Celastraceae	*Elaeodendron australe var. integrifolium*			C		2/2
plants	land plants	Celastraceae	*Siphonodon australis*	ivorywood		C		2/2
plants	land plants	Chenopodiaceae	*Atriplex muelleri*	lagoon saltbush		C		1/1
plants	land plants	Chenopodiaceae	*Atriplex semibaccata*	creeping saltbush		C		1/1
plants	land plants	Chenopodiaceae	*Chenopodium album*	fat-hen	Y			3/3
plants	land plants	Chenopodiaceae	*Dysphania carinata*			C		3/1
plants	land plants	Chenopodiaceae	*Dysphania pumilio*			C		1
plants	land plants	Chenopodiaceae	*Einadia hastata*			C		3/1
plants	land plants	Chenopodiaceae	*Einadia polygonoides*	knotweed goosefoot		C		10
plants	land plants	Chenopodiaceae	*Einadia trigonos subsp. stellulata*			C		1
plants	land plants	Chenopodiaceae	*Maireana microphylla*			C		2
plants	land plants	Chenopodiaceae	*Salsola australis*			C		3
plants	land plants	Chenopodiaceae	*Sclerolaena birchii*	galvanised burr		C		1
plants	land plants	Chenopodiaceae	*Sclerolaena muricata*			C		5
plants	land plants	Chenopodiaceae	*Sclerolaena muricata var. villosa*			C		1/1
plants	land plants	Colchicaceae	*Iphigenia indica*			C		1
plants	land plants	Colchicaceae	*Wurmbea biglandulosa subsp. biglandulosa*			C		1/1
plants	land plants	Commelinaceae	*Aneilema acuminatum*			C		1
plants	land plants	Commelinaceae	*Callisia repens*		Y			2
plants	land plants	Commelinaceae	*Commelina*					1
plants	land plants	Commelinaceae	*Commelina diffusa*			C		5/1
plants	land plants	Commelinaceae	*Commelina ensifolia*	scurvy grass		C		5
plants	land plants	Commelinaceae	*Commelina lanceolata*			C		6
plants	land plants	Commelinaceae	*Murdannia graminea*	murdannia		C		1
plants	land plants	Commelinaceae	*Tradescantia fluminensis*		Y			2/1
plants	land plants	Commelinaceae	*Tradescantia zebrina*		Y			1
plants	land plants	Convolvulaceae	*Calystegia marginata*	forest bindweed		C		1
plants	land plants	Convolvulaceae	*Convolvulus arvensis*		Y			5
plants	land plants	Convolvulaceae	*Convolvulus graminetinus*			C		10
plants	land plants	Convolvulaceae	*Cuscuta campestris*	dodder	Y			2/1
plants	land plants	Convolvulaceae	*Dichondra repens*	kidney weed		C		19/1
plants	land plants	Convolvulaceae	*Evolvulus alsinoides*			C		1
plants	land plants	Convolvulaceae	*Evolvulus alsinoides var. decumbens*			C		4
plants	land plants	Convolvulaceae	*Ipomoea alba*	moon flower	Y			1
plants	land plants	Convolvulaceae	*Ipomoea indica*	blue morning-glory	Y			3
plants	land plants	Convolvulaceae	*Ipomoea lonchophylla*			C		2/1
plants	land plants	Convolvulaceae	*Ipomoea purpurea*	common morning glory	Y			5/4
plants	land plants	Convolvulaceae	*Polymeria*					1
plants	land plants	Convolvulaceae	*Polymeria pusilla*			C		1/1
plants	land plants	Crassulaceae	*Bryophyllum daigremontianum*		Y			1/1
plants	land plants	Crassulaceae	*Bryophyllum proliferum*		Y			1/1
plants	land plants	Crassulaceae	*Crassula sieberiana*			C		2
plants	land plants	Cucurbitaceae	*Cucumis myriocarpus subsp. myriocarpus*	prickly pademelon	Y			1
plants	land plants	Cucurbitaceae	*Diplocyclos palmatus*			C		1
plants	land plants	Cucurbitaceae	*Diplocyclos palmatus subsp. palmatus*			C		2/1

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plants	land plants	Cucurbitaceae	*Sicyos australis*	star cucumber		C		1
plants	land plants	Cucurbitaceae	*Zehneria cunninghamii*	slender cucumber		C		1/1
plants	land plants	Cupressaceae	*Callitris baileyi*	Bailey's cypress		NT		1/1
plants	land plants	Cupressaceae	*Callitris glaucophylla*	white cypress pine		C		1/1
plants	land plants	Cyatheaceae	*Sphaeropteris cooperi*			C		4/1
plants	land plants	Cyperaceae	*Carex breviculmis*			C		1/1
plants	land plants	Cyperaceae	*Carex declinata*			C		2/2
plants	land plants	Cyperaceae	*Carex inversa*	knob sedge		C		2/1
plants	land plants	Cyperaceae	*Cyperus*					1
plants	land plants	Cyperaceae	*Cyperus clarus*			V		1/1
plants	land plants	Cyperaceae	*Cyperus eragrostis*		Y			5/2
plants	land plants	Cyperaceae	*Cyperus flavescens*		Y			2/2
plants	land plants	Cyperaceae	*Cyperus flavidus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus fulvus*			C		1
plants	land plants	Cyperaceae	*Cyperus gracilis*			C		7/1
plants	land plants	Cyperaceae	*Cyperus imbecillis*			C		1
plants	land plants	Cyperaceae	*Cyperus involucratus*		Y			3
plants	land plants	Cyperaceae	*Cyperus laevis*			C		3/3
plants	land plants	Cyperaceae	*Cyperus nutans var. eleusinoides*	flatsedge		C		1/1
plants	land plants	Cyperaceae	*Cyperus rigidellus*			C		1
plants	land plants	Cyperaceae	*Cyperus rotundus*	nutgrass	Y			18
plants	land plants	Cyperaceae	*Cyperus rotundus var. carinalis*			C		2
plants	land plants	Cyperaceae	*Cyperus sesquiflorus*		Y			1
plants	land plants	Cyperaceae	*Cyperus sphaeroideus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus tetraphyllus*			C		2/2
plants	land plants	Cyperaceae	*Cyperus vaginatus*			C		1
plants	land plants	Cyperaceae	*Fimbristylis dichotoma*	common fringe-rush		C		1
plants	land plants	Cyperaceae	*Gahnia aspera*			C		4/2
plants	land plants	Cyperaceae	*Lepidosperma laterale*			C		4/2
plants	land plants	Cyperaceae	*Scleria mackaviensis*			C		1/1
plants	land plants	Davalliaceae	*Davallia pyxidata*			C		3
plants	land plants	Dennstaedtiaceae	*Pteridium esculentum*	common bracken		C		5
plants	land plants	Dilleniaceae	*Hibbertia linearis*			C		1
plants	land plants	Dioscoreaceae	*Dioscorea transversa*	native yam		C		2/1
plants	land plants	Dryopteridaceae	*Parapolystichum acuminatum*			SL		1
plants	land plants	Ebenaceae	*Diospyros geminata*	scaly ebony		C		1
plants	land plants	Ebenaceae	*Diospyros humilis*	small-leaved ebony		C		1/1
plants	land plants	Elaeocarpaceae	*Elaeocarpus obovatus subsp. obovatus*			C		3/3
plants	land plants	Elatinaceae	*Elatine gratioloides*	waterwort		C		1/1
plants	land plants	Ericaceae	*Melichrus urceolatus*	honey gorse		C		1/1
plants	land plants	Ericaceae	*Monotoca scoparia*	prickly broom heath		C		1/1
plants	land plants	Ericaceae	*Styphelia sieberi*			C		1
plants	land plants	Erythroxylaceae	*Erythroxylum sp. (Splityard Creek L.Pedley 5360)*			C		3/3
plants	land plants	Euphorbiaceae	*Acalypha capillipes*	small-leaved acalypha		C		3/2
plants	land plants	Euphorbiaceae	*Croton insularis*	Queensland cascarilla		C		2/2
plants	land plants	Euphorbiaceae	*Croton phebalioides*	narrow-leaved croton		C		1/1

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plants	land plants	Euphorbiaceae	*Euphorbia*					11
plants	land plants	Euphorbiaceae	*Euphorbia davidii*		Y			10/1
plants	land plants	Euphorbiaceae	*Euphorbia drummondii*			C		1
plants	land plants	Euphorbiaceae	*Euphorbia hirta*		Y			3
plants	land plants	Euphorbiaceae	*Euphorbia hyssopifolia*		Y			1
plants	land plants	Euphorbiaceae	*Euphorbia prostrata*		Y			2
plants	land plants	Euphorbiaceae	*Euphorbiaceae*					1/1
plants	land plants	Euphorbiaceae	*Excoecaria dallachyana*	scrub poison tree		C		3/3
plants	land plants	Euphorbiaceae	*Homalanthus*			C		1
plants	land plants	Euphorbiaceae	*Homalanthus populifolius*			C		1
plants	land plants	Euphorbiaceae	*Mallotus philippensis*	red kamala		C		1
plants	land plants	Euphorbiaceae	*Manihot grahamii*		Y			1/1
plants	land plants	Euphorbiaceae	*Ricinocarpos ledifolius*	scrub wedding bush		C		1/1
plants	land plants	Euphorbiaceae	*Ricinus communis*	castor oil bush	Y			3
plants	land plants	Fabroniaceae	*Fabronia sp. (Brisbane F.M.Bailey 296)*			C		1/1
plants	land plants	Frullaniaceae	*Frullania rubella*			C		1/1
plants	land plants	Funariaceae	*Entosthodon radians*			C		1/1
plants	land plants	Gentianaceae	*Centaurium erythraea*	common centaury	Y			3/1
plants	land plants	Geraniaceae	*Erodium crinitum*	blue crowfoot		C		2/1
plants	land plants	Geraniaceae	*Geranium homeanum*			C		2/1
plants	land plants	Geraniaceae	*Geranium solanderi*			C		1
plants	land plants	Geraniaceae	*Geranium solanderi var. solanderi*	native geranium		C		12
plants	land plants	Goodeniaceae	*Goodenia*					1
plants	land plants	Goodeniaceae	*Goodenia bellidifolia subsp. argentea*			C		1/1
plants	land plants	Goodeniaceae	*Goodenia delicata*			C		1/1
plants	land plants	Gyrostemonaceae	*Codonocarpus attenuatus*			C		1
plants	land plants	Haloragaceae	*Haloragis heterophylla*	rough raspweed		C		1
plants	land plants	Hemerocallidaceae	*Caesia parviflora*			C		2/1
plants	land plants	Hemerocallidaceae	*Caesia parviflora var. vittata*			C		1
plants	land plants	Hemerocallidaceae	*Dianella brevipedunculata*			C		1
plants	land plants	Hemerocallidaceae	*Dianella caerulea*			C		3/2
plants	land plants	Hemerocallidaceae	*Dianella longifolia*			C		3/1
plants	land plants	Hemerocallidaceae	*Dianella revoluta*			C		1/1
plants	land plants	Hemerocallidaceae	*Geitonoplesium cymosum*	scrambling lily		C		2
plants	land plants	Hemerocallidaceae	*Geitonoplesium cymosum forma album*			C		4
plants	land plants	Hydrocharitaceae	*Egeria densa*	dense waterweed	Y			4/2
plants	land plants	Hydrocharitaceae	*Hydrilla verticillata*	hydrilla		SL		1
plants	land plants	Hydrocharitaceae	*Limnobium laevigatum*		Y			2/1
plants	land plants	Hypericaceae	*Hypericum gramineum*			C		1
plants	land plants	Hypoxidaceae	*Hypoxis pratensis*			C		1
plants	land plants	Iridaceae	*Iridaceae*					1/1
plants	land plants	Iridaceae	*Moraea setifolia*		Y			1/1
plants	land plants	Juncaceae	*Juncus articulatus*	jointed rush	Y			2/2
plants	land plants	Juncaceae	*Juncus bufonius*	toad rush	Y			1/1
plants	land plants	Lamiaceae	*Ajuga australis*	Australian bugle		C		5/1
plants	land plants	Lamiaceae	*Ajuga sinuata*			C		2/2

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plants	land plants	Lamiaceae	*Clerodendrum floribundum*			C		2
plants	land plants	Lamiaceae	*Coleus australis*			C		4/2
plants	land plants	Lamiaceae	*Lamium amplexicaule*	deadnettle	Y			5/1
plants	land plants	Lamiaceae	*Marrubium vulgare*	white horehound	Y			3
plants	land plants	Lamiaceae	*Mentha australis*	river mint		C		1
plants	land plants	Lamiaceae	*Mentha satureioides*	native pennyroyal		C		7/3
plants	land plants	Lamiaceae	*Prunella vulgaris*	self heal	Y			2/1
plants	land plants	Lamiaceae	*Salvia reflexa*		Y			9
plants	land plants	Lamiaceae	*Salvia verbenaca*	wild sage	Y			3/2
plants	land plants	Lamiaceae	*Teucrium argutum*			C		3/1
plants	land plants	Lamiaceae	*Teucrium junceum*			C		1/1
plants	land plants	Lauraceae	*Cinnamomum camphora*	camphor laurel	Y			1
plants	land plants	Laxmanniaceae	*Arthropodium fimbriatum*			C		1
plants	land plants	Laxmanniaceae	*Arthropodium milleflorum*	vanilla lily		C		2
plants	land plants	Laxmanniaceae	*Arthropodium paniculatum*			C		1/1
plants	land plants	Laxmanniaceae	*Cordyline petiolaris*	large-leaved palm lily		C		1
plants	land plants	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		6/3
plants	land plants	Laxmanniaceae	*Eustrephus latifolius subforma fimbriatus*			C		1
plants	land plants	Laxmanniaceae	*Lomandra filiformis*			C		2
plants	land plants	Laxmanniaceae	*Lomandra longifolia*			C		5
plants	land plants	Laxmanniaceae	*Lomandra multiflora*			C		2
plants	land plants	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		1
plants	land plants	Laxmanniaceae	*Thysanotus tuberosus*			C		3
plants	land plants	Leguminosae	*Acacia burrowii*			C		1
plants	land plants	Leguminosae	*Acacia complanata*	flatstem wattle		C		1/1
plants	land plants	Leguminosae	*Acacia decora*	pretty wattle		C		2/1
plants	land plants	Leguminosae	*Acacia excelsa subsp. excelsa*			C		4
plants	land plants	Leguminosae	*Acacia falcata*	sickle wattle		C		1
plants	land plants	Leguminosae	*Acacia fimbriata*	Brisbane golden wattle		C		2
plants	land plants	Leguminosae	*Acacia glaucocarpa*	hickory wattle		C		1
plants	land plants	Leguminosae	*Acacia implexa*	lightwood		C		4
plants	land plants	Leguminosae	*Acacia irrorata subsp. irrorata*			C		1/1
plants	land plants	Leguminosae	*Acacia maidenii*	Maiden's wattle		C		1
plants	land plants	Leguminosae	*Acacia melanoxylon*	blackwood		C		2/1
plants	land plants	Leguminosae	*Acacia neriifolia*	pechey wattle		C		1/1
plants	land plants	Leguminosae	*Acacia podalyriifolia*	Queensland silver wattle		C		2/1
plants	land plants	Leguminosae	*Acacia pustula*			C		1/1
plants	land plants	Leguminosae	*Acacia salicina*	doolan		C		10/1
plants	land plants	Leguminosae	*Acacia sertiformis*			C		1/1
plants	land plants	Leguminosae	*Biancaea decapetala*		Y			1/1
plants	land plants	Leguminosae	*Chamaecrista mimosoides*	dwarf cassia		C		1/1
plants	land plants	Leguminosae	*Crotalaria brevis*			C		1/1
plants	land plants	Leguminosae	*Crotalaria mitchellii*			C		3
plants	land plants	Leguminosae	*Crotalaria montana*			C		2
plants	land plants	Leguminosae	*Cullen tenax*	emu-foot		C		10/1
plants	land plants	Leguminosae	*Daviesia wyattiana*	long-leaved bitter pea		C		1/1

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plants	land plants	Leguminosae	*Desmanthus pernambucanus*		Y			1/1
plants	land plants	Leguminosae	*Desmodium brachypodum*	large ticktrefoil		C		1/1
plants	land plants	Leguminosae	*Desmodium gunnii*			C		1/1
plants	land plants	Leguminosae	*Desmodium rhytidophyllum*			C		2
plants	land plants	Leguminosae	*Desmodium varians*	slender tick trefoil		C		1
plants	land plants	Leguminosae	*Erythrina vespertilio*			C		1
plants	land plants	Leguminosae	*Erythrina vespertilio subsp. vespertilio*			C		1
plants	land plants	Leguminosae	*Erythrostemon gilliesii*		Y			1/1
plants	land plants	Leguminosae	*Galactia tenuiflora var. lucida*			C		3/1
plants	land plants	Leguminosae	*Genista monspessulana*	Montpellier broom	Y			2/2
plants	land plants	Leguminosae	*Gleditsia triacanthos*	honey locust	Y			3/1
plants	land plants	Leguminosae	*Glycine clandestina*			C		7
plants	land plants	Leguminosae	*Glycine microphylla*			C		1/1
plants	land plants	Leguminosae	*Glycine tabacina*	glycine pea		C		8/1
plants	land plants	Leguminosae	*Glycine tomentella*	woolly glycine		C		11
plants	land plants	Leguminosae	*Hardenbergia violacea*			C		3/1
plants	land plants	Leguminosae	*Hovea longipes*	brush hovea		C		1/1
plants	land plants	Leguminosae	*Hovea lorata*			C		1/1
plants	land plants	Leguminosae	*Indigofera arrecta*		Y			2/2
plants	land plants	Leguminosae	*Indigofera australis*			C		2
plants	land plants	Leguminosae	*Indigofera hirsuta*	hairy indigo		C		1
plants	land plants	Leguminosae	*Lathyrus latifolius*	perennial pea	Y			1/1
plants	land plants	Leguminosae	*Lespedeza juncea*			C		2
plants	land plants	Leguminosae	*Lespedeza juncea subsp. sericea*	perennial lespedeza		C		2/1
plants	land plants	Leguminosae	*Lysiphyllum*					2
plants	land plants	Leguminosae	*Macroptilium atropurpureum*	siratro	Y			7/1
plants	land plants	Leguminosae	*Medicago minima var. minima*		Y			2
plants	land plants	Leguminosae	*Medicago polymorpha*	burr medic	Y			6/2
plants	land plants	Leguminosae	*Medicago sativa*	lucerne	Y			2
plants	land plants	Leguminosae	*Medicago sativa subsp. sativa*		Y			13/1
plants	land plants	Leguminosae	*Medicago scutellata*	snail medic	Y			1
plants	land plants	Leguminosae	*Melilotus albus*	sweet clover	Y			18/1
plants	land plants	Leguminosae	*Melilotus indicus*	hexham scent	Y			3/1
plants	land plants	Leguminosae	*Neptunia gracilis*			C		4
plants	land plants	Leguminosae	*Pararchidendron pruinosum*			C		1/1
plants	land plants	Leguminosae	*Rhynchosia*					1
plants	land plants	Leguminosae	*Rhynchosia minima*			C		12
plants	land plants	Leguminosae	*Senna acclinis*			C		1/1
plants	land plants	Leguminosae	*Senna barclayana*			C		7
plants	land plants	Leguminosae	*Senna coronilloides*			C		1/1
plants	land plants	Leguminosae	*Senna pendula var. glabrata*	Easter cassia	Y			2/2
plants	land plants	Leguminosae	*Senna sophera var. (40Mile Scrub J.R.Clarkson+ 6908)*			C		1/1
plants	land plants	Leguminosae	*Senna sophera var. sophera*			C		1/1
plants	land plants	Leguminosae	*Sesbania cannabina var. cannabina*			C		1
plants	land plants	Leguminosae	*Sophora fraseri*	brush sophora		V	V	3/2

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plants	land plants	Leguminosae	*Swainsona brachycarpa*			C		2/2
plants	land plants	Leguminosae	*Swainsona queenslandica*			C		6/1
plants	land plants	Leguminosae	*Swainsona reticulata*			C		1/1
plants	land plants	Leguminosae	*Tephrosia rufula*			C		1
plants	land plants	Leguminosae	*Trifolium campestre*		Y			1
plants	land plants	Leguminosae	*Trifolium campestre var. campestre*		Y			1/1
plants	land plants	Leguminosae	*Trifolium repens var. repens*	white clover	Y			6
plants	land plants	Leguminosae	*Vachellia farnesiana*		Y			10
plants	land plants	Leguminosae	*Vicia monantha subsp. monantha*		Y			2
plants	land plants	Leguminosae	*Vicia sativa subsp. nigra*		Y			1
plants	land plants	Leguminosae	*Vigna suberecta*			C		2
plants	land plants	Leguminosae	*Zornia dyctiocarpa*			C		1
plants	land plants	Leguminosae	*Zornia dyctiocarpa var. dyctiocarpa*			C		1
plants	land plants	Lejeuneaceae	*Lejeunea aloba*			C		1/1
plants	land plants	Lentibulariaceae	*Utricularia gibba*	floating bladderwort		SL		1/1
plants	land plants	Linaceae	*Linum marginale*	native flax		C		1/1
plants	land plants	Loranthaceae	*Amyema congener subsp. rotundifolia*			C		2/2
plants	land plants	Loranthaceae	*Amyema lucasii*			C		4/3
plants	land plants	Loranthaceae	*Amyema miquelii*			C		2
plants	land plants	Loranthaceae	*Amyema pendula subsp. longifolia*			C		1
plants	land plants	Loranthaceae	*Amylotheca dictyophleba*			C		10
plants	land plants	Loranthaceae	*Dendrophthoe glabrescens*			C		2/1
plants	land plants	Loranthaceae	*Lysiana subfalcata*			C		2/1
plants	land plants	Loranthaceae	*Muellerina eucalyptoides*			C		2/1
plants	land plants	Lunulariaceae	*Lunularia*					1/1
plants	land plants	Lythraceae	*Lythrum salicaria*	purple loosestrife		C		2/1
plants	land plants	Malvaceae	*Abutilon oxycarpum*			C		2
plants	land plants	Malvaceae	*Anoda cristata*	anoda weed	Y			10/1
plants	land plants	Malvaceae	*Hibiscus*					2
plants	land plants	Malvaceae	*Hibiscus tridactylites*			C		14/2
plants	land plants	Malvaceae	*Malva parviflora*	small-flowered mallow	Y			6
plants	land plants	Malvaceae	*Malvastrum americanum*		Y			10
plants	land plants	Malvaceae	*Malvastrum coromandelianum subsp. coromandelianum*		Y			2/1
plants	land plants	Malvaceae	*Modiola caroliniana*	red-flowered mallow	Y			16
plants	land plants	Malvaceae	*Pavonia hastata*	pink pavonia	Y			12/1
plants	land plants	Malvaceae	*Sida*					2/2
plants	land plants	Malvaceae	*Sida hackettiana*			C		2/1
plants	land plants	Malvaceae	*Sida hackettiana subsp. (Gayndah P.Grimshaw+ PG2388)*			C		12
plants	land plants	Malvaceae	*Sida rhombifolia*		Y			17/2
plants	land plants	Malvaceae	*Sida spinosa*	spiny sida	Y			4
plants	land plants	Malvaceae	*Sida trichopoda*			C		1
plants	land plants	Marchantiaceae	*Marchantia foliacea*			C		2/2
plants	land plants	Martyniaceae	*Proboscidea louisianica subsp. fragrans*		Y			1/1
plants	land plants	Meliaceae	*Melia azedarach*	white cedar		C		2/1
plants	land plants	Meliaceae	*Toona ciliata*	red cedar		C		1/1

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plants	land plants	Meliaceae	*Turraea pubescens*	native honeysuckle		C		4/4
plants	land plants	Menispermaceae	*Legnephora moorei*			C		2/1
plants	land plants	Menispermaceae	*Stephania japonica*			C		1
plants	land plants	Menispermaceae	*Stephania japonica var. discolor*			C		1
plants	land plants	Menispermaceae	*Tinospora smilacina*	snakevine		C		1
plants	land plants	Menyanthaceae	*Nymphoides indica*	water snowflake		SL		1
plants	land plants	Metzgeriaceae	*Metzgeria*					1/1
plants	land plants	Moraceae	*Ficus coronata*	creek sandpaper fig		C		2/1
plants	land plants	Moraceae	*Ficus henneana*			C		1
plants	land plants	Moraceae	*Ficus rubiginosa forma glabrescens*			C		1/1
plants	land plants	Moraceae	*Ficus rubiginosa forma rubiginosa*			C		1/1
plants	land plants	Moraceae	*Maclura cochinchinensis*	cockspur thorn		C		2
plants	land plants	Moraceae	*Streblus brunonianus*	whalebone tree		C		2
plants	land plants	Myrsinaceae	*Lysimachia arvensis*		Y			1
plants	land plants	Myrsinaceae	*Myrsine variabilis*			C		3/3
plants	land plants	Myrtaceae	*Angophora floribunda*	rough-barked apple		C		3/1
plants	land plants	Myrtaceae	*Angophora leiocarpa*	rusty gum		C		1/1
plants	land plants	Myrtaceae	*Corymbia*					1
plants	land plants	Myrtaceae	*Corymbia clarksoniana*			C		1/1
plants	land plants	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		1
plants	land plants	Myrtaceae	*Eucalyptus*					1
plants	land plants	Myrtaceae	*Eucalyptus biturbinata*			C		2/1
plants	land plants	Myrtaceae	*Eucalyptus camaldulensis subsp. camaldulensis*			C		1
plants	land plants	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		1
plants	land plants	Myrtaceae	*Eucalyptus eugenioides*			C		2
plants	land plants	Myrtaceae	*Eucalyptus major*	mountain grey gum		C		2/1
plants	land plants	Myrtaceae	*Eucalyptus melliodora*	yellow box		C		4/1
plants	land plants	Myrtaceae	*Eucalyptus montivaga*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus nobilis*	manna gum		C		2/2
plants	land plants	Myrtaceae	*Eucalyptus orgadophila*	mountain coolibah		C		10/7
plants	land plants	Myrtaceae	*Eucalyptus pilularis*	blackbutt		C		1/1
plants	land plants	Myrtaceae	*Eucalyptus tereticornis*			C		4
plants	land plants	Myrtaceae	*Eucalyptus tereticornis subsp. basaltica*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus tereticornis subsp. tereticornis*			C		1/1
plants	land plants	Myrtaceae	*Gossia bidwillii*			C		1/1
plants	land plants	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		1/1
plants	land plants	Myrtaceae	*Lophostemon confertus*	brush box		C		2
plants	land plants	Myrtaceae	*Melaleuca bracteata*			C		2
plants	land plants	Myrtaceae	*Melaleuca viminalis*			C		1
plants	land plants	Myrtaceae	*Rhodamnia dumicola*	rib-fruited malletwood		E		1/1
plants	land plants	Nephrolepidaceae	*Nephrolepis cordifolia*	fishbone fern		C		6
plants	land plants	Notothyladaceae	*Phaeoceros carolinianus*			C		1
plants	land plants	Nyctaginaceae	*Boerhavia dominii*			C		10
plants	land plants	Nyctaginaceae	*Mirabilis jalapa*	four o'clock	Y			1/1
plants	land plants	Nymphaeaceae	*Nymphaea caerulea*		Y			1
plants	land plants	Ochnaceae	*Ochna serrulata*	ochna	Y			2

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plants	land plants	Oleaceae	*Jasminum*					1
plants	land plants	Oleaceae	*Jasminum dianthifolium*			C		5/1
plants	land plants	Oleaceae	*Jasminum dianthifolium x Jasminum simplicifolium subsp. australiense*			C		1/1
plants	land plants	Oleaceae	*Jasminum didymum subsp. racemosum*			C		1/1
plants	land plants	Oleaceae	*Jasminum simplicifolium subsp. australiense*			C		2/2
plants	land plants	Oleaceae	*Ligustrum lucidum*	large-leaved privet	Y			7/1
plants	land plants	Oleaceae	*Notelaea linearis*			C		1/1
plants	land plants	Oleaceae	*Notelaea microcarpa*			C		2
plants	land plants	Oleaceae	*Olea europaea subsp. cuspidata*		Y			3/3
plants	land plants	Onagraceae	*Epilobium billardierianum*			C		1
plants	land plants	Onagraceae	*Epilobium hirtigerum*			C		1/1
plants	land plants	Onagraceae	*Ludwigia peploides subsp. montevidensis*			C		3
plants	land plants	Onagraceae	*Oenothera affinis*	long-flowered evening primrose	Y			1/1
plants	land plants	Onagraceae	*Oenothera curtiflora*		Y			6/1
plants	land plants	Onagraceae	*Oenothera stricta subsp. stricta*		Y			2/2
plants	land plants	Onagraceae	*Oenothera tetraptera*	four-winged evening primrose	Y			1/1
plants	land plants	Ophioglossaceae	*Ophioglossum lusitanicum*	adder's tongue		C		2
plants	land plants	Ophioglossaceae	*Ophioglossum reticulatum*			C		2/2
plants	land plants	Orchidaceae	*Acianthus fornicatus*	pixie caps		SL		2
plants	land plants	Orchidaceae	*Calochilus campestris*	copper beard orchid		SL		1/1
plants	land plants	Orchidaceae	*Corybas*					1
plants	land plants	Orchidaceae	*Cymbidium canaliculatum*			SL		1
plants	land plants	Orchidaceae	*Cymbidium suave*			SL		1
plants	land plants	Orchidaceae	*Dendrobium monophyllum*			SL		1
plants	land plants	Orchidaceae	*Dendrobium speciosum*			SL		2
plants	land plants	Orchidaceae	*Dendrobium speciosum subsp. hillii*			SL		1
plants	land plants	Orchidaceae	*Dendrobium x delicatum*			SL		1/1
plants	land plants	Orchidaceae	*Diuris abbreviata*	lemon doubletail		SL		1
plants	land plants	Orchidaceae	*Diuris sulphurea*	tiger orchid		SL		5/1
plants	land plants	Orchidaceae	*Dockrillia bowmanii*	scrub pencil orchid		SL		2/1
plants	land plants	Orchidaceae	*Dockrillia cucumerina*			SL		2
plants	land plants	Orchidaceae	*Dockrillia linguiformis*	tongue orchid		SL		3
plants	land plants	Orchidaceae	*Dockrillia pugioniformis*	dagger orchid		SL		1
plants	land plants	Orchidaceae	*Dockrillia teretifolia*	rat's tail orchid		SL		1
plants	land plants	Orchidaceae	*Microtis parviflora*	slender onion orchid		SL		1/1
plants	land plants	Orchidaceae	*Pterostylis acuminata*	sharp greenhood		SL		1
plants	land plants	Orchidaceae	*Pterostylis baptistii*	king greenhood		SL		1
plants	land plants	Orchidaceae	*Pterostylis curta*	blunt greenhood		SL		2/1
plants	land plants	Orchidaceae	*Pterostylis erecta*			SL		1
plants	land plants	Orchidaceae	*Pterostylis grandiflora*			SL		2/1
plants	land plants	Orchidaceae	*Sarcochilus ceciliae*	fairy bells		SL		2/1
plants	land plants	Orchidaceae	*Sarcochilus falcatus*	orange blossom orchid		SL		1/1
plants	land plants	Orchidaceae	*Sarcochilus weinthalii*	blotched sarcochilus		E	V	2/2
plants	land plants	Orobanchaceae	*Orobanche minor*	lesser broomrape	Y			2/2
plants	land plants	Oxalidaceae	*Oxalis*					1

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plants	land plants	Oxalidaceae	*Oxalis articulata*	shamrock oxalis	Y			1/1
plants	land plants	Oxalidaceae	*Oxalis chnoodes*			C		9
plants	land plants	Oxalidaceae	*Oxalis corniculata*		Y			5
plants	land plants	Oxalidaceae	*Oxalis debilis var. corymbosa*	pink shamrock	Y			1
plants	land plants	Oxalidaceae	*Oxalis latifolia*	fishtail oxalis	Y			1/1
plants	land plants	Oxalidaceae	*Oxalis perennans*			C		4/2
plants	land plants	Papaveraceae	*Argemone ochroleuca*		Y			1
plants	land plants	Papaveraceae	*Argemone ochroleuca subsp. ochroleuca*	Mexican poppy	Y			2
plants	land plants	Papaveraceae	*Fumaria bastardii*	bastard fumitory	Y			1/1
plants	land plants	Papaveraceae	*Fumaria densiflora*	dense-flowered fumitory	Y			1/1
plants	land plants	Papaveraceae	*Fumaria muralis subsp. muralis*	wall fumitory	Y			1/1
plants	land plants	Papaveraceae	*Papaver aculeatum*	bristle poppy	Y			3
plants	land plants	Papaveraceae	*Papaver hybridum*	rough poppy	Y			1/1
plants	land plants	Papaveraceae	*Papaver somniferum*	opium poppy	Y			3
plants	land plants	Papaveraceae	*Papaver somniferum subsp. setigerum*		Y			4/1
plants	land plants	Papaveraceae	*Papaver somniferum subsp. somniferum*		Y			2/1
plants	land plants	Passifloraceae	*Passiflora aurantia*			C		2
plants	land plants	Passifloraceae	*Passiflora edulis*		Y			1
plants	land plants	Passifloraceae	*Passiflora herbertiana subsp. herbertiana*	native passionfruit		C		2
plants	land plants	Passifloraceae	*Passiflora suberosa subsp. litoralis*		Y			5/2
plants	land plants	Passifloraceae	*Passiflora subpeltata*	white passion flower	Y			1/1
plants	land plants	Phyllanthaceae	*Breynia oblongifolia*			C		4/1
plants	land plants	Phyllanthaceae	*Bridelia exaltata*			C		1
plants	land plants	Phyllanthaceae	*Bridelia leichhardtii*			C		4/4
plants	land plants	Phyllanthaceae	*Phyllanthus*					2/1
plants	land plants	Phyllanthaceae	*Phyllanthus gunnii*			C		2
plants	land plants	Phyllanthaceae	*Phyllanthus similis*			C		1/1
plants	land plants	Phyllanthaceae	*Phyllanthus virgatus*			C		2
plants	land plants	Phytolaccaceae	*Phytolacca octandra*	inkweed	Y			3/1
plants	land plants	Pinaceae	*Pinus*					2
plants	land plants	Pittosporaceae	*Auranticarpa rhombifolia*			C		1
plants	land plants	Pittosporaceae	*Bursaria incana*			C		3/2
plants	land plants	Pittosporaceae	*Bursaria spinosa subsp. spinosa*			C		2
plants	land plants	Pittosporaceae	*Pittosporum angustifolium*			C		3/1
plants	land plants	Pittosporaceae	*Pittosporum undulatum*	sweet pittosporum		C		2
plants	land plants	Plantaginaceae	*Linaria texana*		Y			1/1
plants	land plants	Plantaginaceae	*Plantago cunninghamii*	sago weed		C		1
plants	land plants	Plantaginaceae	*Plantago debilis*	shade plantain		C		8/1
plants	land plants	Plantaginaceae	*Plantago lanceolata*		Y			29/2
plants	land plants	Plantaginaceae	*Plantago major*	greater plantain	Y			12
plants	land plants	Plantaginaceae	*Veronica plebeia*	trailing speedwell		C		3/1
plants	land plants	Plumbaginaceae	*Plumbago zeylanica*	native plumbago		C		3/3
plants	land plants	Poaceae	*Anthosachne plurinervis*			C		4
plants	land plants	Poaceae	*Anthosachne scabra*			C		2/2
plants	land plants	Poaceae	*Aristida calycina*			C		1
plants	land plants	Poaceae	*Aristida caput-medusae*			C		1

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plants	land plants	Poaceae	*Aristida gracilipes*			C		1
plants	land plants	Poaceae	*Aristida lazaridis*			C		1/1
plants	land plants	Poaceae	*Aristida leptopoda*	white speargrass		C		16
plants	land plants	Poaceae	*Aristida personata*			C		1/1
plants	land plants	Poaceae	*Aristida queenslandica var. dissimilis*			C		1/1
plants	land plants	Poaceae	*Arthraxon hispidus*			V	V	5
plants	land plants	Poaceae	*Arthraxon hispidus var. hispidus*			V		2/1
plants	land plants	Poaceae	*Austrostipa aristiglumis*	plains grass		C		11/1
plants	land plants	Poaceae	*Austrostipa ramosissima*	bamboo grass		C		2/1
plants	land plants	Poaceae	*Austrostipa rudis subsp. rudis*			C		1/1
plants	land plants	Poaceae	*Austrostipa scabra subsp. scabra*			C		1/1
plants	land plants	Poaceae	*Austrostipa verticillata*	slender bamboo grass		C		9/1
plants	land plants	Poaceae	*Avena fatua*	wild oats	Y			2
plants	land plants	Poaceae	*Avena fatua x Avena sativa*		Y			1/1
plants	land plants	Poaceae	*Avena sativa*	common oats	Y			1
plants	land plants	Poaceae	*Bothriochloa biloba*			C		10
plants	land plants	Poaceae	*Bothriochloa bladhii*			C		6
plants	land plants	Poaceae	*Bothriochloa bladhii subsp. bladhii*			C		1/1
plants	land plants	Poaceae	*Bothriochloa bunyensis*	Bunya Mountains bluegrass		V	V	3/3
plants	land plants	Poaceae	*Bothriochloa decipiens*			C		4
plants	land plants	Poaceae	*Bothriochloa decipiens var. decipiens*			C		1/1
plants	land plants	Poaceae	*Bothriochloa erianthoides*	satintop grass		C		8
plants	land plants	Poaceae	*Bothriochloa macra*	redleg grass		C		2/2
plants	land plants	Poaceae	*Bromus catharticus*	prairie grass	Y			6/1
plants	land plants	Poaceae	*Capillipedium parviflorum*	scented top		C		1
plants	land plants	Poaceae	*Capillipedium spicigerum*	spicytop		C		1
plants	land plants	Poaceae	*Cenchrus ciliaris*		Y			7
plants	land plants	Poaceae	*Cenchrus clandestinus*		Y			6
plants	land plants	Poaceae	*Cenchrus longisetus*		Y			8/5
plants	land plants	Poaceae	*Cenchrus purpurascens*			C		1/1
plants	land plants	Poaceae	*Chloris divaricata var. divaricata*	slender chloris		C		1
plants	land plants	Poaceae	*Chloris gayana*	rhodes grass	Y			18/1
plants	land plants	Poaceae	*Chloris ventricosa*	tall chloris		C		5/2
plants	land plants	Poaceae	*Chloris virgata*	feathertop rhodes grass	Y			6
plants	land plants	Poaceae	*Cortaderia selloana*	pampas grass	Y			1
plants	land plants	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		5/2
plants	land plants	Poaceae	*Cynodon dactylon*		Y			5
plants	land plants	Poaceae	*Cynodon dactylon var. dactylon*		Y			4/1
plants	land plants	Poaceae	*Dactyloctenium radulans*	button grass		C		2
plants	land plants	Poaceae	*Dichanthium annulatum*	sheda grass	Y			1/1
plants	land plants	Poaceae	*Dichanthium aristatum*	angleton grass	Y			2/1
plants	land plants	Poaceae	*Dichanthium sericeum*			C		16
plants	land plants	Poaceae	*Dichanthium sericeum subsp. humilius*			C		1/1
plants	land plants	Poaceae	*Dichanthium sericeum subsp. polystachyum*			C		1/1
plants	land plants	Poaceae	*Dichelachne crinita*	longhair plumegrass		C		14/4
plants	land plants	Poaceae	*Dichelachne micrantha*	shorthair plumegrass		C		4/1

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plants	land plants	Poaceae	*Dichelachne montana*			C		1/1
plants	land plants	Poaceae	*Digitaria abyssinica*		Y			1/1
plants	land plants	Poaceae	*Digitaria brownii*			C		2
plants	land plants	Poaceae	*Digitaria ciliaris*	summer grass	Y			1/1
plants	land plants	Poaceae	*Digitaria diffusa*			C		1/1
plants	land plants	Poaceae	*Digitaria divaricatissima*	spreading umbrella grass		C		7
plants	land plants	Poaceae	*Digitaria divaricatissima var. divaricatissima*			C		1/1
plants	land plants	Poaceae	*Digitaria eriantha 'Pangola'*		Y			8/1
plants	land plants	Poaceae	*Digitaria parviflora*			C		1/1
plants	land plants	Poaceae	*Digitaria porrecta*			NT		81/9
plants	land plants	Poaceae	*Digitaria ramularis*			C		1
plants	land plants	Poaceae	*Echinochloa colona*	awnless barnyard grass	Y			2/1
plants	land plants	Poaceae	*Echinopogon nutans*			C		1
plants	land plants	Poaceae	*Echinopogon nutans var. nutans*			C		2/2
plants	land plants	Poaceae	*Echinopogon ovatus*			C		1
plants	land plants	Poaceae	*Ehrharta erecta var. erecta*		Y			2/2
plants	land plants	Poaceae	*Eleusine indica*	crowsfoot grass	Y			2/1
plants	land plants	Poaceae	*Eleusine tristachya*	goose grass	Y			2
plants	land plants	Poaceae	*Enneapogon gracilis*	slender nineawn		C		1/1
plants	land plants	Poaceae	*Enteropogon acicularis*	curly windmill grass		C		9
plants	land plants	Poaceae	*Enteropogon unispiceus*			C		1/1
plants	land plants	Poaceae	*Entolasia marginata*	bordered panic		C		1/1
plants	land plants	Poaceae	*Entolasia whiteana*			C		1/1
plants	land plants	Poaceae	*Eragrostis alveiformis*			C		1
plants	land plants	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		2/1
plants	land plants	Poaceae	*Eragrostis brownii var. pubescens*			C		2
plants	land plants	Poaceae	*Eragrostis cilianensis*		Y			4
plants	land plants	Poaceae	*Eragrostis curvula*		Y			12/1
plants	land plants	Poaceae	*Eragrostis leptostachya*			C		3/2
plants	land plants	Poaceae	*Eragrostis tenuifolia*	elastic grass	Y			5/1
plants	land plants	Poaceae	*Eriochloa crebra*	spring grass		C		2/1
plants	land plants	Poaceae	*Eriochloa procera*	slender cupgrass		C		3
plants	land plants	Poaceae	*Eulalia aurea*	silky browntop		C		6
plants	land plants	Poaceae	*Heteropogon contortus*	black speargrass		C		4/1
plants	land plants	Poaceae	*Hordeum vulgare*		Y			1
plants	land plants	Poaceae	*Hyparrhenia hirta*	coolati grass	Y			12/2
plants	land plants	Poaceae	*Imperata cylindrica*	blady grass		C		4
plants	land plants	Poaceae	*Lachnagrostis filiformis*			C		1/1
plants	land plants	Poaceae	*Lolium multiflorum*	italian ryegrass	Y			1
plants	land plants	Poaceae	*Lolium perenne*	perennial ryegrass	Y			8
plants	land plants	Poaceae	*Megathyrsus maximus*		Y			1
plants	land plants	Poaceae	*Megathyrsus maximus var. pubiglumis*		Y			12/1
plants	land plants	Poaceae	*Melinis repens*	red natal grass	Y			7/1
plants	land plants	Poaceae	*Microlaena stipoides*			C		1
plants	land plants	Poaceae	*Microlaena stipoides var. stipoides*			C		1/1
plants	land plants	Poaceae	*Oplismenus aemulus*	creeping shade grass		C		3/1

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plants	land plants	Poaceae	*Oplismenus aemulus var. lasiorhachis*			C		2
plants	land plants	Poaceae	*Oplismenus imbecillis*			C		1/1
plants	land plants	Poaceae	*Panicum bisulcatum*	blackseed panic		C		1/1
plants	land plants	Poaceae	*Panicum coloratum*		Y			3/1
plants	land plants	Poaceae	*Panicum decompositum*			C		10
plants	land plants	Poaceae	*Panicum decompositum var. decompositum*			C		3/2
plants	land plants	Poaceae	*Panicum effusum*			C		2/1
plants	land plants	Poaceae	*Panicum queenslandicum var. queenslandicum*			C		13/1
plants	land plants	Poaceae	*Panicum simile*			C		1/1
plants	land plants	Poaceae	*Paspalidium aversum*			C		1
plants	land plants	Poaceae	*Paspalidium distans*	shotgrass		C		6/2
plants	land plants	Poaceae	*Paspalidium globoideum*	sago grass		C		1
plants	land plants	Poaceae	*Paspalum dilatatum*	paspalum	Y			9/1
plants	land plants	Poaceae	*Phyllostachys aurea*	fishpole bamboo	Y			1/1
plants	land plants	Poaceae	*Poa labillardierei var. labillardierei*	tussock grass		C		1/1
plants	land plants	Poaceae	*Polypogon monspeliensis*	annual beardgrass	Y			1/1
plants	land plants	Poaceae	*Polypogon monspeliensis var. rosei*			C		1
plants	land plants	Poaceae	*Rytidosperma longifolium*			C		3/3
plants	land plants	Poaceae	*Rytidosperma racemosum var. racemosum*			C		4/4
plants	land plants	Poaceae	*Rytidosperma tenuius*			C		4/1
plants	land plants	Poaceae	*Sarga leiocladum*			C		2
plants	land plants	Poaceae	*Setaria pumila*		Y			1
plants	land plants	Poaceae	*Setaria pumila subsp. pumila*		Y			1/1
plants	land plants	Poaceae	*Setaria sphacelata*		Y			6
plants	land plants	Poaceae	*Setaria surgens*			C		2
plants	land plants	Poaceae	*Sorghum bicolor*	forage sorghum	Y			1/1
plants	land plants	Poaceae	*Sorghum halepense*	Johnson grass	Y			14
plants	land plants	Poaceae	*Sorghum nitidum*			C		4
plants	land plants	Poaceae	*Sporobolus africanus*	Parramatta grass	Y			2/1
plants	land plants	Poaceae	*Sporobolus creber*			C		1
plants	land plants	Poaceae	*Sporobolus elongatus*			C		1/1
plants	land plants	Poaceae	*Sporobolus pyramidalis*		Y			1/1
plants	land plants	Poaceae	*Stenotaphrum secundatum*	buffalo grass	Y			1
plants	land plants	Poaceae	*Themeda avenacea*			C		10
plants	land plants	Poaceae	*Themeda triandra*	kangaroo grass		C		15/1
plants	land plants	Poaceae	*Tragus australianus*	small burr grass		C		1
plants	land plants	Poaceae	*Tripogon loliiformis*	five minute grass		C		1/1
plants	land plants	Poaceae	*Urochloa fusca*		Y			1/1
plants	land plants	Poaceae	*Urochloa mosambicensis*	sabi grass	Y			9
plants	land plants	Poaceae	*Urochloa panicoides var. panicoides*		Y			12
plants	land plants	Poaceae	*Vulpia muralis*		Y			1/1
plants	land plants	Poaceae	*Walwhalleya proluta*			C		1
plants	land plants	Polygonaceae	*Fallopia convolvulus*	black bindweed	Y			2/1
plants	land plants	Polygonaceae	*Muehlenbeckia gracillima*			C		1
plants	land plants	Polygonaceae	*Persicaria attenuata*			C		2
plants	land plants	Polygonaceae	*Persicaria capitata*		Y			2

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plants	land plants	Polygonaceae	*Persicaria decipiens*	slender knotweed		C		1
plants	land plants	Polygonaceae	*Persicaria hydropiper*	water pepper		C		7/2
plants	land plants	Polygonaceae	*Persicaria lapathifolia*	pale knotweed		C		1
plants	land plants	Polygonaceae	*Rumex brownii*	swamp dock		C		19
plants	land plants	Polygonaceae	*Rumex crispus*	curled dock	Y			10
plants	land plants	Polygonaceae	*Rumex hypogaeus*		Y			1
plants	land plants	Polypodiaceae	*Dendroconche scandens*			SL		2
plants	land plants	Polypodiaceae	*Dictymia brownii*	strap fern		SL		1
plants	land plants	Polypodiaceae	*Drynaria rigidula*			SL		1
plants	land plants	Polypodiaceae	*Platycerium bifurcatum*			SL		5
plants	land plants	Polypodiaceae	*Platycerium superbum*	staghorn fern		SL		2
plants	land plants	Polypodiaceae	*Pyrrosia confluens*			SL		3/1
plants	land plants	Polypodiaceae	*Pyrrosia confluens var. confluens*			SL		4/1
plants	land plants	Polypodiaceae	*Pyrrosia rupestris*	rock felt fern		SL		4/1
plants	land plants	Portulacaceae	*Calandrinia eremaea*			C		1/1
plants	land plants	Portulacaceae	*Portulaca bicolor*			C		4/1
plants	land plants	Portulacaceae	*Portulaca oleracea*	pigweed	Y			12
plants	land plants	Portulacaceae	*Portulaca pilosa*		Y			3
plants	land plants	Potamogetonaceae	*Potamogeton ochreatus*	blunt pondweed		SL		1
plants	land plants	Pottiaceae	*Weissia sp. (Victoria Park H.Tryon AQ645533)*			C		1/1
plants	land plants	Proteaceae	*Banksia spinulosa var. collina*			C		1/1
plants	land plants	Proteaceae	*Grevillea robusta*			C		3
plants	land plants	Proteaceae	*Hakea eriantha*			C		1/1
plants	land plants	Proteaceae	*Petrophile canescens*			C		1/1
plants	land plants	Pteridaceae	*Adiantum aethiopicum*			SL		2
plants	land plants	Pteridaceae	*Adiantum atroviride*			SL		5/1
plants	land plants	Pteridaceae	*Adiantum formosum*			C		2
plants	land plants	Pteridaceae	*Adiantum hispidulum*			SL		5
plants	land plants	Pteridaceae	*Adiantum hispidulum var. whitei*			SL		1
plants	land plants	Pteridaceae	*Adiantum silvaticum*			SL		2
plants	land plants	Pteridaceae	*Cheilanthes distans*	bristly cloak fern		C		3
plants	land plants	Pteridaceae	*Cheilanthes sieberi*			C		1
plants	land plants	Pteridaceae	*Cheilanthes sieberi subsp. sieberi*			C		3
plants	land plants	Pteridaceae	*Pellaea*					1/1
plants	land plants	Pteridaceae	*Pellaea nana*			SL		1
plants	land plants	Pteridaceae	*Pellaea paradoxa*	heart fern		SL		1
plants	land plants	Pteridaceae	*Pteris vittata*	Chinese bracken		SL		1
plants	land plants	Ptychomitriaceae	*Ptychomitrium australe*			C		2/2
plants	land plants	Racopilaceae	*Racopilum cuspidigerum var. cuspidigerum*			C		1/1
plants	land plants	Ranunculaceae	*Clematis fawcettii*			V	V	1
plants	land plants	Ranunculaceae	*Clematis glycinoides*			C		3/1
plants	land plants	Ranunculaceae	*Clematis pickeringii*			C		1/1
plants	land plants	Ranunculaceae	*Ranunculus inundatus*	river buttercup		C		2
plants	land plants	Ranunculaceae	*Ranunculus lappaceus*	common buttercup		C		2
plants	land plants	Ranunculaceae	*Ranunculus meristus*			C		3/1
plants	land plants	Ranunculaceae	*Ranunculus muricatus*	sharp buttercup	Y			1/1

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plants	land plants	Ranunculaceae	*Ranunculus sessiliflorus*			C		1
plants	land plants	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		3/1
plants	land plants	Ricciaceae	*Riccia lamellosa*			C		1
plants	land plants	Rosaceae	*Acaena ovina*			C		1
plants	land plants	Rosaceae	*Cotoneaster coriaceus*		Y			1/1
plants	land plants	Rosaceae	*Potentilla indica*		Y			7/1
plants	land plants	Rosaceae	*Prunus persica var. persica*		Y			2/1
plants	land plants	Rosaceae	*Prunus rivularis*		Y			2
plants	land plants	Rosaceae	*Pyracantha angustifolia*		Y			1/1
plants	land plants	Rosaceae	*Rosa bracteata*	Macartney rose	Y			1/1
plants	land plants	Rosaceae	*Rubus moluccanus*			C		1
plants	land plants	Rosaceae	*Rubus parvifolius*	pink-flowered native raspberry		C		2
plants	land plants	Rubiaceae	*Asperula conferta*			C		5
plants	land plants	Rubiaceae	*Galium aparine*	cleavers	Y			2/1
plants	land plants	Rubiaceae	*Galium leptogonium*			C		4/2
plants	land plants	Rubiaceae	*Galium terrae-reginae*			C		1/1
plants	land plants	Rubiaceae	*Pavetta australiensis*			C		1
plants	land plants	Rubiaceae	*Pomax umbellata*			C		1/1
plants	land plants	Rubiaceae	*Psydrax odorata forma buxifolia*			C		4/2
plants	land plants	Rubiaceae	*Triflorensia cameronii*			C		4/4
plants	land plants	Rutaceae	*Boronia glabra*			C		1/1
plants	land plants	Rutaceae	*Dinosperma erythrococcum*			C		3/3
plants	land plants	Rutaceae	*Flindersia australis*	crow's ash		C		2/1
plants	land plants	Rutaceae	*Flindersia collina*	broad-leaved leopard tree		C		4/3
plants	land plants	Rutaceae	*Geijera salicifolia*	brush wilga		C		3/3
plants	land plants	Rutaceae	*Melicope micrococca*	white evodia		C		1/1
plants	land plants	Rutaceae	*Murraya paniculata 'Exotica'*		Y			1
plants	land plants	Rutaceae	*Sarcomelicope simplicifolia subsp. simplicifolia*	yellow aspen		C		1/1
plants	land plants	Rutaceae	*Zanthoxylum brachyacanthum*			C		1/1
plants	land plants	Rutaceae	*Zieria smithii*			C		1/1
plants	land plants	Salicaceae	*Casearia multinervosa*	casearia		C		1/1
plants	land plants	Salicaceae	*Populus nigra*	Lombardy poplar	Y			1
plants	land plants	Salicaceae	*Salix babylonica*	weeping willow	Y			3/1
plants	land plants	Salviniaceae	*Azolla rubra*			C		1
plants	land plants	Santalaceae	*Choretrum candollei*	white sour bush		C		1/1
plants	land plants	Santalaceae	*Exocarpos cupressiformis*	native cherry		C		2
plants	land plants	Santalaceae	*Korthalsella breviarticulata*			C		2/2
plants	land plants	Santalaceae	*Leptomeria acida*	sour currant bush		C		1
plants	land plants	Santalaceae	*Notothixos subaureus*	golden mistletoe		C		1/1
plants	land plants	Santalaceae	*Santalum lanceolatum*			SL		4/4
plants	land plants	Santalaceae	*Viscum articulatum*	flat mistletoe		C		4/3
plants	land plants	Sapindaceae	*Alectryon diversifolius*	scrub boonaree		C		1
plants	land plants	Sapindaceae	*Alectryon pubescens*			C		5/5
plants	land plants	Sapindaceae	*Alectryon subdentatus*			C		2
plants	land plants	Sapindaceae	*Atalaya salicifolia*			C		1
plants	land plants	Sapindaceae	*Cupaniopsis parvifolia*	small-leaved tuckeroo		C		2/2

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plants	land plants	Sapindaceae	*Dodonaea triquetra*	large-leaved hop bush		C		1
plants	land plants	Sapindaceae	*Dodonaea viscosa*			C		1
plants	land plants	Sapindaceae	*Dodonaea viscosa subsp. burmanniana*			C		1/1
plants	land plants	Sapindaceae	*Elattostachys xylocarpa*	white tamarind		C		3/2
plants	land plants	Sapotaceae	*Planchonella cotinifolia var. cotinifolia*			C		1/1
plants	land plants	Sapotaceae	*Pleioluma macrocarpa*			C		1
plants	land plants	Scrophulariaceae	*Eremophila debilis*	winter apple		C		3
plants	land plants	Scrophulariaceae	*Verbascum virgatum*	twiggy mullein	Y			13
plants	land plants	Smilacaceae	*Smilax australis*	barbed-wire vine		C		3/1
plants	land plants	Solanaceae	*Cestrum parqui*	green cestrum	Y			1
plants	land plants	Solanaceae	*Datura ferox*	fierce thornapple	Y			2/1
plants	land plants	Solanaceae	*Datura stramonium*	common thornapple	Y			8
plants	land plants	Solanaceae	*Lycium ferocissimum*	African boxthorn	Y			10
plants	land plants	Solanaceae	*Nicotiana*					1
plants	land plants	Solanaceae	*Physalis lanceifolia*		Y			1/1
plants	land plants	Solanaceae	*Physalis peruviana*		Y			2/1
plants	land plants	Solanaceae	*Solanum*					1/1
plants	land plants	Solanaceae	*Solanum americanum*		Y			6/2
plants	land plants	Solanaceae	*Solanum capsicoides*	devil's apple	Y			1
plants	land plants	Solanaceae	*Solanum chenopodioides*	whitetip nightshade	Y			2/2
plants	land plants	Solanaceae	*Solanum mauritianum*	wild tobacco	Y			8
plants	land plants	Solanaceae	*Solanum mitchellianum*			C		3/3
plants	land plants	Solanaceae	*Solanum nemophilum*			C		3/1
plants	land plants	Solanaceae	*Solanum nigrum*		Y			8
plants	land plants	Solanaceae	*Solanum parvifolium*			C		1
plants	land plants	Solanaceae	*Solanum pseudocapsicum*	Madeira winter cherry	Y			1
plants	land plants	Solanaceae	*Solanum seaforthianum*	Brazilian nightshade	Y			2
plants	land plants	Solanaceae	*Solanum sisymbriifolium*		Y			1/1
plants	land plants	Solanaceae	*Solanum stelligerum*	devil's needles		C		2/2
plants	land plants	Solanaceae	*Solanum stupefactum*			C		2/2
plants	land plants	Stackhousiaceae	*Stackhousia viminea*	slender stackhousia		C		1
plants	land plants	Sterculiaceae	*Brachychiton discolor*			SL		1/1
plants	land plants	Sterculiaceae	*Brachychiton populneus*			C		1
plants	land plants	Sterculiaceae	*Brachychiton rupestris*			SL		2/1
plants	land plants	Tamaricaceae	*Tamarix aphylla*	athel pine	Y			3
plants	land plants	Thelypteridaceae	*Christella dentata*	creek fern		SL		2/1
plants	land plants	Thelypteridaceae	*Christella hispidula*			SL		2
plants	land plants	Thymelaeaceae	*Pimelea curviflora*			C		3
plants	land plants	Thymelaeaceae	*Pimelea curviflora subsp. divergens*			C		1/1
plants	land plants	Thymelaeaceae	*Pimelea neoanglica*	poison pimelea		C		18/6
plants	land plants	Thymelaeaceae	*Wikstroemia indica*	tie bush		C		1
plants	land plants	Typhaceae	*Typha domingensis*			C		1
plants	land plants	Typhaceae	*Typha orientalis*	broad-leaved cumbungi		C		2
plants	land plants	Urticaceae	*Dendrocnide*					1
plants	land plants	Urticaceae	*Elatostema reticulatum*	rainforest spinach		C		1/1
plants	land plants	Urticaceae	*Urtica incisa*	stinging nettle		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Urticaceae	*Urtica urens*	small nettle	Y			1
plants	land plants	Verbenaceae	*Glandularia aristigera*		Y			23
plants	land plants	Verbenaceae	*Lantana camara*	lantana	Y			16/2
plants	land plants	Verbenaceae	*Lantana montevidensis*	creeping lantana	Y			3/1
plants	land plants	Verbenaceae	*Phyla nodiflora*	carpetweed		C		1
plants	land plants	Verbenaceae	*Verbena*					1
plants	land plants	Verbenaceae	*Verbena africana*			C		2/2
plants	land plants	Verbenaceae	*Verbena bonariensis*	purpletop	Y			4
plants	land plants	Verbenaceae	*Verbena gaudichaudii*			C		6
plants	land plants	Verbenaceae	*Verbena halei*		Y			1/1
plants	land plants	Verbenaceae	*Verbena incompta*		Y			1/1
plants	land plants	Verbenaceae	*Verbena litoralis*	verbena	Y			4
plants	land plants	Verbenaceae	*Verbena litoralis var. brevibracteata*		Y			1
plants	land plants	Verbenaceae	*Verbena litoralis var. litoralis*		Y			5/1
plants	land plants	Verbenaceae	*Verbena rigida*		Y			15/2
plants	land plants	Viburnaceae	*Viburnum odoratissimum var. awabuki*	sweet viburnum 'emerald lustre'	Y			1/1
plants	land plants	Violaceae	*Pigea enneasperma*			C		1
plants	land plants	Violaceae	*Pigea stellarioides*			C		1/1
plants	land plants	Violaceae	*Viola betonicifolia*			C		1
plants	land plants	Vitaceae	*Apocissus antarctica*			C		2
plants	land plants	Vitaceae	*Apocissus sterculiifolia*			C		1
plants	land plants	Vitaceae	*Causonis clematidea*			C		5/3
plants	land plants	Vitaceae	*Cayratia acris*	hairy grape		C		1
plants	land plants	Vitaceae	*Tetrastigma nitens*	shining grape		C		1
plants	land plants	Xanthorrhoeaceae	*Xanthorrhoea glauca subsp. glauca*			SL		1
plants	land plants	Zygophyllaceae	*Roepera apiculata*			C		1/1
plants	land plants	Zygophyllaceae	*Tribulus micrococcus*	yellow vine		C		9
plants	land plants	Zygophyllaceae	*Tribulus terrestris*	caltrop		C		10
plants	uncertain	Indet.	*Indet.*			C		3
protozoans	slime molds	Physaraceae	*Fuligo septica*			C		5

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix B
Curricula vitae

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B.1 Daniel Kelly

Daniel Kelly

Ecologist

EMM Consulting Pty Limited

Professional Overview

Daniel is an Ecologist who finished an honours project on Koala habitat use across different vegetation communities in 2015. Since joining EMM in 2017, Daniel has developed a varied skillset by working on several large infrastructure projects on the east coast of Australia from Kosciuszko National Park to Townsville. Throughout his work and studies Daniel has developed a keen interest in native flora and has a strong botanical knowledge across the east-coast of Australia.

Qualifications and licences

Bachelor of Environmental Science (Hons) Ecology, University of Queensland, 2015

Introduction to Regional Ecosystems and BioConditioning, 2018

Biodiversity Offset Scheme Accredited Assessors Course, 2018

Advanced Plant Identification Skills for Research and Environmental Assessment, 2019

Associate Member Environmental Institute of Australia and New Zealand, 2018

4WD and Defensive Driving, 2018

White Card – Work Safely in the Construction Industry, 2015

Specialisation

Botanical field assessments.

Threatened species surveys.

Data analysis.

Desktop and field-based biodiversity assessments.

Technical reporting.

Representative experience

Queensland

- Carmichael mine and rail project (September 2017 – December 2017), regional ecosystem ground truthing surveys, pest, weed and contaminated land surveys, breeding place surveys, targeted threatened flora surveys and fauna surveys, Central Queensland (Carmichael Rail Network Pty Ltd).
- Carmichael mine and rail project (July 2019), Pest, weed and contaminated land surveys & reporting, pre-clearance surveys & reporting, Central Queensland (Carmichael Rail Network Pty Ltd).
- Carmichael mine and rail project (July – October 2019), Species Management Plans (MCU1, MCU2 & MCU3) (Carmichael Rail Network Pty Ltd).
- Inland Rail Geotechnical support - Gowrie to Kagaru (March 2018 – August 2019), Protected plant surveys & reporting, pre-clearance surveys & reporting, landholder liaison and access planning, Species Management Plan (Australian Rail Track Corporation).
- Karreman Quarries Expansion (October 2018), offset site BioCondition assessments (Karreman Quarries).
- ARTC G2K Inland Rail Geotechnical Support (2018/2019), protected plant reports, pre-clearance reporting, SMP, and MNES reports. South-East Queensland, (Australian Rail Track Corporation).
- Karreman Quarries Expansion (February 2020), hollow bearing tree assessments (Karreman Quarries).
- Razorback Windfarm Development Approval (April/May 2020), fieldwork planning, vegetation Assessments (Ground-truthing Regional Ecosystem mapping), key findings report (flora). Mount Morgan Ranges, (Epuron).
- Specimen Hill Windfarm Development Approval (April/May 2020), fieldwork planning, vegetation Assessments, key findings report (flora). Callide Range (Epuron).
- Crush Creek exploratory works (2020) – EPBC self-assessment. (Evolution Mining).
- Townsville Energy Chemicals Hub (March 2021), Terrestrial Ecology Tech Report (QPM).
- Inland Rail B2G Geotechnical Investigations (May - June 2021) – Protected plants survey (non-SQ) and Protected Plants survey report (ARTC).
- Bravis Great Artesian Basin Strategy Implementation (August/September 2021) – Bubbling Bore, Bow Park Bore and Culbernie Station Bore desktop ecological reviews (Bravis).
- ARTC Inland Rail G2K Ecological Assessments (September 2020 – May 2023), fieldwork planning and logistics, BioCondition assessments, frog surveys, reptile active searches, bird surveys, RE verification, habitat assessments (Australian Rail Track Corporation).
- G2H Inland Rail Collared Delma surveys (May/June 2021) Collared Delma active searches and habitat mapping (ARTC).
- Specimen Hill Wind Farm (January 2021), MSES SRI assessments as a part of the Ecological Assessment Report (Epuron Pty Ltd).
- QPM Pipeline flora surveys (December 2021 and March 2022), RE verification, RE mapping, trapping lines for Ornamental Snake and habitat assessments (Queensland Pacific Metals Ltd).
- Olive Downs Impact and Offset sites (February 2022 – March 2023) Impact site protected plant surveys, pre-clear spotlighting and offset site BioCondition assessments (Pembroke Resources).
- Inland Rail Geotechnical survey (July 2022) EPBC referral (ARTC).
- Boulder Creek Offset Delivery (May – July 2023) *Cycas megacarpa* relocation plan surveys and management plan updates (Zenviron Pty Ltd).

New South Wales

- Mole River (February 2020) Koala surveys (WaterNSW).
- NSW Offset Advice (February 2020), Assisting in Grassland TEC field assessments (Dorado).

- HMAS Creswell (March 2021), Gap Analysis (Defence).
- Inland Rail North Star to Border and Border to Gowrie (November 2022 – June 2023) due diligence assessments, pre-clearance surveys (*Digitaria porrecta*) and reports (Laing O'Rourke).

Pumped hydro and dam projects

- Snowy 2.0 (Jan 2018 – January 2020), targeted threatened flora surveys, BAM plots in addition to targeted threatened reptile, amphibian, mammal, diurnal bird and owl surveys, Kosciuszko National Park NSW (Snowy Hydro Limited).
- Snowy 2.0 (March 2019 – February 2020), Biodiversity Monitoring Program, smoky mouse trapping/chipping/habitat monitoring, weed monitoring, feral predator monitoring, feral herbivore monitoring, Booroolong Frog monitoring (Snowy Hydro Limited).
- Burrawang to Avon Tunnel (November 2019), Amphibian and Avifauna surveys (WaterNSW).
- Burrawang to Avon Tunnel (February 2020), Threatened Flora surveys (WaterNSW).
- OMPS (May 2022) Threatened Flora surveys using the two-phase method (Oven Mountain Pumped Hydro Storage).
- OMPS (June 2022) Camera trap deployment for threatened fauna species (Oven Mountain Pumped Hydro Storage).
- OMPS (July 2022) Owl and Glossy Black-cockatoo surveys (Oven Mountain Pumped Hydro Storage).
- OMPS (October 2022) Small Snake Orchid and Barrington Tops Ant Orchid surveys (Oven Mountain Pumped Hydro Storage).
- Dungowan Dam Biodiversity Assessments (February 2023) Threatened Flora surveys (WaterNSW).
- OMPS (November 2023) *Pultenaea rubescens* distribution and abundance surveys outside footprint (Oven Mountain Pumped Hydro Storage).
- CHDR (November 2023) Targeted threatened flora surveys – wet sclerophyll and lowland rainforest species (Clarrie Hall Dam Raising – Tweed Shire Council).

Volunteering

- National Parks Association Queensland Council & Advocacy Committee (August 2016 – January 2018).
- National Parks Association (January – August 2016) internship.
- University of Queensland School of Geography and Planning (May and October 2015) Volunteer Research Assistant (PhD fieldwork support).
- Bulimba Creek Catchment Co-ordinating Committee (November 2015) Volunteer.
- The Wilderness Society (January – December 2017) Volunteer assisting/advising campaign managers with conservation research and GIS tasks.

B.2 Rachel Scott

Rachel Scott

Ecologist

EMM Consulting Pty Limited

Professional Overview

Rachel is an Ecologist with over 4 years' experience within varying environmental sectors including: the resource and development industry, fauna rescue and rehabilitation, human-wildlife conflict, and wildlife tourism. Rachel has completed work in various South-east Asian locations, ranging from marine habitat surveys to anti-poaching wildlife programs. Additionally, Rachel has experience conducting extensive field work in remote locations in Australia such as the Northern Territory, far-north Queensland and west New South Wales. During her time at EMM, Rachel has contributed to MNES and MSES management plans and self-assessments, species management plans, offset management plans, project proposals and responses to EPBC approvals. Rachel has experience conducting a range flora surveys such as BioCondition assessments, quaternary assessments, protected plant surveys and targeted threatened flora species surveys. Fauna surveys that Rachel has conducted include baseline surveys (with a range of trapping methods applied e.g. pitfall, elliot, camera and funnel trapping), breeding place surveys and targeted threatened fauna species surveys.

Qualifications and licences

Bachelor of Environmental Science (Wildlife and Conservation Biology), Deakin University, 2021

GI, G8, G9 Mining Supervisor

Standard S11 Course (including Coal Board Medical)

Provide First Aid and Cardiopulmonary Resuscitation

Operate and Maintain a 4WD Vehicle

Queensland White Card

Working at Heights

Queensland Class C Driver's Licence

Specialisation

Targeted fauna surveys

Habitat quality surveys

Flora and fauna baseline surveys

Rescue and rehabilitation

Representative experience

- MNES independent peer review (AGL Pty Ltd)
- Olive Downs Impact, greater glider nest box utilisation analysis (Pembroke Resources, QLD)
- Olive Downs Impact, feral animal monitoring surveys and analysis (Pembroke Resources, QLD)
- North Star to Border, EPBC self-assessment (Inland Rail)
- Cape Flattery Silica Mine Expansion, gap analysis (Cape Flattery Silicia Pty Ltd)
- North Queensland Bulk Ports, EPBC self-assessment (North Queensland Bulk Ports Corporation Limited)
- Aurukun Bauxite offset delivery and ecological ground turthing, ecology surveys and habitat quality analysis (Glencore Bauxite Resource Pty Ltd)
- Eva Copper, baseline ecology surveys (Harmony Gold Pty Ltd)
- Eva Copper, baseline report, MSES and MNES assessments (Harmony Gold Pty Ltd)
- North Star to Border, ecological ground truthing (Inland Rail)
- Boulder Creek Wind Farm offset delivery, field surveys (Macquarie Corporate Holdings Pty Ltd)
- Boulder Creek Wind Farm Cycad Translocation Plan, targeted threatened flora surveys (Macquarie Corporate Holdings Pty Ltd)
- Olive Downs Impact, targeted species MNES field surveys (Pembroke Resources, QLD)
- Olive Downs Offset Area, habitat quality surveys (Pembroke Resources, QLD)
- QPM Offset Area Management Plan, habitat quality impact assessment (Queensland Pacific Metals)
- QPM Energy Powerline Project, ecology fieldwork (Queensland Pacific Metals)
- Blackwater Northern Lease Expansion, MNES Assessments (BHP)
- Solquartz Silicon Smelter, ecological survey (Solquartz)
- Baseline fauna surveys (National Parks and Wildlife Service, NSW)
- Data consolidation and review (Victorian National Parks Association, VIC)
- Animal rehabilitation (Free the Bears, Cambodia)
- Animal rehabilitation (Elephant Nature Park, Thailand)
- Habitat surveys, PhD Assistant (Charles Darwin University, NT)
- Rescue and rehabilitation (Crystal Ocean Wildlife Shelter, VIC)
- Marine fauna guide (Watermaarq, VIC)
- Environmental guide (Kimberly Wild Expeditions, WA)

B.3 Elliot Leach

Dr Elliot Leach

Senior Ecologist
EMM Consulting Pty Limited

Professional Overview

Elliot is a Senior Ecologist who completed a PhD on Australian rainforest birds in 2018. He has extensive field experience in eastern Australia, working on a wide range of biodiversity surveys and threatened species surveys, including several in national parks.

Since joining EMM in 2018, Elliot has carried out threatened species surveys in New South Wales (primarily for Snowy 2.0), the Australian Capital Territory and Queensland. He has also played a key role in the preparation of technical reports, as well as conducting desktop and field-based biodiversity assessments and threatened species surveys for many projects across Queensland.

Qualifications and licences

Doctor of Philosophy "Monitoring the effects of climate change on the rainforest birds of eastern Australia" Griffith University, 2018.

Bachelor of Science (Hons I) Ecology and Conservation Biology, Griffith University, 2013.

Specialisation

Threatened species surveys.

Technical reporting.

Desktop and field-based biodiversity assessments.

Data analysis.

Representative experience

Resource industries

- Eva Copper Project, threatened species surveys, habitat mapping, vegetation surveys ,technical reporting. Cloncurry, North-west Qld (Copper Mountain Mining Corporation).
- Olive Downs Coking Coal Project, threatened species surveys, vegetation surveys, pre-clearance ecology surveys, habitat assessment and preparation of an offset area management plan (OAMP). Central Qld (Pembroke Resources).
- QPM Moranbah gas pipeline, threatened species surveys, habitat assessment, technical reporting. Central Qld (Queensland Pacific Metals).
- QPM Tech project, threatened species surveys, habitat assessment, habitat quality scoring, technical reporting. North QLD (Queensland Pacific Metals).
- Karreman Quarries Offset Project, vegetation surveys and pre-clearance ecology surveys. South-east QLD (Karreman Quarries).
- Hall Quarry overburden, threatened species surveys. Central NSW (Boral).

Infrastructure

- Snowy 2.0, threatened species surveys, Kosciuszko National Park. Southern NSW (Snowy Hydro Limited).
- Inland Rail (Gowrie to Kagaru Project), project management, desktop biodiversity assessment, planning of ecological surveys, ecological fieldwork, technical reporting, habitat assessment and habitat quality scoring. South-east QLD (ARTC).
- North Queensland Bulk Ports, flora surveys, habitat assessments, preparation of species management program (SMP). Ports of Weipa, Mackay, Hay Point and Abbot Point QLD (North Queensland Bulk Ports).
- Gladstone Ports Corporation, migratory shorebird monitoring surveys and preparation of 2020 annual report. Central QLD (Gladstone Ports Corporation) **note: work completed for Wildlife Unlimited.*
- Mona Vale Road upgrade, targeted threatened species surveys for Red-crowned Broodfrog (*Pseudophryne australis*) within Ku-ring-gai Chase National Park. Sydney NSW (NSW Roads & Maritime Services).
- Moreton Bay Rail Link project, design, construction and installation of wildlife telemetry equipment to monitor movement and behaviour of Koalas. South-east QLD (QLD Transport & Main Roads).
- SEQ Koala retrofit works, koala surveys and monitoring. South-east QLD (QLD Transport & Main Roads).

Renewable energy

- Green Poly, threatened fauna and flora surveys, technical reporting, habitat quality scoring. North Queensland (Solquartz).
- Specimen Hill Windfarm, bird utilisation surveys, threatened fauna and flora surveys, technical reporting, preparation of bird and bat management plan (BBMP). Central QLD (Epuron).
- Boulder Creek windfarm, bird utilisation surveys, technical reporting, preparation of BBMP. Central QLD (Epuron).
- Ti-tree Bioenergy, bird of prey surveys and mitigation strategy. South-east QLD (Veolia).

Scientific Research

- Lamington National Park, IBISCA Project, arthropod biodiversity surveys. South-east QLD (Hong Kong University).
- Eungella National Park, Eungella Biodiversity Study, multidisciplinary biodiversity surveys. Central QLD (Griffith University).
- Mt Tamborine BioBlitz, multidisciplinary biodiversity surveys. South-east QLD (Griffith University, Queensland Museum and Scenic Rim Council).
- Border Ranges National Park, community level avifauna surveys. North-east NSW (Griffith University).
- Mt Lewis National Park, multidisciplinary biodiversity surveys. Far north QLD (Griffith University).

Publications

- Barlow, B., Ashton, L., Boyle, M., Leach, E., Stone, M., Dem, F., Kitching, R.L. & Stork, N. in review. Moth, beetle, and bug assemblages are shaped differently across a tropical rainforest vertical gradient.
- Boyle, M., Amaral, V., Leach, E., Kitching, R.L., Burwell, C. & Ashton, L. in prep. Fifteen years of change in the arthropod community of a primary rainforest: repeating the IBISCA Qld survey.
- Leach, E. & Burwell C. J. 2021. *Birds*. In: Eungella: Land of Clouds (eds B. Mitchell & R. Ridgway). Queensland Museum, Brisbane.
- Leach, E., Daly, G. & Burwell, C. J. 2020. The avifauna of the Eungella Region, central coastal Queensland, Australia. *Proceedings of the Royal Society of Queensland – Special Issue on Eungella*, 125, 117-138.
- Ashton, L. A., Leach, E. C., Odell, E. H., McDonald, W. J. F., Arvidsson, D. & Kitching, R. L. 2020. The Eungella Biodiversity Study: filling the knowledge gap. *Proceedings of the Royal Society of Queensland – Special Issue on Eungella*, 135, 11-21
- Burwell, C. J., Theischinger, G., Leach, E. & Burwell-Rodriguez, A. I. 2020. Dragonflies and Damselflies (Odonata) of the Eungella region, central coastal Queensland, Australia. *Proceedings of the Royal Society of Queensland – Special Issue on Eungella*, 135, 33-42.
- Leach, E., Burwell, C., Jones, D. & Kitching, R. 2018. Estimating the population sizes of rainforest birds of the Tweed Caldera. *Australian Field Ornithology*, 35, 119-125.
- Leach, E., Burwell, C., Jones, D. & Kitching, R. 2018. Identifying avian indicators of elevation in the Gondwanan Rainforests of Australia. *Pacific Conservation Biology*, doi.org/10.1071/PC18039
- Leach, E., Burwell, C., Jones, D. & Kitching, R. 2018. Modelling the responses of Australian subtropical rainforest birds to changes in environmental conditions along elevational gradients. *Austral Ecology*, 43, 490-501.
- Leach, E. 2016. Notes on the Zoothera thrushes in the Tweed Range of north-eastern New South Wales. *Australian Field Ornithology*, 33, 240-243.
- Leach, E., Burwell, C., Ashton, L., Jones, D. & Kitching, R. 2016. Comparison of point counts and automated acoustic monitoring: detecting birds in a rainforest biodiversity survey. *Emu*, 116, 305-309.
- Leach, E., Jones, D., Mcbroom, J. & Appleby, R. 2015. Diet of Nankeen Kestrels *Falco cenchroides* at Brisbane Airport. *Australian Field Ornithology*, 32, 15-25.
- Leach, E. 2014. Dust bathing behaviour in a young male Australian brush-turkey (*Alectura lathami*). *The Sunbird*, 44, 24-25.
- Leach, E., Nakamura, A., Turco, F., Burwell, C. J., Catterall, C. P. & Kitching, R. L. 2013. Potential of ants and beetles as indicators of rainforest restoration: characterising pasture and rainforest remnants as reference habitats. *Ecological Management & Restoration*, 14, 202-209.

Volunteering

- Monthly monitoring of migratory shorebird populations at Luggage Point Advanced Water Treatment Plant. South-east Queensland (Queensland Wader Studies Group).
- Woodford Folk Festival Dawn Chorus Bird Walk (with Roy Sonnenburg). South-east Queensland (Woodford Folk Festival).
- Woodford Folk Festival Kids Nature Walk (with Jess Mackie). South-east Queensland (Woodford Folk Festival).
- Birds and Binoculars for Kids. South-east Queensland (The Planting Festival).
- Weeding and habitat restoration for various Habitat Brisbane groups and / or catchment committees including sites at Moorhen Flats, Whites Hill Reserve and Arnwood Place Park. South-east Queensland (Habitat Brisbane).

Appendix C

Likelihood of occurrence table

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Table C.1 Likelihood of occurrence - CEEVNT flora species

Scientific name	Common name	Source	EPBC Act status	NC Act status	Likelihood and habitat requirements
Arthraxon hispidus	Hairy-joint Grass	WildNet	VU	V	Unlikely - The species occurs in a range of habitats including wet eucalypt forest, rainforest and alluvial woodlands, often in association with water sources such as creeks or swamps (Leiper et al 2017).
Bertya opponens	-	PMST	VU	-	Unlikely – Grows in a variety of vegetation communities generally associated with shallow soils derived from sandstone and other well-draining substrates (Halford and Henderson 2002).
Bosistoa transversa	Three-leaved Bosistoa	PMST	VU	-	Unlikely - No records of this species exist within the study area and the preferred habitat of subtropical rainforest are not known to occur in the locale.
Bothriochloa bunyensis	Satin-top Grass	PMST & WildNet	VU	V	Potential - Satin-top Grass grows on fertile basaltic soils on the upper slopes and crests of hills at altitudes between 600-1100 m above sea level (DEWHA 2008a). Although the soil is basaltic, the elevation of the site sits between 400-500 m above sea level.
Bulbophyllum globuliforme	Miniature Moss-orchid	PMST	VU	NT	Unlikely - This species is only known to occur on the upper branches of mature Hoop Pines (*Araucaria cunninghamii*) (Jones 2021).
Cadellia pentastylis	Ooline	PMST	VU	V	Unlikely - This species is not known to occur within the study area. It primarily occurs in association with semi-evergreen vine thicket and Brigalow communities of the Brigalow Belt bioregion, west of the Great Dividing Range (DEWHA 2008f).
Callitris baileyi	Bailey's Cypress	WildNet	-	NT	Unlikely - Grows in mountainous terrain in rocky, basalt derived soils in Eucalypt woodlands (DES 2024f). It also has a preference for the ecotones of dry rainforest (Harden et al. 2014).
Clematis fawcettii	Stream Clematis	PMST & WildNet	VU	V	Potential - This species is associated with dry rainforest, subtropical rainforests, the ecotone of dry rainforests and to a lesser extent eucalypt forests with rainforest species in the understorey. Stream Clematis can be found growing in basalt derived soils where there are suitable canopy gaps, or on the margins of SEVT (DEWHA 2008b).
Coleus omissus	-	PMST	EN	E	Unlikely – Only known from four sites between Gympie and Gayndah. Grows on rocky outcrops in Eucalypt forest adjacent to vine thicket (DES 2024g).
Cryptostylis hunteriana	Leafless Tongue-orchid	PMST	VU	-	Unlikely - In Queensland, this species is primarily associated with sandy coastal heath (DEWHA 2008g).
Cyperus clarus	A sedge	WildNet		V	Likely - *Cyperus clarus* inhabits open woodlands or grasslands in heavy soils derived from basalt (DES 2024a). This species has been previously recorded in the vicinity of Gowrie as a part of the G2H project.

Table C.1 Likelihood of occurrence - CEEVNT flora species

Scientific name	Common name	Source	EPBC Act status	NC Act status	Likelihood and habitat requirements
Dichanthium queenslandicum	King Bluegrass	PMST	EN	V	Potential - This species is primarily associated with grassland communities (particularly those dominated by other blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.) on black cracking soils (TSSC 2013a).
Dichanthium setosum	Bluegrass	PMST	V	-	Potential - The species is primarily restricted to heavy volcanics such as red-brown and heavy black soils. However, it can be found in a broad range of habitats from remnant woodlands to roadside vegetation and pasture (DEWHA 2008c).
Digitaria porrecta	Finger Panic Grass			NT	Known – Previously observed within the clearing impact area.
Eucalyptus taurina	Helidon Ironbark	PMST	EN	E	Unlikely - grows on ridges in shallow sandy soils (Leiper et al 2017).
Grevillea quadricauda	Four-tailed Grevillea	PMST	VU	V	Unlikely - This species occurs in eucalypt woodlands on gravelly and sandy soils in the Helidon Hills and Murphy's Creek area. It occurs primarily near watercourses and drainage lines (Leiper et al 2017; DEWHA 2008h).
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	PMST	VU	V	Unlikely - The subspecies occurs in a range of habitats including eucalypt forests, rainforest ecotones and grasslands (DEWHA 2008i). However, there are no records in or near the study area.
Homopholis belsonii	Belson's Panic	PMST	VU	E	Potential - *Homopholis belsonii* occurs in dry woodland habitats on a range of soil types at an altitudinal range between 200 - 520 metres. This species is generally found growing at the base trees and under the shade of branches and other shaded areas (DES 2024b).
Leichhardtia coronata	Slender Milkvine	WildNet	-	V	Unlikely - Slender Milkvine grows most commonly in moist areas of open forest or rainforest (Borsboom and Wang 1996). This species distribution is primarily east of the Great Dividing Range.
Leionema obtusifolium	-	PMST	VU	V	Unlikely - This species is largely restricted to the Helidon Hills area growing on sandy or rocky soils (Leiper et al 2017).
Lepidium monoplocoides	Winged Pepper-cress	PMST	EN	-	Unlikely - This semi-arid species is not known from the region with the nearest records approximately 150 km south-west of the study area (Leigh et al. 1984).
Lepidium peregrinum	Wandering Peppercress	PMST & WildNet	EN	-	Potential - This species has been recorded in a range of habitats but prefers riparian forests and the ecotones between rainforest and woodland in elevated areas (DoE 2014b).
Leuzea australis	Austral Cornflower	PMST & WildNet	VU	V	Likely – *Leuzea australis* grows in eucalypt open forest with a grassy understory and in grasslands on black clay soil. It is often found on roadsides and on road or rail reserves (DES 2024c).
Macadamia integrifolia	Macadamia Nut	PMST	VU	V	Unlikely - Rainforest habitats required for this species do not occur and no confirmed records exist in the study area (DEWHA 2008j).

Table C.1 Likelihood of occurrence - CEEVNT flora species

Scientific name	Common name	Source	EPBC Act status	NC Act status	Likelihood and habitat requirements
Notelaea lloydii	Lloyd's Olive	PMST	VU	V	Unlikely - The species primarily occurs in open eucalypt woodland with vine forest associations including ecotones and understorey species (Guymer 1987).
Paspalidium grandispiculatum	A Grass	PMST	VU	V	Unlikely - This species is primarily associated with eucalypt woodlands on sedimentary substrates but can also be found in disturbed environments (DAWE 2021).
Phebalium distans	Mt Berryman Phebalium	PMST	EN	E	Unlikely - There are no records of this species within the study area. Although volcanic soils are present within the disturbance footprint, the closest records are more than 50 km to the south-east near Mt. Berryman.
Picris evae	Hawkweed	PMST	VU	V	Likely - Hawkweed primarily occurs in association with *Dichanthium* sp., on rich dark or reddish soils, in open Eucalypt woodland with a grassy understorey (DEWHA 2008i).
Rhodamnia dumicola	Rib-fruited Malletwood	WildNet	-	E	Unlikely - The species occurs in dry rainforests and vine thickets (Leiper et al 2017).
Rhodamnia rubescens	Scrub Turpentine	PMST & WildNet	CE	CR	Unlikely - Records of this species are not known within the study area. This species has the potential to inhabit most forms of rainforest, in both volcanic and sedimentary soils, except cool temperate rainforest (Floyd 1989).
Rhodomyrtus psidioides	Native Guava	PMST	CE	CR	Unlikely - Records of this species are not known within the study area. This species is generally observed in wet sclerophyll forest or along the fringes of littoral rainforest (Floyd 1989).
Samadera bidwillii	Quassia	PMST	VU	V	Unlikely - Records of this species are not known within the study area. The species usually occurs in dry rainforest north of Gympie (Leiper et al 2017).
Sarcochilus weinthalii	Blotched Sarcochilus	PMST & WildNet	VU	E	Unlikely - grows epiphytically on the upper branches of rainforest trees between the altitudinal range of 400 to 700 m above sea level (Barker and Borsboom 1998).
Sophora fraseri	Brush Sophora	PMST & WildNet	VU	V	Unlikely - Brush Sophora grows in moist habitat and is typically associated with hilly terrain in shallow soils derived from basalt or sandstone (DES 2019h).
Thesium australe	Austral toadflax	PMST	VU	V	Potential - Austral Toadflax grows in moist areas of grassland or woodland on skeletal soils, or heavy alluvium and black cracking clays (DES 2024d). As the species exhibits broad habitat preferences, it was surveyed for throughout the disturbance footprint.

Appendix D
Flora list

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Table D.1 Flora species list

Scientific name	
Acacia salicina	*Hypochaeria albiflora*
Alectryon diversifolius	*Jasminum* sp.
Alternanthera denticulata	*Lactuca serriola*
Anthosachne scabra	*Lantana camara*
Aristida leptopoda	*Leiocarpa brevicompta*
Asperula conferta	*Lepidium bonariense*
Aster subulatus	*Leuzea australis*
Austrostipa sp.	*Lolium* sp.
Bidens pilosa	*Lycium ferocissimum*
Boerhavia dominii	*Melilotus albus*
Bothriochloa biloba	*Melinis repens*
Bothriochloa erianthoides	*Mentha satureioides*
Brunoniella australis	*Neptunia gracilis*
Calotis lappulacea	*Notelaea microcarpa*
Chloris gayana	*Oenothera curtiflora*
Chloris sp.	*Opuntia stricta*
Cirsium vulgare	*Opuntia tomentosa*
Convolvulus graminetus	*Panicum decompositum*
Corymbia tessellaris	*Panicum queenslandicum*
Cullen tenax	*Peripluera* sp.
Cyclospermum leptophyllum	*Picris evae*
Cyperus bifax	*Pimelia neo-anglica*
Cyperus eragrostis	*Plantago lanceolata*
Cyperus esculentus	*Plantago* sp.
Cyperus fulvus	*Portulaca oleracea*
Cyperus rotundus	*Rhynchosia minima*
Dianella sp.	*Rubus parvifolius*
Dichanthium sericeum	*Rumex brownii*
Dichondra repens	*Rumex crispus*
Digitaria ciliaris	*Rytidosperma tenuius*
Digitaria divaricatissima	*Salsola australis*
Digitaria porrecta	*Salvia reflexa*

Table D.1 Flora species list

Scientific name	
Digitaria sp.	*Santalum lanceolatum*
Dysphania sp.	*Sclerolaena sp.*
Ehretia membranifolia	*Senecio bipinnatisectus*
Einadia sp.	*Senecio pinnatifolius*
Enneapogon truncatus	*Senecio quadridentatus*
Enteropogon ramosus	*Setaria globoidea*
Eremophila debilis	*Sida hackettiana*
Erigeron sp.	*Sida spinosa*
Eriochloa pseudoacrotricha	*Solanum nigrum*
Erodium crinitum	*Sonchus oleraceus*
Eucalyptus argophloia	*Sorghum halepense*
Eucalyptus orgadophila	*Themeda avenacea*
Euphorbia davidii	*Themeda triandra*
Geranium solanderi	*Tribulus sp.*
Glandularia aristigera	*Urochloa panicoides*
Glycine sp.	*Verbascum* sp.
Gomphocarpus physocarpus	*Verbena bonariensis*
Hackelia suaveolens	*Verbena gaudichaudii*
Haloragis sp.	*Wahlenbergia* sp.
Heliotropium amplexicaule	*Zinnia peruviana*
Hibiscus tridactylites	

Appendix E

Queensland Herbarium specimen identifications

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creating opportunities

Queensland Herbarium and Biodiversity Science
Brisbane Botanic Gardens Mt Coot-tha • Toowong Qld 4066 • Australia
Telephone +61 7 3199 7699
e-mail Queensland.Herbarium@qld.gov.au
http://www.qld.gov.au/herbarium

Queensland Government
Department of
Environment, Science, and Innovation

Enquiries	Lorna Ngugi
Telephone	07 3199 7666
Your reference	
Our reference	LN 23/24

25 January 2024

Daniel Kelly
6/32 Cottell Street
NORMAN PARK QLD 4170
dankelly87@gmail.com

Dear Daniel,

The botanical specimens received by the Queensland Herbarium on 15 January 2024 have been identified as:

CYPE1	*Cyperus gracilis*
DIPO1	*Digitaria porrecta*
ELNE	*Elattostachys nervosa*
EUAR1	*Eucalyptus argophloia*

You can contribute to Queensland's biodiversity information by submitting these plant identifications and associated information to the Atlas of Living Australia using the 'Report a sighting' template at (https://www.ala.org.au/).

The amount of $128.30 (GST inclusive) has been paid for this identification. Thank you for your payment.

Yours sincerely

Lorna B. Ngugi

For Dr G. Brown
Director, QHBS

Download a full version of Census of the Queensland Flora 2022
https://www.data.qld.gov.au/dataset/census-of-the-queensland-flora-and-fungi-2022

Elliot Leach

From: Advisory Services <advisory.services@des.qld.gov.au>
Sent: Thursday, 29 February 2024 1:07 PM
To: Elliot Leach
Cc: Daniel Kelly
Subject: RE: Identification of protected plants Leuzea australis and Picris evae from photographs

CAUTION: This email originated outside of the Organisation.

Hi Elliot,
Yes, that link worked.
I can confirm that all of the images show Picris evae.
Regards,
Tony Bean

Biodiversity Information and Advisory Services
Telephone: (07) 3199 7666 Facsimile: 07 3876 1278
Email: advisory.services@des.qld.gov.au
http://www.qld.gov.au/environment/plants-animals/herbarium/

Queensland Herbarium
Brisbane Botanic Gardens Mt Coot-tha
Mt Coot-tha Rd
TOOWONG, Qld 4066
Australia
Email: queensland.herbarium@qld.gov.au

From: Elliot Leach <eleach@emmconsulting.com.au>
Sent: Thursday, February 29, 2024 12:35 PM
To: Advisory Services
Cc: Daniel Kelly
Subject: RE: Identification of protected plants Leuzea australis and Picris evae from photographs

Thanks for that Tony, fantastic!

Does this link work? If not I can send a series of emails – the photos are quite large so there might be a few, that's all.

Picris evae

Thanks again,

elliot

From: Advisory Services <advisory.services@des.qld.gov.au>
Sent: Thursday, February 29, 2024 12:21 PM

To: Elliot Leach <eleach@emmconsulting.com.au>
Cc: Daniel Kelly <dkelly@emmconsulting.com.au>
Subject: RE: Identification of protected plants Leuzea australis and Picris evae from photographs

CAUTION: This email originated outside of the Organisation.

Dear Elliot,
I was able to access the images for Leuzea australis, and I can confirm that all images are of that species.
I was not able to access the images for Picris evae. Not sure why.
Regards,
Tony Bean

Biodiversity Information and Advisory Services
Telephone: (07) 3199 7666 Facsimile: 07 3876 1278
Email: advisory.services@des.qld.gov.au
http://www.qld.gov.au/environment/plants-animals/herbarium/

Queensland Herbarium
Brisbane Botanic Gardens Mt Coot-tha
Mt Coot-tha Rd
TOOWONG, Qld 4066
Australia
Email: queensland.herbarium@qld.gov.au

From: Elliot Leach <eleach@emmconsulting.com.au>
Sent: Wednesday, February 28, 2024 5:09 PM
To: Advisory Services
Cc: Daniel Kelly
Subject: Identification of protected plants Leuzea australis and Picris evae from photographs

Good afternoon,

My colleague and I were out in the field last week conducting formal Protected Plant surveys (timed meanders) west of Gowrie Junction. We identified *Leuzea australis* and *Picris evae* in the field.
Daniel spoke on the phone earlier today with Tony Bean regarding whether we would be able to get confirmation of our identifications from the Herbarium by using photographs.
Unfortunately Dan (our SQP) has knocked off early today with a bad headache so I am following up!

There were only 15 *Leuzea* present in a small area, and Dan decided not to collect a plant for submission as he didn't want to compromise the population. Dan was very confident on his identification, and photographs of a number of plants are provided in the following linked folder: Leuzea australis

The population of *Picris* was very large, but Dan did not take a specimen for submission. He may be able to clarify why tomorrow if necessary – his email address has been CC'd.
Again Dan was confident of his identification, and we are providing a number of photographs at the following link for your examination: Picris evae

Incidentally, Dan and I would like to talk to someone at the herbarium about this population of *Picris* and other interesting findings in the area. We may try to set up a meeting later this week.

Thanks for your help!

Dr. Elliot Leach
Senior Ecologist

EMM
creating opportunities

T 07 3648 1200
M 0434 633 218
LI Connect on LinkedIn
emmconsulting.com.au

BRISBANE | Yuggera/Turrbal Country, Level 1, 87 Wickham Terrace, Spring Hill QLD 4000

Climate Active Carbon Neutral ORGANISATION

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APPENDIX

O

Matters of National Environmental Significance Report

Appendix B Herbarium confirmation letter

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND RAIL

Queensland Government

Department of
Environment and Science

Queensland Herbarium
Brisbane Botanic Gardens Mt Coot-tha•Toowong 4066 Queensland•Australia
Telephone +61 7 3896 9326 • Facsimile +61 7 3896 9624
e-mail Queensland.Herbarium@qld.gov.au
http://www.qld.gov.au/herbarium

Enquiries	Tony Bean
Telephone	07 3896 9318
Your reference	
Our reference	ARB:mh 340/18

1 May 2018

Chris Schell
Aurecon Australia
Locked Bag 331
BRISBANE Qld 4001

Dear Chris

The botanical specimens received by the Queensland Herbarium on 24 April 2018 have been identified as:

#*Picris barbarorum*. This species is listed as Vulnerable under Queensland's *Nature Conservation Act 1992*.
Acacia polybotrya
Dodonaea sp., fertile material needed for identification.
#*Digitaria porrecta*, confirmed. This species is listed as Near Threatened under Queensland's *Nature Conservation Act 1992*.
#*Homopholis belsonii*, confirmed. This species is listed as Endangered under Queensland's *Nature Conservation Act 1992*.
Bothriochloa erianthoides

These specimens have been kept for incorporation into the Herbarium collection, with thanks.

There is a charge of $110.55 (minimum charge 1hr) for these identifications. A tax invoice and receipt are enclosed.

Yours sincerely

G.P.Guymer
Director

Download a full version of Census of the Queensland Flora 2017
https://data.qld.gov.au/dataset/census-of-the-queensland-flora-2017

APPENDIX

O

Matters of National Environmental Significance Report

Appendix C Flora and fauna habitat assessment proformas

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Inland Rail is a subsidiary of
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INLAND RAIL

Vegetation Proforma

Date: 16/4/2018 CBZ		Future Freight
Observers: CS + OR.	**Site Name:** Site 1.	

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:**

Start point Zone 5 E 0 N

End point Zone 5 E 0 N

Photo points (numbers): North: ____ East: ____ South: ____ West: ____

S 28.60824
E 150.62366

GPS 054

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Mid		Shrub#		Ground	
Height Range (m): 12-14		Height Range: 6 – 8		Height Range: 2-5m		Height Range: 01-0.3m	
Av. Height (m): 12		Av. Height: 7		Av. Height: 3m		Av. Height: 01	
Cover (%): 0 – 65.		Cover: 20%		Cover: 30		Cover: 10%	
Bollok.	d	Bollok	d	wilga	d	Eragrostis leptostachya	
Brigalow	a			Senna barnebyana	a	Cottonia anomala	
						Cymbopogon bombycinus	
						Chloris gayana	
						Cymbopogon dallachianus	
						Bare ground	
						Chloris pectinata	
						Honey Navdoo	
						Black Aristida	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.4.3	**Confirmed Regional Ecosystem:** 11.4.3.
Landform: Claypan	
Soils: fine silty clays	
Structural formation (eg woodland, open-forest etc.: open forest	
Field Observations/ Notes (eg. Level of disturbance connectivity): Road	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canop "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Myrtaceae spp.	Melaleuca sp. (potable)	
Ficus virens	Ficus bidwillii	
Opuntia tomentosa	Bush lime	
Mentha spicata		
Cestrum parqui		
Cenchrus pennisetiformis		
Ficus virens		
Ficus benjamina		
Cinnamomum camphora		
Eucalyptus maculata		
Cupaniopsis anacardioides		
Sarcochilus hartmannii		
Asteraceae		
Solanum chenopodioides		
Passiflora edulis		
Pennisetum clandestinum		
Small-leaved [illegible] (other)		

Vegetation Proforma

Date: 16/4/2018		Future Freight
Observers: CS / OR	Site Name: Morelia Site 2	

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length: —

Start point	Zone 5	E 0	N		
End point	Zone 5	E 0	N		

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 28.59330
E 150.67551. GPS - 03E.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (not required for all sites)

Canopy/ Emergent		Tree		Shrub#		Ground	
Height Range (m): 10 - 12		Height Range: 6 - 8		Height Range: 0.1 - 3		Height Range: 0.1 - 0.2	
Av. Height (m): 11m		Av. Height: 7m.		Av. Height: 2.		Av. Height: 0.1	
Cover (%): 10%		Cover: 5%		Cover: 10%		Cover: 60%	
E. woodsiana ~~[illegible]~~ Bdoh. A. p.p.	*	Acacia aneura. Grevillea striata Brigalow		Eremophila mitchelli Cungeera pulchra		Mulga of mth walnut tree pear Cocksfoot pig fn pig fn rabbit grass neyum pest Solanum nut	
Point dense of canopy, RoC to open area							

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non veg	Confirmed Regional Ecosystem: Non veg
Landform: clay pan	
Soils: fine silts	
Structural formation (eg woodland, open-forest etc.: Cleared	
Field Observations/ Notes (eg. Level of disturbance connectivity): Highly disturbed (dead)	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): i.e. pear, walnut tree pear, mulla of mulla	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canop "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Coolibah		
Gum		
Gum		
Milk		
Red		
Cheese		
Sea		
Solanum		
False		
Saplah		
Bloh		
Mulga		
Native		
Bottle		
Poplar		
Long		
Silver		
Scheme		

Vegetation Proforma

Date: 16/4/18	Future Freight
Observers: CS OR	Site Name: Site 3.

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N

End point Zone 5 E 0 N

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 28.57300.
E 150.745 14 GPS - 039.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Shrub#		Ground	
Height Range (m): 10-12m	Height Range:	Height Range:		Height Range:	
Av. Height (m): 12	Av. Height:	Av. Height:		Av. Height:	
Cover (%): 10%	Cover: 30%	Cover:		Cover:	
Bulloak	*	Melaleuca densispicata		Grass with Cyper sp east	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.5.14.	Confirmed Regional Ecosystem: 11.5.14.
Landform: Drainage	
Soils: Fine silt.	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Heavy grazed	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:		
Minimum height of plants included in the transect table:	m	
Intercept of EDL 0 - 50m:		m
Intercept of EDL 50 -100m:		m
Measured crown cover % of EDL 0 -100m:		%
Structural formation		
Conclusions/notes:		

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Melaleuca sp	Nagonia [illegible]	
Hoary Nock	Rumex	
Sallow	rather illfish	
Green wattle	Bipinn [illegible]	
Tucan wattle	& Cassia [illegible]	
Seaweed	Joy weed	
Gum polyanthy		
Milk of wife		
Bull thistle		
Chris's gum		
~~[illegible]~~		
Grass Nock	Balsam Pear (coll)	
Pain [illegible]	or	
Camphor pling	walwhalleya subxerophila	
~~[illegible]~~		
Bc		
Milk		

pw: drUGepuQ7Zu!

Vegetation Proforma

Date: 17/4/2018	Future Freight
Observers: CS / OR	Site Name: New site A

Transect Details (required for all sites)

GPS coordinates: Datum: GDA 94 Transect length:

Start point Zone 56 E 0778739 N 6834775 GPS 040

End point Zone 5 E 0 N

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (non-woody species)

Canopy/ Emergent		Shrub#		Ground	
Height Range (m):	Height Range:	Height Range: 1-2m		Height Range:	
Av. Height (m):	Av. Height:	Av. Height: 1m		Av. Height:	
Cover (%):	Cover:	Cover: 5%		Cover:	
Absent *	Absent	E. microtheca	d.	mat of mulch	d.
				Opuntia tuna	a
				Lorum	a.
				Sporobolus mitchell	a
				Eragrostis pros	a
				Cloak Rush	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem	Confirmed Regional Ecosystem:
Landform: Clay pan	
Soils: fine silty - clay	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): largely devoid of vegetation - heavily grazed by sheep	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): velvet tree pear, Mother of millions, Harrow weed 30%	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Mother of water		
Schinus molle		
Solanum aust.		
Ficus pubi		
Eucalyptus (Gully typ.)		
Chinchin (Acacia fa)		
Acacia aur		
Acacia farnes		
Morus nigra		
Guava Guava		
Hoang nardo		
Pig Pear		

Note: on walk in second occur at "Belvoir Ponds" were observed

Vegetation Proforma

Date: 17/4/2018		Future Freight
Observers: CS / OR.	**Site Name:** New 6	

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:**

Start point	Zone 56	E 0284035	N 6839067	GPS 41
End point	Zone 5	E 0	N	

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy/ Ground Cover (mandatory for all sites)

Canopy/ Emergent		Canopy		Shrub#		Ground	
Height Range (m): 19-22		Height Range: 2-6m		Height Range: 1-3		Height Range: 0.1-0.2	
Av. Height (m): 20		Av. Height: 5m		Av. Height: 2m		Av. Height: 0.1	
Cover (%): 0%		Cover: 10%		Cover: 10%		Cover: 30%	
E. woollsiana	d	Bauhinia	✓	Acacia	c	Bergalia grass	a
Bauhinia	a			Bauhinia	c	Opuntia tuna	c
				Blue southernwood	c	Horse	c
				Opuntia tuna	a	Lignum	a
						Schum weeds	c
						Eragrostis sp	a

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem.	**Confirmed Regional Ecosystem:**
Landform: Plain	
Soils: fine silty / sand	
Structural formation (eg woodland, open-forest etc.: Open woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): Thinning disturb graze	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Horsem cactus, Opuntia tuna	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Corkwood		
Brigalow		
Ironbark		
Hoop		
Dogwood		
Buddy		
Tumbledown		
Lignum		
Bingalow gum		
Soft Cypress		
Scaly mulga		
Coolibah		
Neem	Coastal Rights	
Crimson Plectran		
Paradise gum		

Vegetation Proforma

Date: 17/4/18	Future Freight
Observers: CS/OR	Site Name: Site 9.

Transect Details (required for all sites) Open forest.

GPS coordinates: Datum: Transect length:

Start point Zone 56 E 0278110 N 6839904 GPS 92

End point Zone 5 E 0 N

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tier 2		Shrub#		Ground	
Height Range (m): 10-18		Height Range:		Height Range:		Height Range:	
Av. Height (m): 13		Av. Height:		Av. Height:		Av. Height:	
Cover (%): 60%		Cover: 60%		Cover: 60%		Cover: 30	
	*						
Eucalyptus	c	Callitris glaucus	c	Callitris glaucus	d	Lomandra	a
Allo luehmannii	e	Allo luehmannii	c	Acacia cowleana	a	Cocks aloe	a
E. tereticornis	a	E. tereticornis	a	Acacia cincinata	a	Native grass	d
E. tessellaris	a			Acacia glaucocarpa	a		
				Acacia decurrens	a		
Callitris	c						
E. crebra?	c						

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.5.10 / ~~11.3.14~~	Confirmed Regional Ecosystem: 11.5.10
Landform:	
Soils:	
Structural formation (eg woodland, open-forest etc.: Open forest 60%	
Field Observations/ Notes (eg. Level of disturbance connectivity): Relatively undisturbed	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Opuntia tomentosa, Milk of milk] - 2%	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Corymbia spp	Chlorophytum	
Aristida caput	Solanum esuriale	
Bracken fern		
Eriochrysogon		
Grass fern		
Mollugo cerviana		
Callitris glauca		
Acacia cowell		
Acacia decora		
Acacia irrorata		
Acacia glaucocystis		
E. tereticornis		
C. terminalis		
Allo leuhmann		
Bogalora grass		
E. pop		
E. woods		
Eucalyptus tereticornis		
Cheilanthes sieberiana		

Vegetation Proforma

Date: 17/4/18	Future Freight
Observers: CS / OR.	Site Name: Site 14.

Transect Details (required for all sites)

GPS coordinates: Datum: J Transect length:

Start point	Zone 56	E 0296570	N 6845503
End point	Zone 5	E 0	N

GPS. 043

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Groundcover with rough trees

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/Estimated		Tree 2		Shrub#		Ground
Height Range (m):		Height Range: 4 - 7		Height Range: 2-5m		Height Range:
Av. Height (m):		Av. Height: 6m		Av. Height: 3m		Av. Height:
Cover (%): 5%		Cover: 10%		Cover: 20%		Cover:
E. pop	d	Callitris glau.	d	grass tree	d	E. pop
				E. pop	a	Rough weed
						Soft brome
						Sheep bed
						Native grass.

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem.	Confirmed Regional Ecosystem:
Landform: Plain	
Soils: eyre ch 7	
Structural formation (eg woodland, open-forest etc.: Ch	
Field Observations/ Notes (eg. Level of disturbance connectivity): Cleared - grass	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): grass Tiggerpit 30%	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Sclerocarya (white)		
Eucalyptus sp.		
Eucalyptus sp.		
Grevillea sp.		
Terminalia		
Melaleuca sp.		
Cathormion glauca		
Eragrostis brownii		
Aristida		
Cyperus sp.		
Austrostipa verticillata		
Bothriochloa erianthoides		

Vegetation Proforma

Date: 18/4/18		Future Freight
Observers: CS / QR	**Site Name:** Site 18	

Transect Details (required for all sites)

GPS coordinates:	Datum:	Transect length:
Start point	Zone 56 E 0300838 N 6853007	GPS 44.
End point	Zone 5 E 0 N	

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Non veg

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy Projection		Tree 2		Shrub#		Ground	
Height Range (m):		Height Range:		Height Range:		Height Range:	
Av. Height (m): 5m		Av. Height:		Av. Height:		Av. Height:	
Cover (%): 30%		Cover:		Cover:		Cover:	
E. tereticornis (molle)	d	Melaleuca fish	c	Opuntia tomentosa	c	Aristida sp	c
E. melanophloia	a	Corymbia glauca	c	Senna coactata	c	Lomandra sp.	c
E. ? → sic melaleuca	a	Melaleuca	a			phillotheca sp	c
Ang. leucophylla	a					Eragrostis sp.	a

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non veg	**Confirmed Regional Ecosystem:**
Landform: Plain	
Soils: Sandy loam / Alluvium	
Structural formation (eg woodland, open-forest etc.: open forest regrowth	
Field Observations/ Notes (eg. Level of disturbance connectivity): Highly disturbed grazed by cattle	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Opuntia tom 2% Senna coa	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

E. tereticornis	Pothos chinensis	
E. crebra	Acacia implexa	
P. orbicularis	Acacia leichhardii	
Lomandra multiflora	E. crebra	
White grass		
Aristida calycina		
Aristida caput-medusae		
Phyllanthus virgatus		
Calotis glandulosa		
Wyoming cocksfoot		
Eulalia aurea		
Pachystachys pilosa		
Acacia glaucocaesia		
E. [illegible]		
Allocasuarina leuhmannii		
Opuntia tuna		
Sporobolus creber		
Chrysopogon sp. (exot. lady)		
Sorghum [illegible]		

Vegetation Proforma

Date: 18/8/18		Future Freight
Observers: CS OR.	**Site Name:** new site 15	

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:**

Start point	Zone 56	E 0297206	N 6847771 GPS
End point	Zone 5	E 0	N 045.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree		Shrub#		Ground	
Height Range (m): 10-14		Height Range: 7 – 10		Height Range: 1-3m		Height Range: 0.1 - 0.3	
Av. Height (m): 12m		Av. Height: 9m		Av. Height: 2m		Av. Height: 0-3.	
Cover (%): 10%		Cover: 50%		Cover: 15%		Cover: 30%	
Cor intermedia	e	Allo inophloia	a	A. leptopus	c	Cotton spp	
Eucalypt spp (i.e. C. erythr)	e	C. glauca	d	A. conferta	c	Native grass	
A. shirleyi	c			Allo. inophl	c	Fox tail	
E. tereticornis (s.)	c						
C. intermedia							

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: ~~HG~~ ~~HSL~~	**Confirmed Regional Ecosystem:** 17
Landform: small rise	
Soils: Sandy	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): on edge of CZ 7. Connected to other areas adjacent	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Grass tussock	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Melaleuca sp.		
Acacia aulacocarpa		
Melaleuca sp.		
Dysoxylum pettaria		

Vegetation Proforma

Date: 18/4/18.		Future Freight
Observers: CS / OR.	**Site Name:** New site 16	

Transect Details (required for all sites)

GPS coordinates: **Datum:** **Transect length:**

Start point	Zone 5	E 0297855	N 6848235
End point	Zone 5	E 0	N

GPS 046

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Cover (required for all sites)

Canopy/ Emergent		Tree		Shrub#		Ground	
Height Range (m): 6-12m		2-5		Height Range: 1-2m		Height Range: 0.1-0.2	
Av. Height (m): 10m.		3m		Av. Height: 2m		Av. Height: 0.1	
Cover (%): 40		30%		Cover: 40%		Cover: 30%	
E. tenuiramis	C	midge (Acacia cowiana)	a	~~Callistemon~~ sp.	d	Native grass + Aloe	30
E. moreton bay	c	Callistemon glaucus	d	melaleuca			
A. shirleyi	a	Allo inophloia	a				
Corymbia (tric shire gum)	a						
C. glauca	c						

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.3.2 / 11.3.28	**Confirmed Regional Ecosystem:**
Landform: Rocky slope	
Soils: Sand / underlying sandstone (CZ 9.)	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): tracks, some clearing, relatively good	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): O. burnetii (1%)	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Alle [illegible] e [illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
A. [illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		
[illegible]		

Vegetation Proforma

Date: 18/4/18		Future Freight
Observers: CS/OR.	**Site Name:** New site 17.	

Transect Details (required for all sites)

GPS coordinates:	Datum:		Transect length:	
Start point	Zone 56	E 0297647	N 6848261	GPS only
End point	Zone 5	E 0	N	

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Shrub#	Ground
Height Range (m): 10 – 13.	Height Range:	Height Range:	Height Range:
Av. Height (m): 12	Av. Height:	Av. Height:	Av. Height:
Cover (%): 30	Cover:	Cover:	Cover:
C. glaucophylla	C. glaucophylla Allo inuiphila	A. carbonaria Leptospermum sp. Acacia megalota	Angophora costata Acacia sp. Maire cooki Dodonaea sp. Xanthorrhoea

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.5.1 / 11.7.7 / 11.7.8	**Confirmed Regional Ecosystem:**
Landform: hill slope	
Soils: sandy	
Structural formation (eg woodland, open-forest etc.: open with forest	
Field Observations/ Notes (eg. Level of disturbance connectivity):	
relatively undist, some selective clearing	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	
Opuntia tomentosa 1% Tiger pear	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Acacia [illegible]		
Persoonia [illegible]		
Cheilanthes		
Callitris		
Acacia leucolepis		
Acacia aulacocarpa		
Allocasuarina inophloia		
Acacia [illegible]		
Acacia [illegible]		
Xanthorrhoea		
Grevillea [illegible]		
Grevillea [illegible]		
Melaleuca [illegible]		
Eucalyptus [illegible]		
Lomandra [illegible]		
Calytrix sp.		

Vegetation Proforma

Date: 19/9/18	Future Freight
Observers: CS OR	Site Name: Site 27.

Transect Details (required for all sites)

GPS coordinates: Datum: J Transect length:

Start point	Zone 56	E 0320576	N 6880871
End point	Zone 5	E 0	N

GPS 049.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 13-18		Height Range: 4-8m		Height Range: 1-2m		Height Range: 0.1-0.2	
Av. Height (m): 14		Av. Height: 5m		Av. Height: 1.5m		Av. Height: 0.1	
Cover (%): 70% - 30%		Cover: 10%		Cover: 10%		Cover: 20%	
Corymbia citriodora	D	wilga	d.	Bellah	a	Native grasses	+
E. moorei	a.			wilga	d.	Forbs.	
A. harpo	a.			Eremophila	a		

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.5.20 / 11.9.5.	Confirmed Regional Ecosystem: 11.9.5
Landform:	
Soils: fine sands. → undulating Lr 9.	
Structural formation (eg woodland, open-forest etc.: Closed forest / woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): evidence of clearing. Stands at Bellah and wilga Brigalow	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): ~~[illegible]~~ African boxthorn 2%. opuntia stricta	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Bellah	Myrnes pestis	
Bigelow's	Callitris	
milkpa	Yellow bottlebrush	
Acacia [illegible]	Cypress [illegible]	
Acacia peel	Eucalyptus [illegible]	
Aristida [illegible]	Eucalyptus [illegible]	
Philotheca (small pink)	Scleroma [illegible]	
Aristida [illegible]	Santalum lanceolatum	
Aristida [illegible]	Panicum [illegible]	
Eremophila [illegible]	Poplar [illegible]	
P. [illegible]	Dianella [illegible]	
Eucalyptus [illegible]	Acacia stenoa (coll)	
Morgan [illegible]	Dodonaea viscosa	
Chenopodium [illegible]		
Acacia [illegible]		
Acacia [illegible]		
Acacia [illegible]		
Acacia [illegible]		
Acacia [illegible]		

Vegetation Proforma

Date: 19/03/18		Future Freight
Observers: CS / OR	**Site Name:** New site 21	

Transect Details (required for all sites)

GPS coordinates: **Datum:** J **Transect length:**

Start point	Zone 56	E 0319408	N 6864999	GPS
End point	Zone 5	E 0	N	050

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 10-12		Height Range: 4-6		Height Range: 1-2m		Height Range: 0.2-0.5	
Av. Height (m): 12m		Av. Height: 6m		Av. Height: 1m		Av. Height: 0.2	
Cover (%): 30%		Cover: 20%		Cover: 70%		Cover: 0 60%	
	*						
E. clhradata? (grey bark with red bark from top)	D	Acacia oxycedrus	A	A. glauca cangr (PK collected)	C	Eragr curvula	C
		Callitris glauca	D			Aristida sp	C
				Opuntia tomentosa	A	Eragr sp.	C
A. leucoxylon	C						
				A. conchata	A		
E. microcorys	C						
						Non grass forbs	
Bullocks	C						

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non rem	**Confirmed Regional Ecosystem:** Non rem
Landform: Plain.	
Soils: Sandy.	
Structural formation (eg woodland, open-forest etc.: Acacia woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): Adjacent to road / [illegible]	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Opuntia tomentosa Opuntia stricta ~ 10%	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Bottle		
Purple [illegible]		
E. [illegible]		
E. [illegible]		
[illegible]		
[illegible]		
[illegible]		
Melaleuca [illegible]		
[illegible]		
[illegible]		
[illegible]		

Vegetation Proforma

Date:	11/3/18
Observers: CS / OR	Site Name: Site 20

Future Freight
Integrating Community, Environment and Engineering

Transect Details (required for all sites)

GPS coordinates: Datum: J Transect length:

Start point	Zone 5 <	E 0319217	N 6863319
End point	Zone 5	E 0	N

GPS 05L

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 6-10m		Height Range: 5m		Height Range: 1-2m		Height Range: 0.1-0.5	
Av. Height (m): 8m		Av. Height: 3-5m		Av. Height: 1.5m		Av. Height: 0.2	
Cover (%): 20%		Cover: 10%		Cover: 15%		Cover: 15%	
E. microcorys	d	Corbium glorus	d	Apophyllum ovatum	C	Native grasses +	
		E. moreton	a	wilga	a	Dichos.	
		Bullocks	a	Acacia oxycephala	C		

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem	Confirmed Regional Ecosystem: Non Rem
Landform: low rise	
Soils: Strong LZ 11 / LZ 9	
Structural formation (eg woodland, open-forest etc.: woodland	

Field Observations/ Notes (eg. Level of disturbance connectivity):
Highly disturbed / near road / cleared with tracks

Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):
Opuntia tomentosa - 1%

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

E. microcorys	Acacia irsata	
A. oxyphylla	~~[illegible]~~	
Amalla cocoth	Sarsot oak	
Q. Sagittata grass	(x) prosopis alteted	
Grass tree		
Sallow flower		
Alectryon oleifolius		
Senna [illegible]		
Chloris gayana		
Prosopis [illegible]		
Bullocks		
Acacia cowleana		
mulga		
Cypress iron		
Kindly sedge		
grass tree seed		
native spinifex		
Kurrajong		
E. crebra		

Vegetation Proforma

Date: 19/4/18	Future Freight
Observers: CS / OR. Site Name: Site 19.	

Transect Details (required for all sites)

GPS coordinates: Datum: GDA Transect length:

Start point	Zone 56	E 0316009	N 6859266	GPS
End point	Zone 5	E 0	N	052

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 16-20		Height Range: 8-12		Height Range: 2-5		Height Range: 0.1-0.5	
Av. Height (m): 18m		Av. Height: 10m		Av. Height: 3m		Av. Height: 0.2	
Cover (%): 15%		Cover: 60%		Cover: 60%		Cover: 30%	
E. grandis	d	C. glaucophylla	d	wilgoa	c	native grasses	
E. cloeziana	a			cockatoo	c		

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: 11.3.2	Confirmed Regional Ecosystem: 11.3.2
Landform: other	
Soils: alluvium	
Structural formation (eg woodland, open-forest etc.: woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): gully area	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): senecio cochinz	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canop "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Senna Cactus		
gum tree		
Poplar box		
Red gum		
tiger bean		
Cal. tra glauca		
Austrostipa		
Mitchell grass		
Acacia sorom		
wilga		
citrus lime		
Melaleuca linariifolia		
Cunnii Cunnii		
Abutilon oxy.		
Cannabis / [illegible]		
cotton bush		
Acacia cupularis		
C. [illegible]		

Vegetation Proforma

Date: 19/4/18		Future Freight
Observers: CS / OR.	**Site Name:** New site 29.	

Transect Details (required for all sites)

GPS coordinates:	Datum:	Transect length:
Start point	Zone 5	E 0	N
End point	Zone 5	E 0	N

GPS 059.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 28.13984
E 151.18794

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 8m.		Height Range:		Height Range: 1-3m		Height Range: 60cm.	
Av. Height (m): 7-9m		Av. Height:		Av. Height: 2m		Av. Height: 0.3.	
Cover (%): 70%		Cover:		Cover: 30%		Cover: 0.1-0.5	
A. keyo	d.	—		wilgan	d	Bark bark	
E. pop (E).	a			Bogtree	a	Coarse grass	
in strip.						cyno dark	
						Dig dark	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem	**Confirmed Regional Ecosystem:** Non Rem
Landform: Plain	
Soils: Z2 9.	
Structural formation (eg woodland, open-forest etc.: Closed Forest	
Field Observations/ Notes (eg. Level of disturbance connectivity): Brigalow strip on road side	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*):	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

A. sotoa	cotoba orch	
Bigolow	dropseed	
wilgan		
Alangium vitor		
Cass australis	Digitaria parvet	
Apple tree		
German grass		
Bar Lolth		
Alley grass		
Malvastrum anom		
dwale.		
bitterplace.		
Nephrolepis growth		
Sw Rol grass		
Cymbopogon bracd		
Panicum effusum		
Setaria mutica		
Bogala grass		
Sida hackbar		

Vegetation Proforma

Date: 20/4/18		Future Freight
Observers: CS / OR	Site Name: 56 30.	

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N	GPS
End point	Zone 5	E 0	N	OSS.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S: -28.12714
E: 151.18953.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range:
Av. Height (m):	Av. Height:	Av. Height:	Av. Height:
Cover (%):	Cover:	Cover:	Cover:
Apsd	Abrd	Alut	Schrd [illegible] [illegible] weight Hubb [illegible] Nahr + exotic grasses

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non rem	Confirmed Regional Ecosystem: Non rem
Landform: undulating - hillform drainage line (oxbow). Non wetland	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): to Eucalyptus [illegible] (about 20ft). No [illegible] [illegible]	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): [illegible] opuntia stricta U.	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Blue heliotrope	Spotted cockroach	
fox wire	Digitaria divaricatissima	
Phyla canescens	Lom centuri	
Shelagarra	Sida rhombifolia	
Schkuhria pinnata	Cullen tenax	
Schkuhria bidentata	Bark wire grass	
Mung mung	Dichanthium sericeum	
Mayas pest.		
Golden [illegible]		
Bark wire grass		
Arfon lovegrass		
Jungle pest (in bloom)		
Austrostipa		
Panic grass		
Cilian pest		
Stand fox		
Melinis minutiflora		
Canary grass Sporobolus creber		
Silver leaf		

Vegetation Proforma

Date: 20/4/18.	Future Freight
Observers: CS / OR	Site Name: Site 31.

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N	GPS
End point	Zone 5	E 0	N	056.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.
S: 28 10756
E: 151.19574.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range: 0.1-0.5m
Av. Height (m):	Av. Height:	Av. Height:	Av. Height: 0.2m
Cover (%):	Cover:	Cover:	Cover: 100%
Absent	Absent	Absent	[Native (90%) Non Nat (10%)] → Grass.

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem	Confirmed Regional Ecosystem: Non rem
Landform: Heavy dark soils (CZ9) - Bungalow adjacent.	
Soils:	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Road Reserve - Bahama Panic (collected).	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Opuntia tomentosa 1%.	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Wahnt cam	Bingalow grass	* Belsure point
Sorghum leptom	Calotis erinacea	(GPS - 057 - 80.
Aristida div.	Sida hakeana	→ collected for Herb).
Poa sieb.	Cyno tab	
Aristida gras	Mercyon monopetha	
Bayna pesd	Aristida physo.	
Blue grass	Cullen tom	
Aristidyan vest	Chenopus leach	
Rhodes grass	Bulbil grass.	
Stock Hole	Mystha growth	
Pig fus.	Yellow paper daisy	
Pimelea trichosta	Gomphrena nest	
Red Mat amaran	Dicanth sericea	
Bidens pilosa	Aristida ?	
Salvia erinacea	Convolvul ?	
Oblong div.		
Enchylaena tomentosa		
Bingalow		
Grant Stratos		

Vegetation Proforma

Date: 20/4/18	Future Freight
Observers: CS / OR	Site Name: Site 32

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N	GPS
End point	Zone 5	E 0	N	est.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

(Tree) S 28.07481 E 151.19788.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 15-18		Height Range: 8-10		Height Range: 1-3		Height Range: 0.1-0.5	
Av. Height (m): 15		Av. Height: 9m.		Av. Height: 2m		Av. Height: 0.2.	
Cover (%): 20%		Cover: 40%.		Cover: 40%		Cover: 10%	
Brigalow	c	Brigalow	d	Wilgan	c	Chinese burr	c
Belah	c	Belah	a	Gundi Cactus	a	Rhodes grass	c
				Cassia aneura	a	Opuntia stricta	c
				Alectryon diversifolius	a	Buffel grass	c
				Capparis lasiantha	a	Bulbine lily	a
				Capparis mitchelii	a		

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: ?	Confirmed Regional Ecosystem: 11.5.9?
Landform: CZ 9.	
Soils: Heavy brown soils with surface stones	
Structural formation (eg woodland, open-forest etc.): Open woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): Brigalow patches, few large trees lots of regrowth	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): orange bird thorn, Opuntia stricta	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Bugtan	Pin cotton	
Rotch	Pig face	
Giant lovebush	Magnus gum	
Green mitch	Eucalyptus debile	
Indigo	Green hood	
Acacia dunnii	Buffel grass	
Cream desert		
Angela grass		
Aquila cactus		
Eucalyptus tenuis		
large bushes		
Chamaecrista grandis		
Acacia salicina, Acacia shirleyi		
Parsonsia		
Schinus terebinthifolius		
Rope seed evergreen		
Acacia geyeri		
Solanum (tall, narrow)		

Vegetation Proforma

Date: 21/4/18	Future Freight
Observers: CR / OR	Site Name: Site 39

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N GPS

End point Zone 5 E 0 N 189

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 27·89956
E 151·29138

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#		Ground	
Height Range (m): 8-13m		Height Range:	Height Range:		Height Range:	
Av. Height (m): 12m		Av. Height:	Av. Height:		Av. Height:	
Cover (%): 70%		Cover:	Cover:		Cover:	
Bahk	d	Absent	~~Absent~~ Opuntia bahk		Bahan Rum Bright grass Sorrow dd. Eucal bank Opuntia bahk Horse earth bottom	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem:	Confirmed Regional Ecosystem:
Landform: Plain	
Soils: Rock Brown Fine Sand/Loam	
Structural formation (eg woodland, open-forest etc.): open/closed Forest	
Field Observations/ Notes (eg. Level of disturbance connectivity): Bahan Panic contact → highly disturbed	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Horse, Box thorn, Opuntia bahk → 10%	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:		
Minimum height of plants included in the transect table:	m	
Intercept of EDL 0 - 50m:		m
Intercept of EDL 50 -100m:		m
Measured crown cover % of EDL 0 -100m:		%
Structural formation		
Conclusions/notes:		

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Ficus		
Bolch		
Thrass.		
Grand shrub		
Tacca dod.		
Belcar p.		
Fic henry		
Sal avst.		
Grand shrub		
Bingular grass		
Jostrichs grass		

Vegetation Proforma

Date: 21/4/18	Future Freight
Observers: CS / GR — Site Name: Site X (new)	

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N

End point Zone 5 E 0 N

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S - 27.90022
E 151.29285.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 10-14		Height Range: 7-9		Height Range: 1-3m		Height Range: 0.1-1m	
Av. Height (m): 12		Av. Height: ~ 8		Av. Height: ~ 2m		Av. Height: 0.5	
Cover (%): 15%		Cover: 20%		Cover: 15%		Cover: 90%	
E. pop	d	Bdah	a	Dod viscosa	c	Bothriochloa pon	c
		E. pop	d	A. salicina	c	Aristida ter hyalo	c
		A. solocum	a	Acacia cunninghamii	a	Cymbo refa	a
						Oxa dub	a
						Green pon	a
						Cymbo cordata	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem:	Confirmed Regional Ecosystem:
Landform: Plain	
Soils: Dark Brown Sandy Loam	
Structural formation (eg woodland, open-forest etc.: Woodland	
Field Observations/ Notes (eg. Level of disturbance connectivity): * Belah's Point - Isolated	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Opunt stricta	

[3608 Oxley Sands Rd.] ← [* Sheryl Lindenmayer to look on but never recorded.]

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Poplar Box	Yucca	
Bolcan pine	Aloe sp.	
Acacia salicina	Asparagus fern	
Bristlebark ~~pine~~ cotton	Shelton pumbe	
Cymbidium sp		
Cymbidium canaliculatum		
Dead wattle		
~~Alto term~~		
Carex sp.		
Paspalum dil		
Chloris dis		
Chloris pect		
Aristida ram		
Indigo sp.		
Bothriochloa sp		
Chloris gayana		
Setaria spacelata		
Indigo		
Aristida ram		

Sphacelota.

Vegetation Proforma

Date: 21/4/18	Future Freight
Observers: CS / OR. Site Name: Site 36.	

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N	GPS
End point	Zone 5	E 0	N	190

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 27 49502
E 151.21924

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 16-18		Height Range: 7-8		Height Range: 2-3.		Height Range: 0.1-1	
Av. Height (m): 18m		Av. Height: 7		Av. Height: 3m		Av. Height: 0.5m	
Cover (%): 60%		Cover: 30%		Cover: 50%		Cover: 60%	
Eucalyptus tereticornis	d	Bright	d	wilga	d	chin desert	
	a	Bolds	a	Grevillea Quadrifida	a	Bright grass	
				Cryptandra ericoides	a	cog lo	
						chloris divi	
						chloris pect	
						Sporobolus creb.	
						Opunt tom	
						Below Pone	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem:	Confirmed Regional Ecosystem:
Landform: Low hills	
Soils: heavy soils / cracking clay	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Eucalyptus pil / grazed.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Opunt tom, Opunt stuck] - 5% Bathurst burr	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:		
Minimum height of plants included in the transect table:	m	
Intercept of EDL 0 - 50m:		m
Intercept of EDL 50 -100m:		m
Measured crown cover % of EDL 0 -100m:		%
Structural formation		
Conclusions/notes:		

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Bolcan Panic	Brigalow tree	
Box Plum	Solanum laciniatum	
grass tree		
grass shrub		
Mugwort pest		
Chloris desertorum		
milga		
Bogalow Cores	X Robsons	
Brigalow		
Chloris pest		
Chloris div.		
Cymbopogon Pon		
Cymbopogon arth		
Rabbit		
Spear Grass		
Plant pest		
Forsten lone		
Alstonia cons.		
[illegible]		

Poa -

21, X,

Vegetation Proforma

* wetland on road verge Acacia spp + Lantana

Date: 21/4/18	Future Freight
Observers: CS / OR	Site Name: Site 40

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N GPS

End point Zone 5 E 0 N 191

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 27.87240
E 151.31552

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 17-20		Height Range: 8-10		Height Range:		Height Range:	
Av. Height (m): 18		Av. Height: 9m		Av. Height:		Av. Height:	
Cover (%): 60% (estimate)		Cover: 15%		Cover:		Cover:	
Pylon Box	d	Batch	a	Absent		Gilgi Grass.	
E. camald.	a	Pylon	d			Green panic	
						Pos dal.	
						Both designs	
						Chloris gay	
						Opunt stricta	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non remn	Confirmed Regional Ecosystem: Non Reg
Landform: alluvium / C29	
Soils: Dark brown silty-sand-loam	
Structural formation (eg woodland, open-forest etc.: Open Tab.	
Field Observations/ Notes (eg. Level of disturbance connectivity): Road side	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): Opunt tomentosa	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Pipta tree	Sida chanii	
Red fig	Cypress rotundus	
Bolah	Ctyana dactylon	
Gilgi g Pl.	Megnus pestis	
Pos dytch	Rosmus sunch	
Guava pnt	Juncus usitch	
Qrantia lotus		
Smart Eucyptus		
Yong weed (cotton)		
Mudon - bong		
Knobby reeds		
Vrochk mouth		
Pos dytch		
Ollow pest.		
Crompton weed		
Cotton tailor bin		
Bear Grass		
Panicum Jacq.		
Mahosh cancer		

Vegetation Proforma

Date: 21/4/18.	Future Freight
Observers: CS / OR.	Site Name: Site 41.

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N GPS

End point Zone 5 E 0 N 192

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 27.85856

E 151.36818

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range:
Av. Height (m):	Av. Height:	Av. Height:	Av. Height:
Cover (%):	Cover:	Cover:	Cover:
Alm	Cam	Alyn	Native + Non-native grasses

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non rem	Confirmed Regional Ecosystem: Non rem
Landform: Flat	
Soils: Black soil	
Structural formation (eg woodland, open-forest etc.: Closed grass	
Field Observations/ Notes (eg. Level of disturbance connectivity): High disturb Rd rem	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): N/A	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Rhodes grass		
Cenchrus		
Chloris gayana		
Bloxsomia		
Pennisetum		
Urochloa mosambicensis		
Cynodon		
Sporobolus		
Megathyrsus maximus		
Glycine canescens		
Perotis rara		
Chloris divaricata		
Bothriochloa pertusa		
Eragrostis tenuifolia		
Eragrostis brownii		
Eragrostis mexicana		

Vegetation Proforma

Date: 22/4/18.	Future Freight
Observers: CS OR.	Site Name: site 42

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N GPS

End point Zone 5 E 0 N 193.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S -27.70060
E 151.41299.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m):		Height Range:		Height Range:		Height Range:	
Av. Height (m): 13m		Av. Height:		Av. Height:		Av. Height:	
Cover (%): 10%		Cover:		Cover:		Cover:	
Mel Pure	d	Absent		Absent		Phyla cand Nadoa (Long) Rhodes grass Nothing other grasses	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non remn	Confirmed Regional Ecosystem: Non Remn
Landform: Plain	
Soils: Black soils / cracking soils	
Structural formation (eg woodland, open-forest etc.: Road reserve Grass/Forb land	
Field Observations/ Notes (eg. Level of disturbance connectivity): Highly disturbed — Carbine wetland, introduced plants & landfill.	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 90% — no listed weeds	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Cladg gorg	Low Thatch	
phyla cuneif	Bursaria spinosa	
Murny Nardoo	eucalyptus dat.	
Helicotrum	Sorghum leiocum	
Ag wheat	Dream grass	
Portage lane	Poa	
Pavonia	Panicum effusum	
Eleusine indica		
Dactyloc		
Rhinecomb minus		
Convolvulus		
Chloris pedicel		
Heavy Glycin		
Lotus corniculatus		
Glycin clandestina		
Pin grass		
Dicanthium		
Eragrost tenuifolia		
Amaranth pugens		

Vegetation Proforma

Date: 22/4/18.	Future Freight
Observers: CS AR	Site Name: Site 44

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N

End point Zone 5 E 0 N

GPS 194.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S -27.78063
E 151.42378

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2		Shrub#		Ground	
Height Range (m): 8-15.		Height Range: 4-8		Height Range: 1-2m.		Height Range:	
Av. Height (m): 12m		Av. Height: 6m		Av. Height: 2m		Av. Height:	
Cover (%): 60 (along dam)		Cover: 40% (along dam)		Cover: 10% (along dam)		Cover:	
E. tereticornis	d	A. stenomyrtus	d	Acacia	d	Native & exotic grasses & forbs	

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem	Confirmed Regional Ecosystem: Non rem
Landform: Adjacent to drainage	
Soils: alluvial / Black soil	
Structural formation (eg woodland, open-forest etc.: Grassland / Fodder / open forest.	
Field Observations/ Notes (eg. Level of disturbance connectivity): adjacent to drainage line	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 60% - No listed	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Eucalyptus curtisii	Pinus elliottii	
Acacia gold		
Fern		
Acacia stenoc		
Euc. tereticornis		
Sorghum leiocladum		
Angle cord		
Big wood		
Magnus pest		
Sida rhombifolia		
Magnus bur		
Chinese celtis		
Wider pillow		
Austral apple		
Tuners vetch		
Conyza canad		
Passiflora sp		
Day wood		
Sesbania		

Note

D. parviflora here from this site

Vegetation Proforma

Date: 22/4/18.	Future Freight
Observers: CS / OR.	Site Name: Site 45.

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N

End point Zone 5 E 0 N

GPS @ 195

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S: 27.75623
E: 151.45656

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range:
Av. Height (m): 12m	Av. Height:	Av. Height:	Av. Height:
Cover (%): 5%	Cover:	Cover:	Cover:
Plants trees adjacent to site	N/A	N/A	Native + exotic grasses/forbs

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non veg	Confirmed Regional Ecosystem: Non veg
Landform: Plain	
Soils: Black soil	
Structural formation (eg woodland, open-forest etc.:	
Field Observations/ Notes (eg. Level of disturbance connectivity): Main Road/Rail easement	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 30% None listed.	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

	Refers to BH034 sp list!	* D. pomeroia known
	Geeter inv	
	Area subject to mining	

Vegetation Proforma

Date: 22/4/18	Future Freight
Observers: CS / OR. Site Name: Site 43	

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N	GPS
End point	Zone 5	E 0	N	196

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S 27.78631
E 151.41858

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range: 1-3m	Height Range:
Av. Height (m):	Av. Height:	Av. Height: 2m	Av. Height:
Cover (%):	Cover:	Cover: 90%	Cover:
Apsite	Absent	Lignum - adapt to road side ↓ only in road corridor	Native + non-native grass + Forbs

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: N/A	Confirmed Regional Ecosystem: No
Landform: Plain	
Soils: Black soils	
Structural formation (eg woodland, open-forest etc.: Closed grassland / Forb	
Field Observations/ Notes (eg. Level of disturbance connectivity): Highly disturb along road/Road. wetland, in the point	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 60% non native	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Phyla cond		
Poa		
Aleds gra		
Cigum		
Acacia stens		
Pos dol		
Cany cand		
Hordeo		
Aleds nigrita		
Sorghum		
Myoso pod		
Eragro tef		
Cotula		
Rumex hast		
Euphorbia drac		
Cirsium vul		
Sow thistle		
Bothriochloa pert		
Cymbopogon refr		

Vegetation Proforma

Date: 23/4/18		Future Freight
Observers: CS / OR	Site Name: Site 54.	

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N
End point	Zone 5	E 0	N

Site 54

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S - 27.50509
E 151.81789.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range: 0.1 - 1m
Av. Height (m):	Av. Height:	Av. Height:	Av. Height: 1m
Cover (%):	Cover:	Cover:	Cover: 90%
Absent	Absent	Absent	Native / Non-Native grasslands

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non Rem	Confirmed Regional Ecosystem: Non Rem
Landform: Plain	
Soils: Black soils	
Structural formation (eg woodland, open-forest etc.: closed grassland	
Field Observations/ Notes (eg. Level of disturbance connectivity): Road reserve, Native grasses	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 90% non Iah	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canop "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:	
Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	
Conclusions/notes:	

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Milk vine	Orchard [illegible]	
Green panic	wild [illegible] (Asbestos bush)	
Sweet [illegible]	Bidens pilosa	
Pan grass	Kurdi weed	
Panicum	Aristida leptopoda	
Vicia (vetch)	* Desmodium (adjunct)	
[illegible]	Sorghum	
Rhodes grass	Erythrina [illegible]	
Cilyum [illegible]	Pipe [illegible]	
[illegible]	Mahogany [illegible]	
Pump [illegible]	Echinochloa crus-galli	
Mahogany	Napier grass	
Cane [illegible]	lucerne	
Air vine	Rabbit grass	
Sorghum Setaria [illegible]	Mexican [illegible]	
Cassia [illegible]		
Pinsdon		
Cyno [illegible]	Halgerni ?	
Senna sp.		

Vegetation Proforma

Date: 23/4/18	Future Freight
Observers: CS / OR. Site Name: Site 53	

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N
End point	Zone 5	E 0	N

GPS. 206.

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S -27.49117.
E 151.84323

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy Cover	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range: 0.1-1m
Av. Height (m):	Av. Height:	Av. Height:	Av. Height: 0.5m
Cover (%):	Cover:	Cover:	Cover: 95%
NA	NA	NA	Nothing + each grass + Rhyp * D. pureela

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: NA	Confirmed Regional Ecosystem: NA
Landform: Terrace	
Soils: Black soil	
Structural formation (eg woodland, open-forest etc.): closed grassland	
Field Observations/ Notes (eg. Level of disturbance connectivity): Road nearby beside Drainage/creek	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 70% non nah	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:		
Minimum height of plants included in the transect table:	m	
Intercept of EDL 0 - 50m:		m
Intercept of EDL 50 -100m:		m
Measured crown cover % of EDL 0 -100m:		%
Structural formation		
Conclusions/notes:		

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Pennisetum caudatum	Aristida longiflora	
Eriochloa	Bothriochloa decipiens	
Rhynchelytrum repens	Cymbopogon bombycinus	
Themeda triandra	Dichanthium sericeum	
Heteropogon contortus	Schizachyrium sanguineum	
Bothriochloa decipiens	Rhynchelytrum repens	
Aristida ramosa	Cymbopogon refractus	
Panicum	Aristida warburgii	
Opuntia stricta		
O. parmata 30 plants		
Vitex		
Corymbia		
Zoom plants ✓ Dicanthium queensense - collected.		
Sorghum halepense		

Vegetation Proforma

Date: 23/4/18	Future Freight
Observers: CS / OR.	Site Name: Site 52

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point Zone 5 E 0 N

End point Zone 5 E 0 N

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S - 27.49315
E 151.84506.

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent	Tree 2	Shrub#	Ground
Height Range (m):	Height Range:	Height Range:	Height Range:
Av. Height (m):	Av. Height:	Av. Height:	Av. Height:
Cover (%):	Cover:	Cover:	Cover:
NA	NA	NA	Non-native grasses

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: Non-REM	Confirmed Regional Ecosystem: Non-REM
Landform: Terrace	
Soils: Black soil	
Structural formation (eg woodland, open-forest etc.: Closed grassland	
Field Observations/ Notes (eg. Level of disturbance connectivity): Road reserve / lots grasses	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 80% non native	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canopy "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Sagebrush		
Kimberley Bluegrass		
Milk vine		
Brighton bluebell		
Queensland Bluegrass		
Green panic		
Plume grass		
Stinking Roger		
Barnyard grass		
Swamp dock		
Forgan cur.		
Paspalum		
Common vograss		
Digit dock		

Vegetation Proforma

Date:	23/4/18
Observers: CS / OR	Site Name: Site 55

Future Freight
Integrating Community, Environment and Engineering

Transect Details (required for all sites)

GPS coordinates: Datum: Transect length:

Start point	Zone 5	E 0	N
End point	Zone 5	E 0	N

Site 55

Photo points (numbers): North: ____ East: ____ South: ____ West: ____.

S - 27.53602
E 151.74825

Note: If canopy is estimated (eg. No transect), provide only a single GPS point with a transect length of "0" and state "estimated" Complete Tables 1, 2 and 4 only.

Table 1: Estimated Canopy Cover (mandatory for all sites)

Canopy/ Emergent		Tree 2	Shrub#	Ground
Height Range (m):		Height Range:	Height Range:	Height Range: 0.1 - 0.3
Av. Height (m):		Av. Height:	Av. Height:	Av. Height: 0.2
Cover (%):		Cover:	Cover:	Cover: 90%
Absen		N/A	N/A	Closed growth Note + exotic sp.

Table notes: * use following terms: D = dominant; C = co-dominant; A = associated; S = suppressed. # Shrub is a woody plant <8m tall with multi-stems within 20cm from base or if single stemmed < 2m tall.

Table 2

Mapped Regional Ecosystem: N/A	Confirmed Regional Ecosystem: N/A
Landform: mid-slope	
Soils: Dark brown loam	
Structural formation (eg woodland, open-forest etc.: Closed growth	
Field Observations/ Notes (eg. Level of disturbance connectivity): Road reserve	
Weed species and approx. cover (%) (including restricted matters under the Qld *Biosecurity Act 2016*): 80% non-nat	

Table 3: Canopy cover using Canopy Intercept method (use only if a transect has been established – canop "measured", not "estimated") A minimum of 1 measured canopy survey is required per representative Regional Ecosystem.

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Table 4: Flora species Present (15-20 minute random meander) (required for all sites):

Rhodes grass		
Desert cane		
Digit [illegible]		
Sorghum [illegible]		
Cynodon dactylon		
Aleu bangers		
Turnip weed		
Bartsia lepto.		
Kaurna		
Sorrel.		
Cityon tobacco	Pig weed	
Prayers pea.	Fragrant tamarind	
Ghana		
Gerrale.		
Thomas [illegible]		
Stink grass		
Sida hedera		
Hooky grass		
Lehmbin stem		

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 1

Date: 16/4/18 Observers: OR + CS

Refer to flora proforma

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Regent HE
Curlew SP
black-throated F
border thick-tailed gecko
squatter pigeon
painted HE
koala
southern greater glider
eastern long-eared bat
dunnals snake
ballake jewell
grey snake
wonna
white-throated nailtail
white-winged black tern
caspian tern
sharp-tailed sandpiper
glossy ibis
short-beaked echidna
glossy black-cockatoo
Major Mitchells cockatoo
powerful owl
common death adder

Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	3
Clearing	3
Erosion	2.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
		NO

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	1
Fallen logs (>10cm diam.)		4
Coarse woody debris (<10cm diam.)		3
Decorticating bark		1
Leaf litter (%)		5%
Bare ground (%)		70%
Grass (%)		10%
Soil cracks		1
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		NO
Weeds and non-native species (%)		0
Rock Crevices		0
Flower Abundance (%)		~~0~~ 5 mistletoe
Fruit Abundance (%)		0
Water present (Y/N)		Y road side ditch

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

- apostlebirds
- cows
- T'crow
- willie wagtail
- mfous whistler
- mistlethrush

Variegated Fw
WW chough
bar-shouldered dove
Stripped HE
large macropod - (tracks + scats)

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 2 (moved)

Date: 16/4/18 Observers: OR + CS

LOCATION (GPS reference) Refer to veg proforma.

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	3
Clearing	3
Erosion	2

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		7
Coarse woody debris (<10cm diam.)		6
Decorticating bark		0
Leaf litter (%)		20
Bare ground (%)		40
Grass (%)		~~20~~ 30
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		10
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		Y shallow gilgai

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

crested pigeon ✓ GC bobbles ✓
noisy miner ✓ ~~mistletoe bird~~
wingeed dog (track) ~~mulga parrot~~ ~~mice burrows~~ ~~magpies~~
ants leichardt ✓

Fauna Proforma

Future Freight

Site Information

Site Name: 3

Date: 16.4.18 Observers: OE + CS

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone:____ Easting:_____ Northing:_____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	3
Clearing	1
Erosion	2

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
Aus bittern	✓	
painted snipe	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		3
Coarse woody debris (<10cm diam.)		4
Decorticating bark		2
Leaf litter (%)		5
Bare ground (%)	85	
Grass (%)		5
Soil cracks		2
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		Y
Weeds and non-native species (%)		5
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		Y wetland

Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

mistletoebird ✓
sheep
W swallow ✓
W wagtail ✓

T. crow ✓
C. parmeyiifes ✓
dusky toadlet (call) ✓
eastern grey (scat) ✓
Lymnodynastes tasmaniensis ✓
red-capped robin ✓

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 4 new

Date: 17/4/18 Observers: OR + CS

LOCATION (GPS reference) Refer to vcg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	3
Clearing	3
Erosion	1

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Incidental fauna observations/scats/traces:

brown JBV
willy wt ✓
red-cap R ✓
white-plumed HE
ww-chough

Future Freight
Integrating Community, Environment and Engineering

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	1
	< 5cm diameter	2
Fallen logs (>10cm diam.)		0
Coarse woody debris (<10cm diam.)		0
Decorticating bark		0
Leaf litter (%)		0
Bare ground (%)		70
Grass (%)		20
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		10
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		Y small depressions

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: new site 6

Date: 17/4/18

Observers: ER, CS

LOCATION (GPS reference) see veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	3
Clearing	3
Erosion	1

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		1
Coarse woody debris (<10cm diam.)		1
Decorticating bark		0
Leaf litter (%)		5
Bare ground (%)		60
Grass (%)		30
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		1
Surface Rocks and/or Boulders		5
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		5
Rock Crevices		0
Flower Abundance (%)		10 (mistletoe
Fruit Abundance (%)		0
Water present (Y/N)		Y dam

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

2 mu ✓ gc babs ✓
ringneck.
avian nest in tree on roadside #41
eastern grey tracks ✓
noisy miner ✓
skink (crypto ~~patches patches~~ ✓
plagiocephalus.)

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 9

Date: 17/4/18

Observers: OR + CS

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	0
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
Imperial hairstreak.	Acacia irrorata	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	2
	>15cm, <30cm diameter	4
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	2
	< 5cm diameter	1
Fallen logs (>10cm diam.)		6
Coarse woody debris (<10cm diam.)		7
Decorticating bark		4
Leaf litter (%)		~~50~~ 55
Bare ground (%)		30
Grass (%)		10
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		5
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

Acacia irrorata has signs of herbivory (ie. imperial hairstreak) nectar wh... weebill. wallaby ~~sp~~ redneck. eucalyptus tenuis

Fauna Proforma

Future Freight

Site Information

Site Name: 14

Date: 17/4/18 Observers: GR + CS

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	2
Clearing	3
Erosion	1

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Incidental fauna observations/scats/traces:

pied bb ✓ Tcrow ✓
noisy miner ✓ c' pigeon ✓
Pale head rosy ✓ wedbill ✓
apostlebird ✓ emu (tracks) ✓
dog (tracks) ✓
Cunningham hwy, under Cross Mackenzie Range ⇒ fairy martins

Future Freight

Habitat Features – Abundance:

Characteristics		Abundance (0-7Y or % within landscape
Hollows in trees and stags. (May include hollows in termenterite)	>35cm diameter	0
	>15cm, <35cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		~~0~~ 1
Coarse woody debris (<10cm diam.)		2
Decorticating bark		0
Leaf litter (%)		1%
Bare ground (%)		30
Grass (%)		50
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		29%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 18 gps# 14

Date: .... / .... / ....

Observers: OR + CS

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	3
Clearing	2.
Erosion	2

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		5
Coarse woody debris (<10cm diam.)		6
Decorticating bark		5
Leaf litter (%)		20
Bare ground (%)		~~60~~ 55
Grass (%)		20
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		~~4~~ 2.
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		<5
Rock Crevices		0
Flower Abundance (%)		~~0~~ 5 (mistletoe)
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

T crow, tus Raven.

~~with the~~ the yellow-faced HE feeding in mistletoe green ant (metallica).

Fauna Proforma

Future Freight

Site Information

Site Name: Newsite 15

Date: ..../..../.... Observers: CL, CS

LOCATION (GPS reference) ref to gps

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ___m

Altitude: _____m Altitude accuracy: +/- ___m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___m cover ___%

Dominant species:

Sub canopy present Y / N average height ___m cover ___%

Dominant species:

Shrub layer present Y / N average height ___m cover ___%

Dominant species:

Ground layer: cover ____% weeds ____% Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	0
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	~~0~~ 1
	>10cm, <15cm diameter	~~0~~ 1
	>5cm, <10cm diameter	~~0~~ 1
	< 5cm diameter	~~0~~ 2
Fallen logs (>10cm diam.)		7
Coarse woody debris (<10cm diam.)		7
Decorticating bark		3
Leaf litter (%)		40
Bare ground (%)		40
Grass (%)		~~10~~ 20
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		0
Rock Crevices		0
Flower Abundance (%)		5 (mostly toc)
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces? yellow TB ✓ sitellas ✓ brown TB ✓ grey fantail. ✓ weebill ✓ yellow-faced HE ✓ gst ✓ Allocasuarina inflorescence potential gp cockatoo food ✓ wallaby sp (scat) ✓ emu (scat) ✓ rabbit warren ✓ → confirmed yellow-bellied glider ✓ scat see photo (grey (brown) / Glider in colour ↳ coarse brown material)

Fauna Proforma

Future Freight

Site Information

Site Name: New Side 16

Date: 18/7/18. gps 046 Observers: CS-1 OR

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	0
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	1
	>10cm, <15cm diameter	1
	>5cm, <10cm diameter	2
	< 5cm diameter	3
Fallen logs (>10cm diam.)		7
Coarse woody debris (<10cm diam.)		7
Decorticating bark		3
Leaf litter (%)		60
Bare ground (%)		20
Grass (%)		20
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		dry gully
Surface Rocks and/or Boulders		3
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		0
Rock Crevices		0
Flower Abundance (%)		5 (moderate)
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

pelicans above ✓ gst ✓
emu (track) ✓ weebill ✓ yellow spotted monitor ✓
e' gray k' (track) (scat) ✓ see photo
a postlebir ✓

Fauna Proforma

Future Freight

Site Information

Site Name: New site 17.

Date: 18/4/18 Observers: OR + CS.

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	0
Erosion	0

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	1
	< 5cm diameter	2.
Fallen logs (>10cm diam.)		5
Coarse woody debris (<10cm diam.)		6
Decorticating bark		2
Leaf litter (%)		50
Bare ground (%)		40
Grass (%)		10
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		0
Weeds and non-native species (%)		6
Rock Crevices		0
Flower Abundance (%)		5 (mistletoe)
Fruit Abundance (%)		0
Water present (Y/N)		0

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

e' yellow robin ✓
bearded dragon ✓
emu scat ✓
eas' grey kl' scat/track) ✓

scat w seeds see photo
↳ confirmed, ~~yellow-bellied glider~~ fox scat (scat) ✓

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 27.

Date: 19/4/18

Observers: CR + CS.

LOCATION (GPS reference)

Refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	1
Clearing	0
Erosion	0

belah woodland. on sandy clay
no mistletoe

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	4
	>15cm, <30cm diameter	4
	>10cm, <15cm diameter	~~4~~ 4
	>5cm, <10cm diameter	5
	< 5cm diameter	5
Fallen logs (>10cm diam.)		6
Coarse woody debris (<10cm diam.)		7
Decorticating bark		2
Leaf litter (%)		80
Bare ground (%)		10
Grass (%)		10
Soil cracks		1
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		1
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)	P pon / African Gos thorn	35
Rock Crevices		0
Flower Abundance (%)	45%	wilga
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

grey kangaroo scat/tracks ✓
variegated fw ✓
grey FT ✓
weebill. ✓
rufous WT ✓
noisy miners ✓
silvereye ✓
yellow TB ✓

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: new site 21

Date: 19/4/18 Observers: OOYCS.

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	2
Erosion	1

callitris – box-bloch on sand

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
5' pigeon	✓	
painted he	✓	
southern bat	✓	
dusky adder	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	1
	>15cm, <30cm diameter	2
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	2
	< 5cm diameter	2
Fallen logs (>10cm diam.)		5
Coarse woody debris (<10cm diam.)		5
Decorticating bark		3
Leaf litter (%)		10
Bare ground (%)		~~30~~ 40
Grass (%)		50
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		2
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		N
Rock Crevices		N
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

weebill
yellow TB
e'grey k' tracks
gc labs.

carlia pedoralis

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 20

Date: 19/4/18.

Observers: OR + CS

LOCATION (GPS reference)

refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting:_____ Northing:_____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

(20)

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	1
Erosion	2

box-callitris on sandy gravel (LZ 6).

Habitat suitability for target fauna

no mistletoe

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
acacia irrator		
blue harstrong	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	1
	>10cm, <15cm diameter	2
	>5cm, <10cm diameter	3
	< 5cm diameter	4
Fallen logs (>10cm diam.)		3
Coarse woody debris (<10cm diam.)		5
Decorticating bark		2
Leaf litter (%)		20
Bare ground (%)		~~50~~ 70
Grass (%)		10
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		7
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		0
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%) warrior bush		10
Water present (Y/N)		dam

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

camera trap ≈800m north
↳ fox confirmed
red-necked wallaby ✓
weebill
shoveler ✓
yellow-faced HE ✓
yellow TB ✓
white-eared HE ✓
nearby dam w water
db finch ✓

Fauna Proforma

Future Freight

Site Information

Site Name: 19

Date: 19/4/18

Observers: OR - CS

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

alluvium.

(19)

Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

railway → box / gum. + fern/ferns

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	1
Clearing	0
Erosion	0

commency creek.

allow on a fine sand, clay

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance ((0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentarfia)	>30cm diameter	2
	>15cm, <30cm diameter	2
	>10cm, <15cm diameter	3
	>5cm, <10cm diameter	4
	<5cm diameter	3
Fallen logs (>10cm diam.)		5
Coarse woody debris (<10cm diam.)		6
Decorticating bark		3
Leaf litter (%)		75
Bare ground (%)		10
Grass (%)		15
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		✓
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		velvet pear <5%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		5 wilgan
Water present (Y/N)		NO WATER N - creek

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

wiedall ✓

white-throated gecko.

magpie ✓

drainage line leads to creek (deep cut)

yellow TB.

grey FT ✓

? little shriike / dull kite?

red wrowing ✓

rainbow / golden WH

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 29

Date: 19/4/18

Observers: OR + CS.

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	1
Erosion	0

Brigalow in grassy understorey on ~~[illegible]~~ heavy soil (clay).

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		1
Coarse woody debris (<10cm diam.)		3
Decorticating bark		0
Leaf litter (%)		50
Bare ground (%)		0
Grass (%)		50
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		2
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		N
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		<5
Water present (Y/N)		N

*Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces: eastern grey roo scat/track

rufous wh

dark shouldered kite

db finch → nests in adjacent paddock → in native lime bushes

cockatiel

other FW

T orgw

black-faced cs

Bats

Fauna Proforma

Future Freight

Site Information

Site Name: 30

Date: 20.4.18 gps # 55. Observers: GR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	2
Clearing	3
Erosion	1

grassy paddock. half native half exotic grasses

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
major mitchell	✓	
squatter pigeon	✓	

small cracks not biggenough for pattern.

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	—
	>15cm, <30cm diameter	—
	>10cm, <15cm diameter	—
	>5cm, <10cm diameter	—
	< 5cm diameter	—
Fallen logs (>10cm diam.)		—
Coarse woody debris (<10cm diam.)		2
Decorticating bark		0
Leaf litter (%)		0
Bare ground (%)		40
Grass (%)		30
Soil cracks		2
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma	N	drainage line
Weeds and non-native species (%)		30
Rock Crevices		-
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

kestrel ✓
cornella ✓
striated pardalote ✓
galah ✓
magpies ✓
dbfinch ✓
↳ active nest in cappabush

landzone 9
fine sandy silt

Fauna Proforma

Future Freight

Site Information

Site Name: 31

Date: 20/4/18 Observers: CB - CS.

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	1

3 tree objects brigalow thicket

LZ 9

native grassland. on dark heavy cracking clay derived from sandstone

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
Major mitchell	✓	
eastern dragon	✓	
→ chuspeds.		

Incidental fauna observations/scats/traces: golden-headed cisticola. ✓

cockatiel ✓

grey kangaroo (scat)

T crow

magpie.

kestrel.

db finch.

blue FW

Future Freight

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	6
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		0
Coarse woody debris (<10cm diam.)		0
Decorticating bark		0
Leaf litter (%)		0
Bare ground (%)		0
Grass (%)		100
Soil cracks but small.		6
Soil banks (eg. River banks/road cuttings, etc.)		
Surface Rocks and/or Boulders		
Wetlands (Y/N). If yes complete wetland Proforma		
Weeds and non-native species (%)		
Rock Crevices		
Flower Abundance (%)		
Fruit Abundance (%)		
Water present (Y/N)		

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 32

Date: 20/4/18.

Observers: OR + US.

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	1
Clearing	0
Erosion	1

wilga infrequent with mistletoe

Grey-black on heavy dark clay

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
Painted HE	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
stags	>5cm, <10cm diameter	1
	< 5cm diameter	1
Fallen logs (>10cm diam.)		4
Coarse woody debris (<10cm diam.)		5
Decorticating bark		1
Leaf litter (%)		70
Bare ground (%)		20
Grass (%)		10
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		7
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		<1
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		10 (wilga)
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

gecko's / spiny-checked HE / brown HE / grey roo (scat) / chenopods in ground layer / capparis – paired thorns.

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 39

Date: 21/4/18 Observers: OR + CS

LOCATION (GPS reference)

refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	0
Erosion	0

thick leaf litter under box
poplar
no grass for squatters
L2.9 - dark y heavy soil.

no mistletoe.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in tarmentartia)	>30cm diameter	2
	>15cm, <30cm diameter	2
	>10cm, <15cm diameter	3
	>5cm, <10cm diameter	3
	< 5cm diameter	4
Fallen logs (>10cm diam.)		4
Coarse woody debris (<10cm diam.)		5
Decorticating bark		1
Leaf litter (%)		80
Bare ground (%)		10
Grass (%)		10
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		1
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		0
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		0

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

plover / magpie.
crow / crested pigeon
noisy miner /
skink / parda lote.
fox den active (scats + tracks).

eastern grey (scat)
+ tracks.

Fauna Proforma

Future Freight

Site Information

S -27.90022 / 151.29285

Site Name: Site X gps #

Date: 21/4/18 Observers: CR + CS.

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	0
Erosion	0

woodland.

grassy open forest? populnea.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
not suitable for squatter.		
powerful owl	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	7
	>15cm, <30cm diameter	7
	>10cm, <15cm diameter	7
	>5cm, <10cm diameter	7
	< 5cm diameter	7
Fallen logs (>10cm diam.)		3
Coarse woody debris (<10cm diam.)		4
Decorticating bark		0
Leaf litter (%)		25
Bare ground (%)		5
Grass (%)		70
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		0
Rock Crevices		0
Flower Abundance (%)		Acacia 10
Fruit Abundance (%)		5 gambigundi
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

T'crow ✓

c'pigeon. ✓ grey bird. ✓

noisy miner. ✓

ringneck parrot. ✓

wallaby (scat) ✓

skink ✓ refer to incidentals in notes book for this day

Fauna Proforma

Future Freight

Site Information

Site Name: 36

Date: 21/4/18 Observers: CR + CS

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	1
Clearing	0
Erosion	1

grassy - chenopod. grandiflora.

Bring belah. open forest w/ mistletoe.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

high density of mistletoe.

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	1
	< 5cm diameter	1
Fallen logs (>10cm diam.)		~~6~~ 5
Coarse woody debris (<10cm diam.)		~~7~~ 6
Decorticating bark		0
Leaf litter (%)		30
Bare ground (%)		20
Grass (%)		50
Soil cracks but too small		~~4~~ 3
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		<1
Rock Crevices		0
Flower Abundance (%)		10 mistletoe
Fruit Abundance (%)		5 saltgrass
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

T'crow / grey'bird /
Aus Raven /
noisy m'pipe /
mistletoebird /
striped he
spiny-cheeked hel

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 40

Date: 21/4/17 Observers: CR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: refer to veg proforma

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	
Grazing	
Clearing	
Erosion	

E. camaldulensis. terreticornis. small dam nearby LZ 3

poplar/grassy forest. 3

Habitat suitability for target fauna

on black cracking clays

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	3
	>10cm, <15cm diameter	3
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		1
Coarse woody debris (<10cm diam.)		2
Decorticating bark		0
Leaf litter (%)		10
Bare ground (%)		0
Grass (%)		90
Soil cracks		5
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		1
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		80% of grass ~~30%~~ 80%
Rock Crevices		N
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		Y dam

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces: hoary-headed grebe in dam

cockatiel

yellow-belled (scratches + feeding marks) + scat.

maple mudlark

sulphur crested cockatoo

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 4

Date: 21/4/18

Observers: OR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

refer to veg proforma

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	1

grassland on heavy black cracking clay

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Incidental fauna observations/scats/traces:

very deep large cracks in soil.

Crow

kestrel.

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	—
	>15cm, <30cm diameter	—
	>10cm, <15cm diameter	—
	>5cm, <10cm diameter	—
	< 5cm diameter	—
Fallen logs (>10cm diam.)		—
Coarse woody debris (<10cm diam.)		—
Decorticating bark		—
Leaf litter (%)		—
Bare ground (%)		—
Grass (%)		100
Soil cracks		5
Soil banks (eg. River banks/road cuttings, etc.)		—
Surface Rocks and/or Boulders		—
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%) weed grass		90%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 42

Date: 22 / 4 / 18

Observers: OR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting:_____ Northing:_____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	1

weedy mown roadside

dominated by lipia.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		0
Coarse woody debris (<10cm diam.)		~~2~~ 1
Decorticating bark		0
Leaf litter (%)		0
Bare ground (%)		20
Grass (%)		10
Soil cracks		7
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		
Weeds and non-native species (%)		~~90~~ 70
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces:

rock dove ✓
Indian myna.
magpie. T'crow
n'kestrel

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 44

Date: 22/4/18 Observers: OR tes.

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	1

Slashed grass roadside.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
~~car~~ carless drgn	✓	

Incidental fauna observations/scats/traces:

omu (track)

sp list for nearby creek (offsite)
- SC cockatoo willie wagtail
- grey FT T'crow.

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	—
	>15cm, <30cm diameter	—
	>10cm, <15cm diameter	—
	>5cm, <10cm diameter	—
	< 5cm diameter	—
Fallen logs (>10cm diam.)		—
Coarse woody debris (<10cm diam.)		—
Decorticating bark		—
Leaf litter (%)		—
Bare ground (%)		10
Grass (%)		90
Soil cracks		7
Soil banks (eg. River banks/road cuttings, etc.)		drainage line
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		60%
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

older scars? see photo

under bridge

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 45 (mod) gps# 195

Date: 22.4.18 Observers: CR + CS

LOCATION (GPS reference) refer to veg proforma

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

gps # ~~0815~~ 195

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	0

planted trees adjacent to site. E. albens E. tereticornis

slashed roadside grassland. on black cracking clay

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
cnelomane e'dragon ✓		

Incidental fauna observations/scats/traces:

noisy miner ✓
pied 66 ✓
mudlark!
striated pard. ✓
magpie.
Indian myna.

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	–
	>15cm, <30cm diameter	✓
	>10cm, <15cm diameter	–
	>5cm, <10cm diameter	–
	< 5cm diameter	–
Fallen logs (>10cm diam.)		–
Coarse woody debris (<10cm diam.)		–
Decorticating bark		–
Leaf litter (%)		0
Bare ground (%)		10
Grass (%)		90
Soil cracks		3
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		~~60~~ 30
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 43

Date: 29/4/18

Observers: OR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	
Grazing	
Clearing	
Erosion	

on black cracking clay.
lignum across fences.

Roadside grassland (slashed).

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
eastern dragon	✓	

Incidental fauna observations/scats/traces:

T'crow

Future Freight
Integrating Community, Environment and Engineering

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	–
	>15cm, <30cm diameter	–
	>10cm, <15cm diameter	–
	>5cm, <10cm diameter	–
	< 5cm diameter	–
Fallen logs (>10cm diam.)		–
Coarse woody debris (<10cm diam.)		–
Decorticating bark		–
Leaf litter (%)		–
Bare ground (%)		10
Grass (%)		90
Soil cracks		5
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		70
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight
Integrating Community, Environment and Engineering

Site Information

Site Name: 54

Date: 23/4/18

Observers: CR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	2.

LZ B bought dried black soil.

roadside grassland

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
	0	

Incidental fauna observations/scats/traces:

Indian myna
golden headed cisticola.
white wagtail..

Future Freight
Integrating Community, Environment and Engineering

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		0
Coarse woody debris (<10cm diam.)		0
Decorticating bark		0
Leaf litter (%)		0
Bare ground (%)		10
Grass (%)		80
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		90.
Rock Crevices		0
Flower Abundance (%)		<1 (herbs)
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight

Site Information

moved

Site Name: 53 gps # 267

Date: 23/4/18.

Observers: OR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	1

grassy river terrace

on black soil
black cracking clays.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
earless dragon	✓	

Incidental fauna observations/scats/traces:

superb fairy wren.
willy wagtail.
black kite.

dog (scat)

Future Freight
Integrating Community, Environment and Engineering

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	0
	>15cm, <30cm diameter	0
	>10cm, <15cm diameter	0
	>5cm, <10cm diameter	0
	< 5cm diameter	0
Fallen logs (>10cm diam.)		0
Coarse woody debris (<10cm diam.)		0
Decorticating bark		0
Leaf litter (%)		0
Bare ground (%)		5
Grass (%)		70
Soil cracks		7
Soil banks (eg. River banks/road cuttings, etc.)		creek bank
Surface Rocks and/or Boulders		1
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		20
Rock Crevices		0
Flower Abundance (%)		20 herbs.
Fruit Abundance (%)		0
Water present (Y/N)		Y creek

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Fauna Proforma

Future Freight

Site Information

Site Name: 52

Date: 23/4/18 Observers: OR + CS.

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

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Fauna Proforma

Habitat characteristics

Future Freight
Integrating Community, Environment and Engineering

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	0.

roadside grassland on black cracking clay.

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No
eu-less dgn	✓	

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	–
	>15cm, <30cm diameter	–
	>10cm, <15cm diameter	–
	>5cm, <10cm diameter	–
	< 5cm diameter	–
Fallen logs (>10cm diam.)		–
Coarse woody debris (<10cm diam.)		–
Decorticating bark		–
Leaf litter (%)		–
Bare ground (%)		–
Grass (%)		100
Soil cracks		7
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		0
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		80
Rock Crevices		0
Flower Abundance (%)		0
Fruit Abundance (%)		0
Water present (Y/N)	creek nearby	Y

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

Incidental fauna observations/scats/traces: c/ pigeon.

black faced cs
kestrel.
yellow-rumped TIB
sparrow.
willy wagtail.
eastern rosella.
pale-headed

Fauna Proforma

Future Freight

Site Information

Site Name: 55

Date: 23/9/18 Observers: OR + CS

LOCATION (GPS reference)

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: .....

Plot Centre: Zone: ____ Easting: _____ Northing: _____ Accuracy ____ m

Altitude: _____ m Altitude accuracy: +/- ____ m

Locality Description (e.g. proximity to roads, towns, creeks etc.):

.....

VEGETATION (Note: If a site specific vegetation assessment proforma has been completed, ignore this section)

General Description (e.g. Open woodland on alluvium):

.....

Regional Ecosystem (mapped): ..... Regional Ecosystem Observed: .....

Remnant / Non-remnant (circle)

STRUCTURE

Tree canopy present Y / N average height ___ m cover ___ %

Dominant species:

Sub canopy present Y / N average height ___ m cover ___ %

Dominant species:

Shrub layer present Y / N average height ___ m cover ___ %

Dominant species:

Ground layer: cover ____ % weeds ____ % Dominant species_____

Site Photos

	Photo No/s		Photo No/s	Other photo numbers and notes:
North:		South:		
East:		West:		

55

Fauna Proforma

Habitat characteristics

Habitat Disturbance

Disturbance type	Severity 0-3 (0=nil, 3=severe)
Fire	0
Grazing	0
Clearing	3
Erosion	1

slashed roadside grassland on dark brown loam

Habitat suitability for target fauna

Species (EVNT) known from Region	Suitable habitat present	
What EVNT species are known from region (complete in rows below) – from database searches	Yes	No

Incidental fauna observations/scats/traces:

willie wagtail.
meat ants.
lesiret.

Future Freight
Integrating Community, Environment and Engineering

Habitat Features – Abundance:

Characteristics		Abundance (0-7)* or % within landscape
Hollows in trees and stags. (May include hollows in termentartia)	>30cm diameter	–
	>15cm, <30cm diameter	–
	>10cm, <15cm diameter	–
	>5cm, <10cm diameter	–
	< 5cm diameter	–
Fallen logs (>10cm diam.)		–
Coarse woody debris (<10cm diam.)		
Decorticating bark		–
Leaf litter (%)		–
Bare ground (%)		5
Grass (%)		95
Soil cracks		0
Soil banks (eg. River banks/road cuttings, etc.)		0
Surface Rocks and/or Boulders		4
Wetlands (Y/N). If yes complete wetland Proforma		N
Weeds and non-native species (%)		80
Rock Crevices		0
Flower Abundance (%)	herbs	<1
Fruit Abundance (%)		0
Water present (Y/N)		N

* Note: 0 = absent; 1 = Rare; 2 = Rare to occasional; 3 = occasional; 4 = occasional to common; 5 = common; 6 = common to abundant; 7 = abundant

APPENDIX

O

Matters of National Environmental Significance Report

Appendix D Likelihood of occurrence assessment results

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND RAIL

MNES LIKELIHOOD OF OCCURRENCE

This likelihood of occurrence assessment has been prepared according to the methods detailed in rdEIS Appendix O: Matters of National Significance Technical Report, Section 3.2.5 and in conjunction with the species-specific information contained in the species profiles and habitat definitions in Appendix A: Species and Community Profiles. The criteria for the likelihood of occurrence of each species is detailed below in Table 1 and the assessment is provided in Table 2.

TABLE 1 LIKELIHOOD OF OCCURRENCE CRITERIA

	Preferred habitat exists[4]	**General habitat exists[5]**	**Habitat does not exist[6]**
Recent[1] records within the Project footprint[2]	Known	Known	Known
Recent records in the Locality[3]	Likely	Potential	Unlikely
No records within the Locality, but the Project footprint is within known distribution[7]	Potential	Potential	Unlikely
No records in the Locality, and the Project footprint is outside of distribution	Unlikely	Unlikely	Unlikely

[1]Recent records are those that have been recorded in the last 20 years.
[2]'Project footprint' is the land required to accommodate all permanent and temporary components of the Project as described in EIS Chapter 5: Project Description.
[3]'Locality' refers to a 10 km buffer around the Project footprint and is inclusive of the Project footprint.
[4]Preferred habitat includes breeding, denning, roosting, and/or foraging habitats for fauna species; and habitat containing associated floristic species, vegetation communities, suitable substrates, and/or landforms for flora species.
[5]General habitat includes dispersal habitat and other areas where the species may occasionally be found, but do not contain all required habitat features to constitute preferred habitat.
[6]Based on sources reviewed and/or field survey results.
[7]Known distribution is defined as the may/likely distribution as per the SPRAT profile.

TABLE 2 MNES LIKELIHOOD OF OCCURRENCE

Scientific name	**Common name**	**NC Act**	**EPBC Act**	**Desktop assessment - Known distribution / specific habitat requirements**	**Source**	**Likelihood of occurrence* (desktop)**	**Detected in surveys**	**Habitat assessment data – ground truthed survey data**	**Likelihood of occurrence (Final)**
Threatened flora									
Acacia curranii	Curly-bark wattle	V	V	*Acacia curranii* has a disjunct distribution and is known from three separate areas: Lake Cargelligo and Gunderbooka Range near Bourke in NSW, and Gurulmundi in Queensland. These three locations are separated by several hundred kilometres. Within these areas there are approximately twenty populations of the species found in ten broad localities comprising a total of <5,000 individual plants. Two populations consisting of several hundred plants occur in the vicinity of Gurulmundi, Queensland. Preferred habitat for *Acacia curranii* is located in dry sclerophyll forests and semi-arid woodlands. Where found in parts of south-eastern Queensland in the Darling Downs area around Gurulmundi, it grows on deeply weathered sandstone forming poorly-drained red sandy soils (Pickard, 1995). The soil is stony, containing patches of deep sand and little evidence of rock outcrop near the patches (Pickard, 1995). In this Queensland location, the species occurs in widely scattered thickets within patches of diverse heath scrub containing emergent trees, with associated species including *Hakea purpurea*, *Kunzea opposita*, *Baeckea* sp. (Pickard, 1995b; QLD Herbarium, 2011). Vegetation communities supporting this species include *Eucalyptus dwyeri*, *Acacia triptera*, *A. doratoxylon* mallee/shrubland, *E. intertexta - Callitris glaucophylla*, *E. microcarpa* woodland and *E. morrisii - C. glaucophylla* woodland (Ayers et al., 1996). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species' habitat is likely to and may occur. **Species records:** The nearest record of the species is located halfway between Oakey and Toowoomba Wellcamp Airport (approximately 4.5 km from the Project footprint). However, this record has a very high spatial uncertainty/inaccuracy of 75 km and the specimen was collected in 1973 (ALA, 2023). The next nearest record is approximately 185 km to the north-west of the Project, in Miles. **Records in the Project footprint:** No **Records in the locality:** Yes, but high spatial uncertainty	SPRAT WildNet DES Species Profile Publications	Unlikely	No	Preferred or general habitat for the species was not detected within the Project footprint as no suitable substrates described as deeply weathered sandstone forming poorly drained red sandy soils were detected. Of the described associated floristic species assemblages, only *Kunzea opposita* and *Callitris glaucophylla* were detected in the alignment, this is considered weak evidence of suitability as far as floristic indicators are concerned. Vegetation communities identified in the habitat requirements, dry sclerophyll forests and semi-arid woodlands, were abundant within the Project footprint.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Acacia lauta	Tara wattle	V	V	Occurs within south-east Queensland, in a small region of the Darling Downs between Inglewood and Tara. In this region, the species is known to occur on freehold land that has been previously cleared of vegetation and cultivated and within the road reserve, including road verges. Generally, the species is found on gently undulating to flat landforms with sandy soils in open forest to low woodland with a moderately dense shrub layer (Maslin, 2005). Preferred habitat for the species is located in moderately deep and hard setting soil with a weakly acidic to neutral sandy loam surface, grading into alkaline sandy clay subsoil (Halford, 1995b). *Callitris glaucophylla* and *Allocasuarina luehmannii* occur across all sites. **SPRAT profile distribution in relation to the Project:** The area around Inglewood is in the mapped distribution where the species or species' habitat is likely to or may occur. **Species records:** The nearest record of *Acacia lauta* is from 1989 and is located approximately 16 km south of the Project footprint near Coolmunda Dam, Inglewood. The remaining records are >100 km from the Project footprint, with the most recent being from 1994 (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT EIS WildNet	Potential	No	Both general and preferred habitat for the species occurs within the Project footprint near Inglewood and was targeted during surveys. Although this species has not been detected within the Project footprint, it was recently recorded during affiliated surveys by USC approximately 11 km from the alignment near Coolmunda Dam. The associate species *Callitris glaucophylla* and *Allocasuarina luehmannii* are abundant throughout the alignment. Suitable landforms described as gently undulating to flat landforms are common throughout the potential habitat areas identified. Suitable sandy soil substrates are common throughout the alignment from Goondiwindi to Millmerran, particularly on Landzone 5 and 3 (REs 11.5.1, 11.5.4, 11.3.18, 11.3.7). Vegetation structural types open forest to low woodland are common. However, those with a moderately dense shrub layer are scarce.	Potential
Androcalva procumbens	-	-	V	*Androcalva procumbens* (synonyms: *Commersonia procumbens*) grows in sandy sites, often alongside roads and is endemic to NSW - mainly confined to the Dubbo-Mendooran-Gilgandra region, but also recorded in the Pilliga, Mount Kaputar National Park (NP), north-east of Gulgong, near Denmen and in Goonoo State Conservation Area (Harden and Orme, 2020; NSW OEH, 2021). This species produces persistent seeds which remain viable for some time. Large numbers of seedlings are known to germinate after fires at sites where no live specimens were evident above ground before the fires. Clusters of individuals may be clonal. It is often a pioneer species of disturbed habitats, being recorded colonising disturbed areas such as roadsides, quarry edges and gravel stockpiles and a recently cleared easement under power lines (NSW OEH, 2021). Preferred habitat for this rare species is recorded growing in *Eucalyptus dealbata* and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and *Callitris* area. Also recorded in *Eucalyptus fibrosa subsp. nubila, Eucalyptus dealbata, Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo. Other associated species include *Acacia triptera, Callitris endlicheri, Eucalyptus melliodora, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea species, Exocarpos cupressiformis, Leptospermum parvifolium* and *Kunzea parvifolia* (NSW OEH, 2021). **SPRAT profile distribution in relation to the Project:** The area between Inglewood and Yelarbon in the mapped distribution where the species or species' habitat is likely to or may occur. **Species records:** All known records restricted to central and western NSW. The closest record is approximately 170 km away from the very western point of the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	WildNet	Unlikely	No	Potentially suitable sandy soil substrates are common throughout the alignment from Goondiwindi to Millmerran, particularly on Landzone 5 and 3 (REs 11.5.1, 11.5.4, 11.3.18, 11.3.7). Surveys targeting these areas did not identify the species however many of the associate floristic assemblage species occur in the project footprint, including: *Eucalyptus dealbata* (likely to be present but misidentification as *E. chloroclada*), *Calytrix tetragona, Eucalyptus fibrosa subsp. nubila, Eucalyptus albens Callitris glaucophylla, Callitris endlicheri, Eucalyptus melliodora,* and *Exocarpos cupressiformis,* are present in the alignment. Vegetation communities detected, include: woodlands and scrubs.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Arthraxon hispidus	Hairy-joint grass	V	V	Occurs in scattered locations throughout south-east Queensland. However, most occurrences are from Noosa southwards. Preferred habitat for hairy-joint grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps. In south-east Queensland, hairy-joint grass has also been recorded growing in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests. White et al (2019) found that, in NSW, cover of the species was highest in moisture-associated assemblages in and around wetlands, drainage lines and groundwater seepages, often in association with native grasses, sedges and herbs. *A. hispidus* also occurred widely among introduced pastures and weeds in previously forested areas, demonstrating the species' potential to exploit derived habitat (White et al. 2019). **SPRAT profile distribution in relation to the Project:** The area around Toowoomba, Oakey and Pittsworth is in the mapped distribution where the species or species' habitat is likely to or may occur. The species or species' habitat likely to occur distribution is mapped to the north and east of the Project footprint between Kingsthorpe and Gowrie and around Southbrook (north-east of Pittsworth) where it is closest to the Project. **Species records:** There are multiple recent records of *Arthraxon hispidus* within Toowoomba, from approximately 12 km from the Project footprint (ALA, 2023; DES 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Potential	No	General habitat for the species occurs within the Project footprint. Suitable landforms including moist areas in and around creeks, swamps, wetlands, drainage lines and groundwater seepages, are present throughout the Project footprint. The literature mentions sandy alluvium, which is present at many creeks and waterways throughout the alignment, particularly on Landzone 3. No particular associate floristic assemblages were identified in the literature to define habitat suitable for the species; as it occurs generally amongst native and introduced grasses, forbs and sedges.	Potential
Bertya opponens	Coolabah bertya	-	V	In Queensland the species is widely distributed and has been recorded in the Brigalow Belt South and SEQ Bioregions. *Bertya opponens* preferred habitat occurs mainly in shallow sandy loams and red earth mixed with sandstone. The species is also found with rhyolite, shale, and metasediments. All soils are rocky and well-drained. Common community types include: shrubland, lance woodland, mallee woodland, eucalypt/acacia open forests and *Eucalyptus/Callitris* open woodland and semi-evergreen vine-thicket (Halford and Henderson, 2002; Queensland Herbarium, 2012). **SPRAT profile distribution in relation to the Project:** An area approximately 12 km east of Inglewood is mapped as where the species or species habitat is likely to occur, however this does not overlap with the railway alignment. **Species records:** The nearest records of the species are relatively recent (between 1994 and 2006) and are located within Devine State Forest, approximately 13 km east of the Project footprint north-east of Inglewood (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Potential	No	General habitat for the species occurs within the Project footprint and was targeted during surveys, that being present mixed shrublands, and open eucalypt/acacia woodlands. No individuals were detected during targeted surveys within general habitat. It should be noted that the species requires fire to germinate, then relies upon wind dispersal to pollinate, however frequent fire can actually be fatal to the species. Suitable landforms described in the literature include ridges and gullies, however this is not defined as an explicit list of suitable landforms. Ridges and gullies are present throughout hilly sections of the project. Preferred soils and substrate characteristics including shallow, rocky, and well-drained sandy loams, rhyolite, shale, and metasediments, red earths mixed with sandstone, are present in certain areas of the alignment, particularly on Landzone 7 (REs 11.7.7, 11.7.4, 11.7.5,) occurring between chainage 46500 - 64000. Many of the associate floristic assemblage species occur in the project footprint, including *Acacia shirleyi, Corymbia citriodora, C. trachyphloia, Gahnia aspera, Callitris endlicheri,* and *E. crebra,* however the likely/may distribution does not overlap with the Project footprint. The historical distribution of the species, based upon records and distribution mapping from DCCEEW, is very scattered and does not have large areas of preferred or general habitat. The species is additionally heavily reliant on fire for germination; however, fire is additionally its largest threat. The threat of fire and the amount of disturbed land (cropping and grazing land) is considered a large contributor to its relative absence within the Project footprint.	Unlikely
Bothriochloa bunyensis	Satin-top grass	V	V	*Bothriochloa bunyensis* is endemic to south-east Queensland, where populations are only known to occur along the Great Dividing Range in Bunya Mountains NP, Toowoomba, Crows Nest and Main Range NP (Halford, 1998).	SPRAT WildNet	Unlikely	No	General habitat for the species was observed within the Project footprint, in the form of general grasslands. During surveys	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
				Bothriochloa bunyensis is known to grow in relatively fertile krasnozem soils derived from basalt on upper slopes and hillcrests at altitudes of 600 to 1100 m. The species preferred habitat occurs in tussock grasslands and woodlands with a grassy understorey (Halford, 1998). **SPRAT profile distribution in relation to the Project:** An area north of Toowoomba is mapped within the mapped distribution where the species or species habitat is likely to occur, however this does not overlap with the Project footprint. **Species records:** All records are restricted to south-eastern Queensland. Two records exist in close proximity to Project footprint, both in Blue Mountain Heights (8.8 km and 9.3 km distant). Additional records occur in Toowoomba (<13 km distant) and the Lockyer Resources Reserve (<25 km distant) (ALA, 2023). The three closest records are recent (2004-2022). Majority of other records occur in Bunya Mountains and Main Range NPs. Although the nearest records are <10 km from the alignment (Blue Mountain Heights), no southerly records occur west of the Great Dividing Range (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes, but none south of Toowoomba west of the Great Dividing Range				in grasslands and/or grassy understory woodlands, no specimens were observed. Suitable landforms for the species are described as upper slopes and hillcrests at altitudes of 600 to 1100 m, which are uncommon throughout Project footprint. The species is commonly found in proximity to larger remnant patches of vegetation close to Main Range and Bunya Mountains National Parks. The species is largely threatened from encroachment of woody open forest and invasive weeds, this is thought to be induced from changes in fire regimes after European settlement. Suitable relatively fertile krasnozem soils derived from basalt are common throughout the alignment from Pittsworth to Gowrie, particularly on Landzone 8 (REs 11.8.5,11.8.11). Vegetation communities detected within the Project footprint include tussock grasslands and woodlands with a grassy understorey. As a result of the limited suitable landforms, lack of individuals identified, and prevalence of major threats to the species it is considered that this species is unlikely to occur.	
Bulbophyllum globuliforme	Miniature moss-orchid	NT	V	*Bulbophyllum globuliforme* grows exclusively on the wrinkled bark of hoop pines (*Araucaria cunninghamii*) (Harrison, 2002), and can be considered preferred habitat for the species. The species is known from only four locations: Puzzle Creek near Paluma (north-east Queensland), Kroombit Tops near Calliope (Central Queensland), Cainbable Creek in Lamington NP (south-east Queensland) and Levers Plateau (north-east NSW) (Jones and Clements, 2001). **SPRAT profile distribution in relation to the Project:** Toowoomba is mapped within the mapped distribution where the species or species habitat is likely to occur, however this does not overlap with the Project footprint. **Species records:** The nearest record of the species is from 1946 and is located within Border Ranges NP, approximately 175 km from the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	Preferred and general habitat for the species includes rainforests and vine thicket with emergent hoop pine, which is not present within the Project footprint. This is an epiphytic plant, and the substrate is the bark of hoop pine trees, which were not detected in the alignment.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Cadellia pentastylis	Ooline	V	V	In Queensland, *Cadellia pentastylis* occurs from Balcomba (west of Rockhampton) south to the NSW border and west to near Blackall. All post-1984 records of the species within the Darling Downs are from north of 27° S (i.e., the northern part of Darling Downs). *Cadellia pentastylis* grows as a canopy or emergent species, often locally dominant, within semi-evergreen vine thicket, brigalow-belah, poplar box and bendee vegetation communities, and persists in cleared paddocks. The species has been recorded on undulating clay plains and low hills (Benson 1993), including sandstone, conglomerate, claystone, and basalt as underlying geology types (Harden 1991). Altitude ranges found in the literature range from 200 m to 600 m above sea level, with 300 m to 460 m considered typical. Soils mentioned in the literature include low to moderately fertile soils, of sandy clay or clayey consistencies (Pollock 1999). This can be considered preferred habitat for the species, which forms a closed or open canopy, with an open understorey and dense leaf litter dominating the forest floor. **SPRAT profile distribution in relation to the Project:** The entire alignment is inside of the mapped distribution where the species or species habitat is likely to or may occur. A very small section the alignment intersects with the species or species' habitat likely to occur distribution south of Millmerran. **Species records:** The closest records are two historic records (from 1919 and 1938) located approximately 42 km north-east of the Project footprint from Wyaga and Kindon Station, respectively (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Potential	No	General habitat for the species is present within the Project footprint however the species was not observed within the Project footprint. Suitable landforms occurring in the Project footprint, include: undulating terrain, upper and mid-slopes, and, to a lesser extent, confined areas which may loosely meet the description of edges of sandstone and basalt escarpments (Gowrie). Suitable underlying geology occurring in the Project footprint, includes: sandstone, conglomerate, claystone, and basalt. Suitable soil substrates occurring in the Project footprint, includes: sandy clay or clayey, low to moderately fertile soils, which are present throughout much of the alignment, particularly on Landzone 3, 4, 8 and 9. Associate floristic species detected in the Project footprint include: *Acacia harpophylla, Casuarina cristata, Eucalyptus populnea,* White Box *(Eucalyptus albens),* White Cypress Pine *(Callitris glaucophylla),* Bitterbark *(Alstonia constricta),* Wilga *(Geijera parviflora),* Berry Saltbush *(Einadia hastata), Stipa spp.* and *Aristida* spp. Suitable vegetation communities detected within the Project footprint include: brigalow woodland and poplar box woodland. The Project footprint does contain general habitat for the species, however, no specimens were identified during targeted surveys. Additionally, the closest record of the species is approximately 42 km north-east of the Project footprint from Wyaga and Kindon Station. It is considered that the species is unlikely to occur within the Projects footprint due to the lack of records. Additionally, the area in which the Project footprint is located has seen many of the species' main threats occur (i.e., previous clearing for agriculture, grazing, invasive species introduction, and change in microclimate potentially affecting recruitment) (DEWHA, 2008) which would likely preclude it from occurring locally.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Clematis fawcettii	Stream clematis	V	V	Preferred habitat for stream clematis contains canopy gaps and is often found near streams. The literature describes suitable soils as variable, but particularly mentions loam soils derived from basalt and mixed volcanic rock, and fertile clays (Queensland Herbarium,2009; Harden, 1990; Queensland CRA/RFA Steering Committee, 1998; NSW DECCW, 2005bl (Internet)). It is generally found in the following community types: semi-evergreen vine thicket, araucarian microphyll vine forest, complex notophyll vine forest, and eucalypt open forest with scattered vine forest species. Altitudes described in the literature range from 500 m to 980 m above sea level (Halford 1998; Harden 1990; Queensland Herbarium 2009). No particular floristic assemblages or associations are described in the literature. The literature describes the species as particularly hard to detect due to its nature as a vine with adult foliage confined to the tree canopies where it is difficult to spot (Bean 2009 pers. comm. cited in DEWHA 2009bd). Juveniles with foliage at ground level are reportedly more easily, and therefore more often, detected (DECCW, 2005bl (Internet)). **SPRAT profile distribution in relation to the Project:** Two small areas around Gowrie and Pittsworth are located within the mapped distribution where the species or species habitat may occur. **Species records:** Three recent records of the species are 1.3 km to 5 km north of the project in Kingsthorpe and Gowrie Junction (from 2020-2023) (ALA 2023). Another close record of the species is from 2011, approximately 6 km north of the Project footprint in the Mount Tyson area north of Pittsworth. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Potential	No	Preferred habitat for the species, as described in the literature, occurs however the species was not observed within the Project footprint. Suitable landforms described in the literature and occurring in the Project footprint, includes creeks and streams. Suitable underlying geology described in the literature and occurring in the Project footprint, includes basalt and mixed volcanic rock. Suitable soil substrates described in the literature occurring in the Project footprint, includes loam soils derived from basalt and mixed volcanic rock, and fertile clays. Suitable Landzones occurring in the Project footprint are considered to include: 3, 8. Suitable vegetation communities described in the literature and detected within the Project footprint include: eucalypt woodland communities that are close to vine thicket or rainforest.	Potential
Dichanthium queenslandicum	King bluegrass	V	E	*Dichanthium queenslandicum* occurs in three disjunct populations: 1) Hughenden district; 2) from Nebo to Monto and west to Clermont and Rolleston; and 3) Dalby district, Darling Downs (DSEWPAC, 2013). This species preferred habitat is confined to natural grassland on the black cracking clay soils (basalt downs, basalt cracking clay, open downs) on undulating plains (Simon, 1982; Fletcher, 2001). The literature also lists travelling stock routes, road reserves and unploughed grasslands as general habitat where the species is commonly found. It has been observed in paddocks grazed by cattle, but where the grazing pressure is very irregular and/or low, and where native grasses dominate (natural grasslands) (pers. comm. Jeffers, 2022). Other communities where *Dichanthium queenslandicum* can be found include *Acacia salicina* thickets in grassland and eucalypt woodlands (i.e. *Corymbia dallachiana*, *C. erythrophloia*, *E. orgadophila*). The literature lists species associations as: other species of blue grasses (*Dichanthium* spp. And *Bothriochloa* spp.), and other grasses restricted to black cracking clay soils. **SPRAT profile distribution in relation to the Project:** Areas of the alignment between Gowrie and Pampas (south-west of Pittsworth) are within the mapped distribution where the species or species habitat is likely to or may occur. The areas around Pittsworth are within the species' likely to occur distribution. This area appears to be an extension in a southeast direction, of the Dalby district, Darling Downs population mentioned in the literature. **Species records:** Five recent records exist very close to the Project footprint (30 – 850 m) near Pittsworth around the intersection of the Gore Highway and Toowoomba Road (dated 2014-2021) (ALA, 2023). **Records in the Project footprint:** No but are located very close to the edge of the footprint. **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes – close to the edge of the footprint near Pittsworth	Preferred habitat for the species, as described in the literature, is present within the Project footprint. The closest detection was located 0.8m from the edge of the alignment. Surveys detected the species in open woodland (RE 11.8.5) on low hills near Pittsworth. Suitable landforms described in the literature and occurring in the Project footprint include: undulating plains, low hills, basalt downs, and open downs. The *D. queenslandicum* plants found near the alignment, including previous records, occur on low hills characteristic of the Pittsworth to Gowrie section of the Project alignment (approximately 39 km). Suitable underlying geology described in the literature and occurring in the Project footprint includes basalt. Suitable soil substrates described in the literature occurring in the Project footprint includes black cracking clay soils. Suitable Landzones occurring in the Project footprint are considered to include: 8 Associate floristic species described in the literature and detected in the Project footprint include: *Dichanthium* spp., *Bothriochloa* spp., and other grasses restricted to black cracking clay soils. Suitable vegetation communities described in the literature and detected within the Project footprint includes natural grasslands (RE 11.8.11) and *Eucalyptus orgadophila* open grassy woodland (RE 11.8.5).	Known

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Dichanthium setosum	Bluegrass	-	V	The literature describes *Dichanthium setosum* as occurring in soils generally described as heavy soils (predominantly cracking clays or alluvium, often in gilgai), and including more specific soils including heavy basaltic black soil, stony red-brown hard-setting loam with a clay subsoil (Booth, 2012; DEH, 2022). Vegetation communities forming general habitat for the species are described in the literature as woodland or open woodland usually dominated by *Acacia harpophylla* (brigalow) and/or *Eucalyptus* spp. (Booth, 2012). It is also described as often being found in moderately disturbed areas such as cleared woodland, disturbed open grassy woodlands, grassy roadside remnants, and highly disturbed pasture. Such areas include habitat that has been variously grazed, nutrient-enriched and water-enriched (DE, 2022b). Flora species associated with preferred habitat mentioned in the literature include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra aff. Longifolia, Ajuga australis, Calotis hispidula and Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia and Psoralea* species (Ayers et al., 1996; DE, 2022b; OEH, 2022a). The extent to which the species can tolerate disturbance is not known. However, it is commonly found in disturbed areas such as cleared woodland, roadside remnants, grazed land and highly disturbed pasture. It is also found on variously grazed pasture where the soil is nutrient-enriched and water-enriched (Ayers et al., 1996). **SPRAT profile distribution in relation to the Project:** The entire alignment is inside of the mapped distribution where the species or species habitat is likely to and may occur, mostly within the likely to occur distribution. **Species records:** The nearest records of the species are from 10 km south of the Project footprint in NSW and from 15 km east and north-east of the Project footprint within the Toowoomba Range. Three out of four of these records are recent (between 2004 to 2018) (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes, one record	SPRAT WildNet Publications	Potential	No	Both general and preferred habitat for the species, as described in the literature, occurs within the Project footprint however the species was not observed within the Project footprint. Suitable soil substrates described in the literature occurring in the Project footprint, include cracking clays, alluvium, heavy basaltic black soils. Suitable Landzones occurring in the Project footprint are considered to include: 3, 4, 8. Associate floristic species described in the literature, and detected in the Project footprint, includes *Eucalyptus albens, Eucalyptus melanophloia, Myoporum debile, Aristida ramosa, Themeda triandra, Ajuga australis, Calotis* spp., *Vittadinia* spp., and *Wahlenbergia* spp. Suitable vegetation communities described in the literature and detected within the Project footprint, includes woodland, open woodland, *Acacia harpophylla* (brigalow) woodland, cleared woodland, disturbed open grassy woodlands, grassy roadside remnants, and highly disturbed pasture.	Potential
Eucalyptus infera	Durikai mallee	V	V	*Eucalyptus infera* is currently known from Durikai State Forest south-west of Warwick, on a land area approximately 40 to 50 ha in size (Bean, 1990; The Royal Botanic Gardens & Domain Trust, 2021). The species grows in sandy duplex soils (podsols, grey sandy-clay sometimes with a gravelly surface layer, grey clay loam) derived from metamorphosed sediments (Bean, 1990; DEWHA, 2008). The underlying landzone in the areas of known records are broadly mapped as Landzone 11, metamorphic and may include minor areas of landzone (LZ) 3, potentially at a scale that has not been mapped. General habitat, based on descriptions of vegetation types in the literature includes tall dry sclerophyll forest (Hill, 1997), open forest (Bean, 1990) in which *E. infera*, a mallee, occurs in the understorey. Positions in the landscape mentioned in the literature include growing in or next to often-dry watercourses or small drainage lines, and adjacent low rises (Bean, 1990). Species associated with preferred habitat include *Eucalyptus moluccana*, *E. fibrosa* subsp. *fibrosa*, *E. melliodora, E. tereticornis*, *Corymbia citriodora* subsp. *variegata*, *Melaleuca decora, Jacksonia scoparia*, and *Melichrus urceolatus* (Bean, 1990). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to and may occur. **Species records:** The closest recent records are located 40 to 50 km east of the Project footprint in Talgai and Durikai State Forests. The Project footprint is outside the species current known distribution (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	Both general and preferred habitat for the species, as described in the literature, is not considered present within the Project footprint, due to absence of metamorphic sedimentary geology, which appears to be a habitat requirement. Suitable landforms are not described in the literature, but through examination of topographic maps of the locations of specimens, is considered to be gentle slopes on low hills, similar landscapes are present in the Project footprint, though not those derived from metamorphic sediments. It is not known whether suitable soil substrates described in the literature occur in the Project footprint. Landzone 11, inferred to be suitable for the species, is not mapped in the Project footprint on the Queensland Herbarium Pre-clearing Regional Ecosystems (RE) map V 12.1, and landzone 11 Res were not detected during the surveys. There are no areas of the Project footprint that fall within mapped or known distribution of the species. Associate floristic species described in the literature and detected in the Project footprint includes *E. tereticornis*, *Melaleuca decora, Jacksonia scoparia*, and *Melichrus urceolatus*. Suitable vegetation communities described in the literature and detected within the Project footprint includes open forest.	Unlikely
Eucalyptus virens	Shiny-leaved ironbark	V	V	*Eucalyptus virens* is endemic to south-east Queensland. There are five recorded sites, as far south as Inglewood and as far west as Mt Moffatt (Queensland Herbarium, 2008).	SPRAT WildNet	Potential	No	General habitat for the species, as described in the literature, occurs within the Project footprint however the species was	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
				The species occurs within areas of dynamic topography such as on undulating hills, hillslopes, sandstone escarpments, gentle rises, and scree slopes and has a limited distribution in southern Queensland (Halford, 1997). Soils mentioned in literature and specimen labels include white sand over sandstone (Brooker, M.I.H., 1993), grey sandy loam over sandstone (Briggs, J.D. and Keith, D, 1988), sandy (Bean, A.R., 1993); and grey sandy loam (Hill, K.D., 1984). General habitat, based on vegetation communities recorded in the literature includes *Eucalyptus* woodland (Bean, A.R., 1993), and dense scleromorphic woodland (Hill, K.D., 1984). Floristic species assemblages recorded in the literature include *Eucalyptus exserta* and *E. panda* (Brooker, M.I.H., 1993); *Angophora costata, Eucalyptus umbellata, Corymbia trachyphloia* (Bean, 1993); and *C. trachyphloia*, *E. umbellata,* and *Callitris glaucophylla* (Hill, K.D., 1984). **SPRAT profile distribution in relation to the Project:** Areas of the Project footprint from Inglewood to Bringalily are within the mapped distribution where the species or species habitat is likely to occur. **Species records:** The nearest records of the species are from Bringalily State Forest and Coolmunda, located 11 km and 15 km distant from the Project footprint, respectively (ALA, 2023; DES, 2023). The record in Bringalily SF is from 1988, whereas the most recent of the records around Coolmunda is from 2008. **Records in the Project footprint:** No **Records in the locality:** No	Publications			not observed during targeted surveys of this habitat. Suitable landforms described in the literature and occurring in the Project footprint includes undulating hills, gentle rises, and hill slopes. However, the proposed alignment is generally situated on more level ground at the bottom of the undulating hill sections. Suitable underlying geology described in the literature and occurring in the Project footprint includes sandstone. It is not known if suitable soil substrates, including those described in the literature, occur in the Project footprint. Associate floristic species described in the literature and detected in the Project footprint include: *Callitris glaucophylla.* Suitable vegetation communities described in the literature and detected within the Project footprint includes *Eucalyptus* spp. woodlands. While general habitat typical of the species occurs within the Project footprint, shiny-leaved ironbark was not detected during targeted surveys. The area surrounding the Project footprint has seen immense historical clearing and as a result has fragmented habitat. It can be concluded that the species in unlikely to occur within the Project footprint, due to is lack of presence, historical habitat loss, and no records within the locality.	
Haloragis exalata subsp. velutina	Tall velvet sea-berry	V	V	*Haloragis exalata subsp. velutina* occurs on the north coast of NSW and in south-east Queensland. It occurs from near Kempsey, north to Carnarvon NP (NSW DECC, 2005; Queensland Herbarium, 2008). In Queensland this species is conserved in Carnarvon NP, Bunya Mountains NP, and Mt Moffat NP (NSW DECC, 2005; Queensland Herbarium, 2008). In Queensland, preferred habitat for *Haloragis exalata* subsp*. velutina* occurs in rainforest, rainforest margins, adjacent grassland and open grassy woodland >500 m above sea level (the grassland balds of Bunya Mountain NP) (Queensland CRA/RFA Steering Committee, 1998; Queensland Herbarium, 2008). The species has been recorded growing on brown heavy clay, shallow rock loam and basaltic soils. It was formerly known from swamp vegetation beside the Brisbane River near Hamilton at low elevation (Queensland Herbarium, 2012). Microhabitat noted in the literature includes damp places near watercourses; and in woodland on the steep rocky slopes of gorges (NSW OEH, 2022). Associated species includes broad-leaved apple (*Angophora subvelutina*), forest redgum (*Eucalyptus tereticornis*), green wattle (*Acacia irrorata*), and *Scutellaria humilis* (Queensland Herbarium, 2008). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to and may occur. **Species records:** Nearest recent record is within Bunya Mountains NP (approximately 68 km from the Project footprint) from 2008. Another record exists from 2001 near Oakey, approximately 10 km from the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes, but the record is 22 years old	SPRAT WildNet Publications	Unlikely	No	Preferred habitat for the species was not identified within the Project footprint. No suitable vegetation communities, described in the literature as rainforest, or in proximity to rainforest occur within the Project footprint. Limited general habitat for the species, as described in the literature, was observed within the Project footprint although the species was not detected during targeted surveys. Suitable soil substrates described in the literature occurring in the Project footprint includes brown heavy clay, shallow rock loam and basaltic soils. Associate floristic species described in the literature and detected in the Project footprint includes *Eucalyptus tereticornis*.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Homopholis belsonii	Belson's panic	E	V	This species occurs at elevations ranging from 200 m to 520 m above sea level. Preferred habitat includes a range of dry woodland habitats and soil types including, brigalow and Belah forest and woodlands, temperate sub-humid woodlands, woodland on rocky hills supporting white box (*Eucalyptus albens*) and wilga (*Geijera parviflora*); flat to gently undulating alluvial areas supporting belah (*Casuarina cristata*), *Acacia harpophylla* (Brigalow) or G.parviflora (Wilga); poplar box (*Eucalyptus populnea*) woodlands, mountain coolibah (*Eucalyptus orgadophila*) communities, and roadsides (Trémont and Whalley, 1993a; AusGrass, 2022; Queensland Department of Environment and Science, 2022). Microhabitat features often associated with this grass includes growing beside or supported by, fallen logs, sub-shrubs and tree trunks and low hanging branches. **SPRAT profile distribution in relation to the Project:** Areas of the Project footprint including most of the alignment from the border to Pittsworth are within the mapped distribution where the species or species habitat may occur. **Species records:** In proximity to the Project alignment, *Homopholis belsonii* records are present from Pittsworth to Goondiwindi, with a particularly high density around Millmerran (Queensland Herbarium, 2008; ALA, 2023). Two recent records from 2021 and 2023 are present at the southern end alignment (ALA, 2023; DES, 2023). **Records in the Project footprint:** Yes **Records in the locality:** Yes	SPRAT WildNet	Known	Yes	Preferred habitat for the species, as described in the literature, occurs within the Project footprint and was confirmed during surveys. The species was recorded across the Project footprint during surveys, including multiple records near Yelarbon, Inglewood, Tummaville, Millmerran and Yandilla. Habitat is located sporadically, generally in small patches between Pittsworth and the border (approximately 180 km). Suitable landforms described as gently undulating to flat landforms are common throughout the Project footprint. Suitable soil substrates described in the literature occurring in the Project footprint, includes clay and loam. Suitable Landzones occurring in the Project footprint are considered to include: 3, 4, 8 Associate floristic species described in the literature and detected in the Project footprint, includes *Eucalyptus albens*, *E. populnea, Geijera parviflora, Casuarina cristata*, and *Acacia harpophylla.* Suitable vegetation communities described in the literature and detected within the Project footprint, includes poplar box (*Eucalyptus populnea*) woodlands, belah woodlands, brigalow woodlands and Whitebox woodlands.	Known
Lepidium monoplocoides	Winged peppercress	-	E	The winged peppercress is known from arid to semi-arid areas with an average rainfall of 200 to 450 mm per year. The species generally occurs in ephemeral habitats, such as areas that are seasonally flooded or prone to waterlogging, on heavy clay or clay-loam soils (Mavromihalis, 2010). The species is associated with a number of vegetation communities, including grasslands, wetlands and floodplain woodlands dominated by *Eucalyptus coolabah* and *Eucalyptus largiflorens*, and chenopod shrublands dominated by *Atriplex*, *Maireana* and/or *Nitraria* species (Mavromihalis, 2010). This has been considered as preferred habitat. It has also been recorded from samphire communities dominated by *Halosarcia* species and temperate woodlands with *Eucalyptus microcarpa* and *Allocasuarina luehmannii* on the southern margins of its range. **SPRAT profile distribution in relation to the Project:** Areas of the Project footprint from the border to Pittsworth are within the mapped distribution where the species or species habitat may occur. Two small areas around Yelarbon and Inglewood are located within the mapped distribution where the species or species' habitat is likely to occur. **Species records:** The species has two recent records very close to the alignment at Yelarbon from 2005 and 2011 (ALA, 2023), however one of these records has a low accuracy of 10 km. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes	Preferred habitat for the species, as described in the literature, occurs within the Project footprint and was confirmed during surveys. Habitat is restricted to approximately 8 km of the alignment west from Yelarbon. Suitable soil substrates, including heavy clay and clay-loam occur in the Project footprint. Suitable Landzones occurring in the Project footprint are considered to include: 3, 4, and 5. Vegetation communities described in the literature, including grasslands, wetlands and floodplains were detected in the Project footprint. Populations detected during the Project surveys occur in, or on the edges of, and along fences and cleared tracks in *E. woollsiana* open forest, and *Triodia scabra*/*Melaleuca densispicata* grassland/shrubland.	Known

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Lepidium peregrinum	Wandering peppercress	-	E	The wandering peppercress occurs from Bunya Mountains in SEQ to Tenterfield in northern NSW, with known populations occurring in closest proximity to the Project near Toowoomba (Queensland Herbarium, 2009a; ALA, 2022). The species has not been well studied. Descriptions of vegetation communities described in the herbarium samples include: riparian open forest dominated by *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* (Scarlett, 1999); creek terrace in cleared *Allocasuarina cunninghamiana* open forest with a grassy ground stratum, on red brown alluvial loam (Qld Herbarium, 2019 BRI AQ0553298); edge of walking tracks in wet sclerophyll forest on red brown volcanics with some basalt rock present (National Herbarium of Victoria, MEL 2316492A, 2007); irregularly mowed area in a sheltered gully under tall wet sclerophyll forest (Queensland Herbarium, BRI AQ0736630, 2007). These habitat attributes can be regarded as general habitat. The species has also been recorded along walking tracks and road edges, in native pine plantations, irregularly mown areas, sheltered area in paddock seldom grazed by cattle, a travelling stock route, edge of cultivation area, on granite sand (National Herbarium of Victoria, 2006); and car parks, suggesting this species may respond well to disturbance (Queensland Herbarium, 2009; OEH, 2022; N.C.W. Beadle Herbarium, NE 87834, 2005)). **SPRAT profile distribution in relation to the Project:** Areas of the Project footprint from Gowrie to Pittsworth are within the mapped distribution where the species or species habitat may occur. A small area south-west of Millmerran is also mapped as where the species or species' habitat may occur; the Project footprint overlaps with this area slightly. **Species records:** The nearest record of the species is from Highfield Falls north of Toowoomba in 2007, approximately 10 km east of the Project footprint. Another recent record from 2022 in Harlaxton is approximately 12 km east of the Project (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Potential	No	Limited general habitat for the species, as described in the literature, was observed within the Project footprint although the species was not detected during targeted surveys. The distribution mapping for the species (as per DCCEEW) delineates only a small patch of habitat that may occur on the northern sections of the alignment near Pittsworth and Toowoomba. Again, no specimens were observed during multiple targeted surveys in these areas. Associated floristic species described in the literature and detected in the Project footprint, includes *Eucalyptus camaldulensis.* Suitable vegetation communities described in the literature and detected within the Project footprint, includes riparian open forest, paddocks, roadsides and grasslands.	Unlikely
Macadamia integrifolia	Macadamia nut	V	V	*Macadamia integrifolia* occupies remnant rainforest along the south-east coast of Qld, within 5 to 600 m elevation (Gross 1995; Stanley & Ross 1986). This is regarded as preferred habitat, however the species occupies all topographic positions including ridges, scree slopes, foot slopes, gullies, benches, and riverine terraces, these differing topographic positions are regarded as general habitat. Soils are predominantly alluvial or volcanic, well drained, and often with significant surface exposure of rock fragments (Costello et al. 2009). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to and may occur. **Species records:** There is one recent record from Mount Lofty in 2023, approximately 12 km from the Project footprint (ALA, 2023). The next nearest recent record of the species is from near Toogoolawah in 2019, approximately 60 km from the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	No preferred and general habitat for the species, that is, suitable vegetation communities described in the literature, specifically rainforest or rainforest margins occur within the Project footprint. Suitable soil substrates described in the literature occurring in the Project footprint includes alluvial and rocky soils. Suitable landforms described as slopes in the literature occur in the Project footprint.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Macrozamia conferta	-	V	V	*Macrozamia conferta* has three known populations located within or adjacent to Bringalily State Forest, Durikai State Forest and Talgai State Forest (Queensland Herbarium, 2008). The species general habitat can be found in ash-grey to white silty loam soils in flat undulating terrain and in skeletal, grey to white soils on steep slopes between 600 to 750 m altitude (Borsboom et al. 1998). The species occurs in open forest and is associated with spotted gum (*Corymbia citriodora var. variegata*), broad-leaved red ironbark (*Eucalyptus fibrosa*), yellow box (*E. melliodora*), narrow-leaved ironbark (*E. crebra*) and grey box (*E. moluccana*). The species has also been recorded in 'Woodland of *Eucalyptus fibrosa* subsp. *nubila*, *E. pillagaensis* and *Corymbia citriodora var. variegata*, with an understorey of *Acacia semilunata*, *Olearia elliptica* on pale reddish-white stony clay soil on a rise (ALA, 2022). **SPRAT profile distribution in relation to the Project:** A portion of the Project footprint from Inglewood to Clontarf is within the mapped distribution where the species or species habitat is likely to or may occur. An area of northern Bringalily State Forest is within the mapped distribution where the species or species' habitat is likely to occur. **Species records:** The nearest record of *Macrozamia conferta* is located approximately 10 km east of the Project footprint near the north-east corner of Bringalily State Forest. All records are located outside the eastern boundary of Bringalily State Forest, within or surrounding Durikai State Forest (ALA, 2023). However, due to potential poaching concerns, all records have an imposed spatial uncertainty of 2 km, meaning in actuality a number of these records may occur in proximity to the Project footprint (Bösenberg, J.D., 2010). **Records in the Project footprint:** No **Records in the locality:** Possibly; records are close to 10 km from the Project footprint but locations have an uncertainty of 2 km.	SPRAT WildNet Publications	Potential	No	Limited general habitat for the species, as described in the literature and the conservation advice (DEWHA, 2008), was observed within the Project footprint. Suitable landforms described as flat and undulating terrain are common throughout the Project footprint. Associate floristic species described in the literature and detected in the Project footprint includes *Eucalyptus fibrosa*, *E. melliodora,* and *E. crebra*. However, no specimens were identified within the Project footprint during surveys. The closet records are 10 km east of the Project footprint at the north-east corner of Bringalily State Forest. It is regarded that the species is unlikely to occur, due to limited habitat.	Unlikely
Macrozamia machinii	Machin's macrozamia	V	V	*Macrozamia machinii* occurs on the Darling Downs in Queensland between Texas and Wondul Range NP. When described, there were eight populations near Inglewood (Jones & Forster 1994). Three of the sites are in state forests, while the remaining sites are on leasehold land. The species general habitat occurs in deep sandy soils, in flat areas of open forest that are dominated by *Angophora leiocarpa, Allocasuarina inophloia, Callitris glaucophylla, Lysicarpus angustifolius*, and *Acacia conferta* (Jones & Forster 1994; Hill 1999a; Jones, 2002). **SPRAT profile distribution in relation to the Project:** Areas of the Project footprint from Inglewood to Clontarf are within the mapped distribution where the species or species habitat is likely to occur. **Species records:** Multiple records of the species north and south of Inglewood (mostly from the 1990s), particularly within Yelarbon and Bringalily State Forests (ALA, 2023). The only recent record is approximately 21 km west of the alignment, north of Bulli State Forest. **Records in the Project footprint:** No **Records in the locality:** Yes, however all are over 20 years old	SPRAT WildNet Publications	Potential	No	General habitat for the species was observed within the Project footprint. Suitable landforms described in the literature and occurring in the Project footprint includes flat terrain. Suitable soil substrates described in the literature, observed in the Project footprint: deep sandy soils. Suitable Landzones occurring in the Project footprint are considered to include: 5. Associate floristic species described in the literature and detected in the Project footprint includes *Angophora leiocarpa, Callitris glaucophylla* and *Acacia conferta.* Although general habitat was observed in the Project footprint, it is considered unlikely that the species is present. The Project footprint primarily occurs through cleared areas adjacent to the Yelarbon and Bringalily State Forests. Records of the species occur west of the Project alignment.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Microcarpaea agonis	-	E	E	Until recently *Microcarpaea agonis* was known only from its type locality within Boondandilla State Forest west of Millmerran, where it was found in what is considered the general habitat of the species on the margins of an *Eleocharis-Cyperus* dominated seasonal swamp fringed by *Eucalyptus chloroclada*. However, the species has since been recorded in Bladensburg National Park (NP) and Idalia NP much further north-west of the type locality. In these localities, the species has been recorded in a damp gully shaded by Acacias and bloodwood and in a spring fed wetland. Therefore, *Microcarpaea agonis* is likely to occur more widely and, in more habitats, than are currently listed in the species Conservation Advice. **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to and may occur. **Species records:** The nearest records are from 1996 at the type locality within Boondandilla State Forest, approximately 52 km west of the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	Small areas of general habitat for the species were observed within the Project footprint, notably *Eleocharis sp.* Dominated wetlands and larger gilgai, and wetlands fringed with *Eucalyptus* spp. However, the species was not found during targeted surveys. Associate floristic species described in the literature, detected in the Project footprint include: *Eucalyptus chloroclada*, *Eleocharis sp.* And *Cyperus sp.* Suitable vegetation communities described in the literature and detected within the Project footprint include: 11.3.27, 11.3.27b and 11.3.27i. Although general habitat was observed in the Project footprint, it is considered unlikely that the species is present within the Project footprint. The Project footprint primarily occurs through cleared areas adjacent to the Yelarbon and Bringalily State Forests. The records of the species additionally occur west of the Project alignment.	Unlikely
Phebalium distans	Mt Berryman phebalium	E	E (CE at time of the referral) (downlisted from CE, effective 22 April 2022 – after controlled action date)	*Phebalium distans* is endemic to south-east Queensland, where ten extant populations are known from three locations: Mt Berryman, Mt Jones Plateau near Kingaroy and Mt Walla near Coalstoun Lakes (Forster, 2003). This species is most commonly found in the general habitat of semi-evergreen vine thicket or adjacent community types, 200 m+ above sea level (Queensland Herbarium, 2012). It also occurs within microphyll and notophyll vine forests and low microphyll vine forest. The terrain tends to be undulating to hilly and it grows on a variety of soil types including: red volcanic soil, red-brown earth, brown clay, dark brown loam (from lithosols to shallow, gravelly krasnozems). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to and may occur. **Species records:** The nearest records of *Phebalium distans* are from Mt Berryman, approximately 54 km east of the Project footprint (ALA, 2023). These records span from 1985 to 2016. **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	Limited general habitat for the species, as described in the literature, was observed within the Project footprint. Suitable landforms described as undulating terrain is common throughout the Project footprint. Suitable vegetation communities described in the literature do not occur within the Project footprint.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Picris evae	Hawkweed	V	V	*Picris evae* has been recorded in the Eastern Darling Downs from Toowoomba to west of Brookstead along the Gore Highway (DEWHA, 2008). The literature describes suitable soils as variable, but particularly mentions black, dark grey or red-brown soils, reddish clay-loam or medium clay soils (DEWHA, 2008a). The species general habitat is: *Eucalyptus* open woodland with a grassy understorey composed of *Dichanthium s*pp. although it is mentioned that recent collections appear to come from modified (including non-remnant) habitats such as weedy roadside vegetation and paddocks (DEH, 2022a). The species preferred habitat is *Eucalyptu*s open woodland, the typical upper stratum species include *Eucalyptus melliodora*, *E. crebra*, *E. populnea*, *E. albens*, *Angophora subvelutina*, *Allocasuarina torulosa*, and *Casuarina cunninghamiana* (Holzapfel, 1994). **SPRAT profile distribution in relation to the Project:** Approximately half of the railway alignment (from Gowrie to ~22 km south of Millmerran) is within the mapped distribution where the species or species habitat is likely to or may occur. The area from Gowrie to Yandilla is within the mapped distribution where the species or species habitat is likely to occur. **Species records:** The species has numerous records in close proximity to the north-east section of the Project footprint, mostly from the early 2000s to as recent as 2021 (ALA, 2023). One record from 2002 in Brookstead appears within the Project footprint (along the Gore Highway at Elsden Road), while many other close records are within 5 km of the alignment. **Records in the Project footprint:** Yes, however, the record is over 20 years old. **Records in the locality:** Yes	SPRAT WildNet Publications	Known	Yes	Preferred and general habitat for the species is patchily located from just south of Clontarf to Gowrie (approximately 95 km of the alignment). Suitable vegetation structural types forming preferred and general habitat, including remnant and regrowth *Eucalyptus* open woodland, *Dichanthium* spp. grassland, as well as areas of non-remnant vegetation (weedy roadside vegetation and paddocks) were common across the Project footprint. Additionally, suitable black, dark grey or red-brown soils, reddish clay-loam or medium clay soils are distributed primarily in the northeast sections of the alignment around the Pittsworth area, particularly on alluvial plains and sediments. During field surveys, the species was recorded within the Project footprint south of Brookstead, north of Pittsworth and at the northern extent of the footprint near Gowrie Mountain. It was also recorded at multiple locations within the study area but outside of the Project footprint east of Pittsworth. More recently, during a survey for another project, a large population of the species were recorded within the Project footprint near Gowrie Mountain by EMM. This large population is assumed to have grown from the records during ecological surveys. From EMM's surveys, the population extent within the Project footprint is 14,281.67 m^2, with an average plant density of 23.9 individuals per square metre. This results in an estimated population of 341,332 individuals within the footprint near Gowrie Mountain.	Known
Prostanthera sp. Dunmore (D.M.Gordon 8A)	-	V	V	*Prostanthera* sp. (Dunmore (D.M.Gordon 8A)) is known from four locations in a small area west of Millmerran in southern Queensland. Its extent of occurrence is less than 100 km^2. One population occurs on private land and three in state forest, including one on the border with Wondul Range NP (DEWHA, 2008b). The species general habitat features *Eucalyptus* and *Callitris* woodland in shallow sandy soil or *Eucalyptus* woodland on hard sandstone ridge tops (DEWHA, 2008b). The three populations in state forest occur in remnant vegetation. **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to and may occur. **Species records:** The closest record is in Wondul Range NP which is approximately 20 km west of the alignment from 1994 (Australian Virtual Herbarium, 2023; DES, 2023). The only other database records are located in Western Creek and Boondandilla State Forests, approximately 45 km and 50 km west of the Project footprint respectively. **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	General habitat for the species, as described in the literature and the conservation advice (DEWHA, 2008), is very limited within the Project footprint. Flora surveys along the alignment did not detect the species. Suitable soil substrates described in the literature occurring in the Project footprint include shallow sandy soils, which may occur in the central project footprint area. The species is also known to occur on hard sandstone ridge tops – a geological feature that does not occur across the Project footprint. All known records of the species are approximately 45 km and 50 km west of the Project footprint respectively in Western Creek and Boondandilla State Forests. Due to limited general habitat, limited suitable geological features, and no sightings of the species within the Project footprint, it is considered that the species is unlikely to be present.	Unlikely
Rhaponticum australe	Austral cornflower	V[1]	V	*Rhaponticum australe* is known from locations near Mt Moffatt and Biloela in central Queensland, and from the eastern Darling Downs to Gatton in southeast Queensland (DES, 2022a). According to DAWE the most significant extant population of	SPRAT WildNet	Likely	Yes	Preferred and general habitat for the species, as described in the literature, and present within the Project footprint include	Known

[1] Listed as *Leuzea australis*

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				Rhaponticum australe occurs at upper Glengallan Creek, just north of the Cunningham Highway, in the Toowoomba-Aubigny region. The species general habitat features heavy black or red-brown clay, or clay loams derived from basalt (DEWHA, 2008c). Populations are often confined to roadsides and cultivation headlands (DEWHA, 2008c). Locations where the species have been observed range in altitude up to 480 m above sea level. The species preferred habitat is considered to be in woodland and grassland and in association with *Eucalyptus crebra*, *E. orgadophila*, *E. populnea*, *E. tereticornis, E. melanophloia, Angophora subvelutina, A. floribunda, Cirsium vulgare* (introduced), *Dichanthium sericeum* and *Themeda triandra* (DEWHA, 2008c). It is considered to be a poor competitor and prefers habitat where grass competition has been reduced by fire or other forms of disturbance. However, the species is unlikely to benefit from disturbance that allows the development of a dense cover of exotic grasses such as *Chloris gayana* (DEWHA, 2008c). **SPRAT profile distribution in relation to the Project:** Approximately half of the railway alignment (from Gowrie to ~22 km south of Millmerran) is within the mapped distribution where the species or species habitat is likely to or may occur. The area from Gowrie to Yaranlea (west of Pittsworth) is within the mapped distribution where the species or species habitat is likely to occur. **Species records:** There are many records in proximity to the Project footprint between Pittsworth and Gowrie, including multiple records from 2021 that are within 3 km of the alignment near Pittsworth and Southbrook (ALA, 2023). Other close recent records exist around Kingsthorpe and Gowrie. **Records in the Project footprint:** No **Records in the locality:** Yes				grasslands, eucalypt woodlands with grassy understory, grassy roadsides and on road reserves. Flora surveys along the alignment detected the species within and directly adjacent to the Project footprint, between 20 m to 1 km from the alignment, at multiple locations near Pittsworth and north-east of Southbrook. Furthermore, the significant population recorded by DAWE at upper Glengallan Creek is in close proximity to the north-east end of the alignment. Habitat for the species is located from Yarrenlea to Southbrook (approximately 21 km of the alignment). Suitable soil substrates described in the literature include heavy black or red-brown clay, or clay loams derived from basalt, which occur in the north-eastern areas of the Project footprint. Suitable vegetation communities described in the literature align with several that have been recorded within the Project footprint.	
Sarcochilus hartmannii	Waxy sarcochilus	V	V	*Sarcochilus hartmannii* is known from the Richmond River in northern NSW to Main Range NP in south-eastern Queensland (DEWHA, 2008d). The species preferred habitat is typically located on volcanic rocks, shallow soils and exposed cliffs in sclerophyll forests, rainforest margins or open areas at 500–1000 m altitude (DEWHA, 2008d). It is also found occasionally at the base of fibrous trunks of trees, including cycads and grasstrees. It prefers basalt substrate and exposed sunny locations, although occasionally it has been found growing near creeks in rather shady conditions (DEWHA, 2008d). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to and may occur. **Species records:** The nearest record of *Sarcochilus hartmannii* is located to the east of Toowoomba, approximately 18 km from the alignment (ALA, 2023). The record is not dated; however, the specimen was loaned to the Sydney Herbarium in 1965 indicating it is at least 56 years old. The record location has also been generalised to a 2 km area in an effort to protect the species from illegal collecting. All other records are located >50 km from the Project footprint, predominantly east of Warwick. **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet	Unlikely	No	Both general and preferred habitat, landform and vegetation types for the species, as described in the literature, do not occur within the Project footprint and the Project footprint occurs outside of the mapped distribution. Flora surveys along the alignment did not result in detection of the species.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Sarcochilus weinthalii	Blotched sarcochilus	E	V	*Sarcochilus weinthalii* is known from the east coast of Australia from the north of the Richmond River to the Bunya Mountains and the Gallangowan area, including several records near Toowoomba (DoE, 2014). The species general habitat occurs in rainforest, dry rainforest and drier scrub of sub-coastal ranges and associated foothills inland from the coast at altitudes of 400 to 700 m above sea level (DoE, 2014). In south-east Queensland, it typically grows in a number of microphyll and notophyll rainforest types and patches of isolated scrub (Barker & Borsboom 1997). *Sarcochilus weinthalii* occurs as small, single plants on the upper branches of rainforest trees. In dry rainforest habitats it may occur as a twig epiphyte and has been recorded growing on rocks (DEH, 2018). **SPRAT profile distribution in relation to the Project:** A small area of the Project footprint between Gowrie and Southbrook is within the mapped distribution where the species or species habitat may occur. **Species records:** The nearest records of this species are from pre-1990s and are located within the Toowoomba range (approximately 15 km from the Project footprint) (ALA, 2023). However, the location of the records have been generalised to a 2 km area in an effort to protect the species from illegal collecting, so the exact distance to the Project footprint is not known. **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	General habitat, landform and vegetation types for the species, as described in the literature, do not occur within the Project footprint. Flora surveys along the alignment did not result in detection of the species.	Unlikely
Sophora fraseri	Brush sophora	V	V	*Sophora fraseri* occurs across south-eastern Queensland and north-eastern NSW, as well as along the Great Dividing Range to Toowoomba (DES, 2022b). The species is widespread but not common. The species general habitat consists of moist habitats, often in hilly terrain at altitudes from 60–660 m on shallow soils along rainforest margins in eucalypt forests or in large canopy gaps in closed forest communities (DEWHA, 2008e). It has been recorded growing mostly shallow stony to shaly soils, of loam to clay texture derived from sandstone or basalt rocks (DES, 2022b). Associated species include: *Corymbia citriodora*, *Eucalyptus carnea*, *E. microcorys*, *E. acmenoides*, *E. propinqua*, and *Lophostemon confertus*. (Barker and Borsboom, 1997; DES, 2022b). **SPRAT profile distribution in relation to the Project:** A very small area of the Project footprint at Gowrie is within the mapped distribution where the species or species habitat is likely to or may occur. **Species records:** The nearest records of the species are from 1997 to 2023 at Mount Kingsthorpe Reserve, approximately 1.3 km north of the eastern extent Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet DES Species Profile	Potential	No	General habitat, landform and vegetation types for the species, as described in the literature, do not occur within the Project footprint. The associate species listed in the literature do not occur in the Project footprint. Flora surveys along the alignment did not result in detection of the species.	Unlikely
Styphelia sp. Coolmunda (D.Halford Q1635)	-	E	E	*Styphelia sp*. Coolmunda (previously *Leucopogon* sp. Coolmunda) is known from a small area south-east of Inglewood. It is also known to occur in Yelarbon State Forest (Queensland Herbarium, 2007). Within this restricted area of occurrence, the species occurs in undulating terrain between 300 and 340 m above sea level (Halford, 1993). The soil is typically shallow (1 m), light coloured sandy-loam with mottled orange clayey subsoils, and the vegetation is predominantly open forest to woodland with a dense lower stratum of heath up to 1.5 m high (Halford, 1993). The species general habitat is associated with the following species: *Eucalyptus terrica*, *Corymbia trachyphloia*, *E. virens* and *Callitris endlicheri*. The lower stratum is very diverse with a range of different species, including: *Calytrix tetragona*, *Triodia* sp., *Grevillea floribunda*, *Boronia glabra*, *Xanthorrhoea johnsonii*, *Brachyloma daphnoides*, *Ricinocarpos linearifolius* and *Melichrus urceolatus* (Halford, 1993). **SPRAT profile distribution in relation to the Project:** An area approximately 10 km south-east of Inglewood is within the mapped distribution where the species or species habitat may occur, however, none of this mapping overlaps with the Project Footprint. **Species records:** Several records are located around Coolmunda Dam and in Coolmunda Conservation Park (between approximately 10.5 km and 16 km from the Project footprint), the most recent of which is from 2013 (ALA, 2023; DES, 2023). The closest records in this area are from the 1970s. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet	Potential	No	General habitat for the species, as described in the literature, was observed at only a few locations within the Project footprint and the species was not observed during surveys and the Project footprint is outside the species mapped distribution. Suitable landforms described as undulating terrain is common throughout the potential habitat areas identified. Suitable soil substrate described as sandy loam was found to occur in the Project footprint. Suitable vegetation communities described in the literature as open forest to woodland with a dense lower stratum of heath up to 1.5 m high, were detected within the Project footprint but were rare and restricted to the stretch between Yelarbon and Millmerran. Associate floristic species described in the literature, detected in the Project footprint: *Triodia* sp., *Corymbia trachyphloia, Callitris endlicheri*, *Calytrix tetragona, Triodia sp. and Melichrus urceolatus.*	Unlikely
Swainsona murrayana	Slender Darling-pea,	V	V	*Swainsona murrayana* occurs from South Australia through south-west Victoria and central NSW to south-east Queensland. In Queensland the species has been recorded	SPRAT	Potential	No	The Project alignment has small areas of general habitat, in the form of disturbed	Unlikely

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	Murray Swainson-pea, and Slender Swainson			in Surat and Eromanga. Majority of the sub-populations have less then 50 individuals, however, the largest known population has approximately 42,000 individuals. The common names for the *Swainsona murrayana* are Slender Darling-pea, Murray Swainson-pea and Slender Swainson. The general habitat for *Swainsona murrayana* is primarily found within grasslands, herbland, and open black-box woodland, commonly in depressions. The species grows in heavy grey or brown clay, loam, or red cracking clays. The *Swainsona murrayana* is commonly associated with low chenopod shrubs, wallaby-grass, and spear grass. Most areas that the species is found has had some form of disturbance, commonly occurring in paddocks that have been grazed or used for cultivation activities. The distribution and the preferred habitat of this species overlaps with the following EPBC Act-listed threatened ecological communities: - The community of native species dependant on natural discharge of groundwater from the Great Artesian Basin, - Brigalow (*Acacia harpophylla* dominant and co-dominant), - White box-yellow box-Blakely's red gum grassy woodland and derived native grassland, and - Buloke woodlands of the Riverina and Murray-Darling Depression Bioregions. **SPRAT profile distribution in relation to the Project:** The middle and northern sections of the alignment are outside of the mapped distribution where the species or species' habitat is likely to and may occur, however section of the southern section of the alignment are within the mapped distribution where the species or species' habitat is likely to and may occur. **Species records:** The nearest record of the species is located approximately over 30 km south of the Project alignment; however, this record has a very high spatial uncertainty/inaccuracy of 75 km and the specimen was collected in 2004 (ALA, 2024). **Records in the Project footprint:** No **Records in the locality:** No	WildNet DES Species Profile Publications			pasturelands and grasslands. However, no specimens were found within the Project alignment, and the closet record exist approximately 30 km south of the Project alignment. Sections of the B2G Project alignment has natural grassland communities consisted of 11.3.21, 11.8.11 and 11.5.14. RE 11.3.21 was also observed which consisted of grassland dominated by *Dichanthium sericeum,* and *Aristida leptopoda,* scattered mixed native forbs with cracking clay soils on alluvial plains. No particular associate floristic assemblage were identified in the literature to define habitat suitable for the species; as it occurs generally amongst native and introduced grasses, forbs and sedges and disturbed pasture lands. The species is associated with the following TECs that are found within the Project footprint: • Brigalow (*Acacia harpophylla* dominant and co-dominant), and • White box-yellow box-Blakely's red gum grassy woodland and derive native grassland. Parts of the Project footprint are within totally cultivated areas. The majority of the Project footprint that the species distribution range overlaps is contained within an already existing railway line, and within a non-remnant patch of poplar box and brigalow regrowth adjacent to Rainbow Reserve extending into the Macintyre River. Rainbow Reserve does not contain any vegetation community associated with the presence of the species. A total of five quaternary assessments were conducted within Rainbow Reserve (two by Ausecology, three by Cardno). and an additional 12 south to the Macintyre River (nine by Ausecology, three by Cardno). The species was not recorded during any of these assessments, and as such is considered unlikely to occur.	

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Thesium australe	Austral toadflax	V	V	The distribution of *Thesium australe* in SEQ is sporadic but widespread, going as far inland as the Toowoomba region (DoE, 2013). *Thesium australe* is semi-parasitic on roots of a range of grass species, notably on *Themeda triandra* (Kangaroo Grass) (DoE, 2013). It occurs in subtropical, temperate, and subalpine climates over a wide range of altitudes. It typically occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils, including black clay loams to yellow podzolics and peaty loams (Leigh et al. 1984; Hunter et al. 1999; Cohn 2004). The species general habitat is considered to be shrubland, grassland, or woodland often noted on damp sites (George 1984; Harden 1992). Preferred habitat features the following vegetation types: open grassy heath, kangaroo grass (*Themeda triandra)* grassland surrounded by *Eucalyptus* woodland, and grassland dominated by barbed-wire Grass (*Cymbopogon refractus*) (Leigh et al. 1984; Hunter et al. 1999). **SPRAT profile distribution in relation to the Project:** The central and northeast sections of the alignment between Gowrie and Yelarbon are within the mapped distribution where the species or species habitat is likely to or may occur. Two sections of the alignment (from Gowrie to Pittsworth and Pampas to Bringlily) are within the mapped distribution where the species or species habitat is likely to occur. **Species records:** The closest record is from Highfields from 2022 (~10 km away), with some other records south of Toowoomba within 15 km of the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes	Preferred and general habitat for the species occurs within the Project footprint. Multiple individuals have been recorded during field surveys within the Project footprint, approximately 2 km north-east of Pittsworth. Habitat for the species is patchily located from Canning Creek to Gowrie (approximately 111 km of the alignment). Potential vegetation communities detected include Dry sclerophyll (Eucalypt) woodlands, *Eucalyptus* and/or *Acacia harpophylla* and/or *Casuarina cristata* open forest and Natural grasslands. Non-remnant and disturbed habitats, including grasslands, may also offer some marginal habitat to the species. Suitable soil substrates described in the literature are also distributed throughout the alignment particularly east from Inglewood and Millmerran.	Known
Vincetoxicum forsteri	-	E	E	*Vincetoxicum forsteri* (formerly known as *Tylophora linearis*) has rarely been collected and is known from eight localities in NSW, and one locality near Glenmorgan in Queensland. Besides these locations, it has a potential distribution from inland southern Queensland to central NSW. The species general habitat is considered to be areas of 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*. (Forster et al., 2004). It has also been noted to grow in dry scrubland that may have a eucalypt, *Callitris glaucophylla* and/or *Allocasuarina luehmannii* overtopping the scrub (DEH, 2021). It has been recorded from low-altitude sedimentary flats in dry woodlands, and it is also noted to generally grow in the range of 300–- 400 m elevation (DEH, 2021). **SPRAT profile distribution in relation to the Project:** The area from Bringalily to Yelarbon is within the mapped distribution where the species or species habitat may occur. **Species records:** Multiple recent records exist west of Durikai State Forest 30-50 km east of the Project footprint (2018-2023) (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Potential	No	Limited general habitat for the species occurs within the Project footprint. Although dry scrubland was not noted during surveys, vegetation communities detected include dry sclerophyll (Eucalypt) woodlands or *Eucalyptus* and/or *Acacia harpophylla* and/or *Casuarina cristata* open forest. Suitable soil substrates and landforms described in the literature and the conservation advice (DEWHA, 2008) may occur in the Project footprint but these do not seem to be a defining characteristic of the species given the low number of records. Majority of the associate floristic species described in the literature, were not common along the alignment, and vegetation communities that may suit the species include approximately 20 ha of *Eucalyptus fibrosa* dominated woodland and 2 ha of *Eucalyptus albens* dominated woodland. Flora surveys along the alignment did not result in detection of the species. It has been considered that the Project footprint contains limited habitat for the species. The closest records are additionally Forest 30-50 km east of the Project footprint, in which in addition to the limited suitable habitat lead to it being classed as unlikely to occur within the Project footprint.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Westringia parvifolia	Small-flowered westringia	V	V	*Westringia parvifolia* is known from four collections near Yelarbon, Inglewood and Goondiwindi in SEQ (DEWHA, 2008f). The species is known from a small area near Yelarbon and Inglewood, its distribution range is approximately 80 km and there is no available information on population size (DEWHA, 2008f). The preferred habitat of *Westringia parvifolia* contains Baker's mallee (*Eucalyptus bakeri*) and green mallee (*E. viridis*) and between clumps of spinifex (*Triodia* sp.) on sandy and stony soils (White & Francis 1921, DEWHA, 2008f). **SPRAT profile distribution in relation to the Project:** The area around Inglewood and Yelarbon is within or borders the mapped distribution where the species or species habitat is likely to occur. **Species records:** Past records of the species are in close proximity to the alignment near Inglewood, Yelarbon and Goondiwindi. Only one record, near Yelarbon, is recent (from 2020) and borders the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes	Preferred and general habitat for the species, as described in the literature, is present within the Project footprint. Multiple individuals were detected within the alignment north-east of Yelarbon. Habitat for the species is located along approximately 8 km of the alignment around Yelarbon. Suitable vegetation communities described in the literature and detected within the Project footprint, include: dry sclerophyll (Eucalypt) woodlands, disturbed areas of Eucalypt woodlands and open hummock grasslands. Suitable soil substrates described in the literature occur across the Project footprint.	Known
Xerothamnella herbacea	-	E	E	*Xerothamnella herbacea* is known from 12 sites, including sites near Yelarbon and Goondiwindi, Queensland (Shapcott, 2016). This species preferred habitat occurs in brigalow (*Acacia harpophylla*) dominated communities in shaded situations (i.e., underneath trees/shrubs), often in leaf litter (DEWHA, 2008f). The species are associated with heavy, grey to dark brown clays and gilgais (shallow ground depressions). Typically recorded on soils noted as heavy, grey to dark brown clays (DEWHA, 2008f). A recent study by Shapcott et al. (2016) found that the species has a tendency to die back in response to dry conditions and thus is effectively ephemeral within the landscape. **SPRAT profile distribution in relation to the Project:** The area around Yelarbon is within the mapped distribution where the species or species habitat is likely to or may occur. **Species records:** One record from 2020 appears on the alignment and another record from 2006 is approximately 4 km north of the alignment at Yelarbon (ALA, 2023). **Records in the Project footprint:** Yes **Records in the locality:** Yes	SPRAT WildNet DES Species Profile	Known	Yes	Preferred and general habitat for the species, as described in the literature, includes Eucalyptus and/or *Acacia harpophylla* and/or *Casuarina cristata* open forest within the Project footprint. Multiple individuals were detected within the alignment south-west of Yelarbon. Habitat for the species is located along approximately 44 km of the alignment from the border to the edge of Whetstone State Forest. Suitable soil substrates described in the literature occur across the Project footprint. *Xerothamnella herbacea* was found in brigalow/belah communities particularly in areas dominated by shade lines in remnant and non-remnant areas and surrounded by mainly cropping and grazing areas. Microhabitat present where *X. herbacea* was identified consisted of leaf litter, shaded areas and fallen logs. Identified threats include historical clearing, grazing pressure (sheep and cattle), and competition from other plant species, both native and exotic.	Known
Threatened fauna									
Birds									
Anthochaera phrygia	Regent honeyeater	CE	CE	The regent honeyeater has a patchy distribution which extends from SEQ, through NSW and the Australian Capital Territory, to central Victoria. Records are widely distributed across its range, but it is only found regularly at a few localities in NSW and Victoria, where most of the sightings have been recorded. There are four known key breeding areas: three in NSW and one in Victoria (DoE, 2015a). It is highly mobile, occurring only irregularly in most sites, and in variable numbers, often with long periods with few observations anywhere (DoE, 2016). The species is nomadic and partly migratory, with some predictable seasonal movements observed. Breeding varies between regions and corresponds with flowering of key eucalypt and mistletoe species (DoE, 2015a). The species mostly inhabits inland slopes of the Great Dividing Range, in areas of low to moderate relief with moist, fertile soils. It is most commonly associated with box-ironbark eucalypt woodland and dry sclerophyll forest, but also inhabits riparian vegetation (DoE, 2015a). Principally a canopy bird, it is reliant on select species of eucalypt and mistletoe which provide rich nectar flows (DoE, 2015). The species prefers dry sclerophyll, box ironbark, *Eucalyptus* woodlands and forests on inland slopes, especially in moister sites along creeks, river valleys and lower slopes of foothills, and typically dominated by reliable nectar-producing trees including (specific to Project footprint): *Eucalyptus melliodora* and *Eucalyptus albens*. Regent honeyeater also occurs commonly in more open savanna-type woodland of such eucalypt species, or in remnants of such associations in cleared or partly cleared agricultural land (DoE, 2016). Of 168 observations of habitat across their range, 80% were eucalypt woodland or dry sclerophyll forest. Less often in riparian *Casuarina* forests dominated by river sheoak (*Casuarina18unninghamianaa),* usually with heavy load of the mistletoe *Amyema*	SPRAT WildNet Publications	Potential	No	Preferred foraging habitat for the species, as described in the literature which occurs in the Project footprint includes, remnant dry sclerophyll (Eucalypt) woodlands, especially box-ironbark communities, disturbed areas of Eucalypt woodlands and *Eucalyptus* and/or *Acacia harpophylla* and/or *Casuarina cristata* open forest. The Project falls outside of the breeding range of the species as the four known locations are in NSW and Victoria. As this species is highly mobile and nomadic, scattered records were found within the locality, and foraging habitat as described in the literature was located, the species has potential to occur within the Project footprint.	Potential

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
				cambagei (and sometimes mixed with eucalypts) (Higgins et al., 2020, DoE, 2015a). Preferred habitat can be considered any breeding or foraging areas of habitat. However, the Project falls outside of the breeding range of this species. Habitat critical to the survival of the regent honeyeater includes: Any breeding or foraging areas where the species is likely to occur. Any newly discovered breeding or foraging locations. **SPRAT profile distribution in relation to the Project:** The majority of the alignment (from Gowrie to just east of Yelarbon) is within the mapped distribution where the species or species habitat is likely to or may occur. Only a small portion of the alignment south of Millmerran is within the mapped distribution where the species or species habitat is likely to occur. **Species records:** Records of regent honeyeater have been generalised (within 2 km) to protect the species. However, one record from 2020 is located in Wondul Range National Park (~9 km west of the alignment) and there are a number of records from the Durikai area (which is considered critical habitat for the species), located approximately 35 km southeast of the Project footprint (ALA, 2023). Two undated records are located approximately 25 km north-west of the Project footprint, north of Toowoomba. The lack of records for the regent honeyeater in the region makes it difficult to predict the likelihood of its occurrence in the Project footprint. As suitable foraging habitat, some landscape connectivity, and some scattered regional records from 2000 to 2020 are present, there is some potential for the species to occur. However, there is not enough evidence to increase the species to a likely likelihood of occurrence, nor to discount it. **Records in the Project footprint:** No **Records in the locality:** Yes					
Botaurus poiciloptilus	Australasian bittern	E	E	The Australasian Bittern occurs across south-east Australia, southern Australia, and Tasmania. In Queensland, the species occurs as far north as Yeppoon and west to Wyandra (TSSC, 2019). The Australasian bittern inhabits a range of wetland habitats, mainly in freshwater wetlands with tall dense vegetation (TSSC, 2019). The species prefers still, shallow waters with little fluctuation in water level, such as swamps or lagoons. It favours freshwater habitats dominated by sedges, rushes and reeds (e.g. *Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus*) or cutting grass (*Gahnia*) growing over a muddy or peaty substrate (Marchant & Higgins 1990). The species can also be found in paddocks with sitting water and long grass during and after periods of heavy rainfall (Martínez-Vilalta et al., 2020). The species nests adjacent to relatively deep, densely vegetated freshwater swamps and pools, building its nests under dense cover (prefers vegetation up to 2.5 m) over shallow water (Marchant & Higgins 1990). All natural habitat (including constructed wetlands with preferred habitat) in which the Australasian bittern is known or is likely to occur should be considered critical to the survival of the species (TSSC, 2019). Additionally, any breeding/roosting habitat is classified as preferred habitat, with any foraging habitat classed as general habitat. **SPRAT profile distribution in relation to the Project:** One area the border and Yelarbon is within the mapped distribution where the species or species habitat may occur. The northern most end of that alignment at Gowrie is just outside the distribution. **Species records:** The nearest recent record to the alignment (2009) is from Lake Clarendon (near Gatton), approximately 48 km east of the Project footprint (ALA, 2023). There are undated and older records (1980's or before) from 24 km from the Project footprint. **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet	Likely	No	Preferred habitat for the species, as described in the literature, is present within the Project footprint, approximately 1 km of the alignment where it runs through Bringalily State Forest. The species was not detected despite targeted surveys in potential habitat. Wetland habitat within the Project footprint includes dams and reservoirs (lacustrine), wetlands associated with the floodplains of watercourses (riverine) and vegetated swamps (palustrine). In total, 8 ha of potential wetland habitat was found in remnant vegetation including Eucalypt woodland fringing drainage lines and freshwater wetlands (RE 11.3.25, 11.3.27b and 11.3.27i) in the alignment. Of the wetlands observed during surveys, vegetation cover and species richness was variable depending on drainage and water inundation at the time of survey. Throughout all of these areas, hydrophytic sedge and herb species dominated including *Eleocharis plana, Marsilea mutica*, mixed *Cyperus* and *Juncus* species. Emergent aquatic vegetation was generally present, with a height of 0.2 to 5 m.	Likely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Calidris ferruginea	Curlew sandpiper	CE	CE; Ma; Mi (Bonn, CAMBA, JAMBA, ROKAMBA)	The curlew sandpiper is a non-breeding migrant to Australia; in Queensland, the species has widespread records along the coast with records sparsely scattered inland (DoE 2015b). The species is a summer migrant found in both fresh and brackish waters, mainly occurring on intertidal mudflats in sheltered coastal areas. They have also been recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. (Van Gils et. al., 2020). Occasionally they have been recorded around floodwaters (Higgins & Davies, 1996). Preferred habitat can be classified as breeding habitat, whilst general habitat is considered any roosting or foraging habitat. **SPRAT profile distribution in relation to the Project:** The entire alignment is mapped within the mapped distribution where the species or species habitat may occur. **Species records:** The nearest recent record of the species (2018) is located 14 km north of the Project footprint at Cooby Creek Reservoir (ALA, 2023). An older, closer record (from 1972) is located at Lake Coolmunda, 12 km east of the Project footprint. **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Potential	No	The Project footprint contains general habitat for the curlew sandpiper during times of flooding only. These habitat areas are generally dry and would not provide suitable habitat, unless inundated with water (which is only likely to occur during times of heavy rainfall leading to flooding). Whilst wetland habitats occur throughout the Project footprint, these are generally densely vegetated and small, indicating they may only present general (marginal) habitat for the species. Potential wetland habitat was found in remnant vegetation including Eucalypt woodland along drainage lines and freshwater wetlands (RE 11.3.2, 11.3.25, 11.4.10,11.3.27 and 11.3.27i) in the alignment.	Potential
Erythrotriorchis radiatus	Red goshawk	E	V (at the time of the referral) (uplisted to E effective 31 March 2023, after controlled action date)	The Red Goshawk is very sparsely dispersed across coastal and sub-coastal Australia, from the western Kimberley to south-east Qld (TSSC, 2015). The species gradually became extinct in NSW during the 1980s and 1990s with populations in southeast Qld also suggested to have largely disappeared (Garnett and Baker, 2021). The species is currently known to breed in coastal and sub-coastal areas of wooded and forests regions from the Kimberley east to Cape York Peninsula and north to the Tiwi Islands. It is possible they may breed in low densities in the Wet Tropics and Einasleigh Uploads, although a paucity of data (TSSC, 2015 and Garnett, 2021). This species general habitat is located in forests and woodlands with a mosaic of vegetation types, large prey populations (birds), and permanent water. Nesting habitat consists of tall stands of trees. All identified nest trees have been within 1 km of permanent water, often adjacent to rivers or clearings, and usually the tallest (mean height = 31 m) and most massive trees (Aumann and Baker-Gabb, 1991; Czechura, 2001). There has been a substantial northwards contraction of the range in parts of eastern Australia and the area of occupancy has declined since European settlement. Further, it is suggested that development and habitat alteration have rendered about 20% of the predicted Red Goshawk's range unsuitable for breeding, especially in coastal Queensland (TSSC, 2015). A more recent paper suggests that the red goshawk has an extirpation area of 27% and its average habitat area size has decreased by 46% (Ward et al. 2022). Further to this, MacColl et al. (2023) clearly present the northward range contraction of the red goshawk, with only one record in NSW and one in southern Queensland (south of 23°S) since 2010. A further check of these records reveals three in NSW (2011, 2018 and 2022) and two in southern Queensland (2012 and 2016) (ALA, 2023). Consistently recorded pairs were associated with permanently watered, rather remote areas of rugged terrain supporting mosaics of tall vegetation, primarily forest (TSSC, 2015). In south-east Queensland, Araucaria vine forests and open forests are a significant component of the vegetation mosaics frequented by red goshawks. Habitat for red goshawk survival needs to contain all known sites for nesting, food resources, water, shelter, essential travel routes, dispersal, buffer areas, and sites needed for the future recovery as defined by the EPBC Act (Department of Environment and Resource Management, 2012). **SPRAT profile distribution in relation to the Project:** Almost the entire alignment is mapped within the mapped distribution where the species or species habitat is likely to or may occur. **Species records:** Records of red goshawk have been generalised to protect the species. However, there are a number of records in the region, the nearest database record (2012) is located east of Toowoomba, approximately 15 km east of the Project footprint. Additional older records (1990s or older) occur to the north and east of Toowoomba (ALA, 2023). Notwithstanding, the 10 to 30 pairs in the South Eastern Queensland bioregion have reportedly disappeared (Seaton, 2014 as cited in Garnett and Baker, 2021). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Unlikely	No	There is potential for the species to occur within the Project footprint seldomly when dispersing, particularly within proximity to the Toowoomba region, albeit this would likely be considered an extremely rare and sporadic occurrence. Although the Project footprint contains potentially suitable stands of large trees for breeding, there are not large enough bodies of permanent water to support the species. The severe paucity of recent records for the red goshawk in the region, combined with recorded substantial extirpation and contractions of habitat for the population, indicates it is unlikely to occur in the Project footprint. As some general foraging habitat, some landscape connectivity, and some scattered regional records are present, there is a very small potential for the species to pass through. There has been a substantial northwards contraction of distribution range for the red goshawk species in eastern parts of Australia. Literature has estimated that average habitat for the red goshawk species has decreased by 46%. Due to this, it can be considered that while the Project footprint contains some general habitat, due to the species northward movement it is unlikely that the species occurs within the Project footprint.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Geophaps scripta scripta	Squatter pigeon (southern)	V	V	The squatter pigeon (southern subspecies) occurs on the inland slopes of the Great Dividing Range where it inhabits open-forests to sparse, open-woodland and scrub often found near permanent water such as rivers, creeks and waterholes, with open and short grass cover (TSSC, 2015). Typically, it prefers sandy areas that are dissected by gravel ridges, allowing easier movement. The species is less commonly found on heavy soils with dense grass. It also occurs in burnt areas and sometimes on tracks and roadsides (Higgins & Davies, 1996; Garnett & Crowley, 2000). Preferred habitat is considered any present foraging and breeding habitat, whilst any dispersal habitat is classed as general habitat. Foraging habitat includes open forest to sparse, open-woodland or scrub dominated by *Eucalyptus*, *Corymbia*, *Callitris* or *Acacia* species, on gravelly or sandy soils, within 3 km of an appropriate ephemeral or permanent waterbody (Squatter Pigeon Workshop 2011). Suitable breeding habitat occurs on stony rises occurring on sandy or gravelly soils, within 1 km proximity to a permanent waterbody (Squatter Pigeon Workshop, 2011). The subspecies nests on the ground, usually laying two eggs among or under vegetation. It forages for seeds among sparse and low grass, in improved pastures, and beside railway lines (DAWE: DoE, 2015). The southern boundary of the known distribution of the Squatter Pigeon (southern ssp.) is contracting northwards. Therefore, all the relatively small, isolated and sparsely distributed sub-populations occurring south of the Carnarvon Ranges in Central Queensland are considered to be important sub-populations of the subspecies (Squatter pigeon workshop, 2011). This includes populations occurring in the Condamine River catchment and Darling Downs of southern Queensland. **SPRAT profile distribution in relation to the Project:** The entire alignment is mapped within the mapped distribution where the species or species habitat is likely to or may occur. Only the far southern section of the alignment (south-west of Yelarbon) is within the mapped distribution where the species or species habitat may occur. **Species records:** The nearest record of the species is from Bringalily State Forest, directly adjacent to the Project footprint in 2021 (ALA, 2023). There are numerous database records of the species surrounding the Project footprint in the Inglewood area and Durikai State Forest. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes – two observations of this species were made in November 2023 on the Canning Creek offset property, directly adjacent to the Project footprint. Additionally, a potential observation of this species was made along a roadside during the Cardno spring ecological assessments near Inglewood.	Preferred habitat for foraging and breeding of the species, as described in the literature occurs in the Project footprint including woodlands, open forest and grasslands with denser grass near water sources particularly Landzones 3, 5, and 7. Both foraging and breeding habitat occurs on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills across the Project footprint. Habitat for the species is located along approximately 67 km of the alignment from Yelarbon to Canning Creek.	Likely
Grantiella picta	Painted honeyeater	V	V	*Grantiella picta* is most commonly associated with box-ironbark eucalypt woodland and dry sclerophyll forest, but also inhabits riparian vegetation and can be found in a range of other habitats including remnant trees in farmland, roadside reserves and travelling stock routes. Principally a canopy bird, it is reliant on select species of eucalypt and mistletoe (National Recovery Plan, 2016). The species preferred habitat is found in woodlands which contain a higher number of mature trees (Conservation Advice, 2015), as these host more mistletoes. However, the species can be seen in areas of scattered eucalypts or patches of forest in farmland and in narrow roadside strips if ample flowering and fruiting mistletoe and flowering eucalypts is available which is considered general habitat. They are less often found in patches of *Acacia* with mistletoes, in woodlands dominated by cypress-pine (*Callitris*), woodlands of *Eucalyptus camaldulensis* and in paperbark (*Melaleuca*) association (Higgins et al. 2020). The greatest concentrations and almost all records of breeding come from south of 26ºS, on inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma, Queensland (Higgins et al., 2001). **SPRAT profile distribution in relation to the Project:** The entire alignment is mapped within the mapped distribution where the species or species habitat is likely to occur. **Species records:** The nearest record of the species is from Bringalily State Forest, directly adjacent to the Project footprint in 2017 (ALA, 2023). There are numerous database records both historic and recent of the species surrounding the Project footprint, with a concentration of records near Yelarbon and adjacent to Bringalily State Forest. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes	The species was recorded across the Project footprint at multiple locations, with a concentration of records near Yelarbon and adjacent to Bringalily State Forest. Habitat for the species is located along the entire alignment, with more significant and continuous areas in the southern portion of the alignment. Suitable preferred habitat for foraging and breeding of the species, as described in the literature, was also confirmed within the Project footprint. REs with suitable microhabitat features (i.e., a good availability of flowering and fruiting mistletoe and flowering eucalypts) were recorded within the Project footprint, including RE 11.3.2, 11.4.3, 11.5.1, 11.5.4, 11.5.14, 11.5.20, 11.8.4, 11.7.7 and 11.9.5. Numerous painted honeyeater individuals were recorded within many of these RE's within the Project footprint.	Known

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Lathamus discolor	Swift parrot	E	CE; Ma	The swift parrot is a migratory species, breeding in Tasmania and moving to mainland Australia for the non-breeding season (usually arriving between February and March). Most of the population winters in Victoria and NSW, with smaller numbers reaching south-east Queensland, Australian Capital Territory and south-east South Australia. The species returns to Tasmania during spring (September to October) (Higgins 1999). Movements on the mainland are poorly understood but the species is considered to be nomadic and irruptive, moving in response to food supply—especially areas of heavily flowering eucalypts (Higgins 1999). Vegetation communities and key tree species that provide important foraging habitat for Swift Parrots, include *Eucalyptus leucoxylon*, *Eucalyptus tricarpa*, *Eucalyptus sideroxylon*, *Eucalyptus microcarpa*, *Eucalyptus albens*, *Eucalyptus melliodora*, *Eucalyptus robusta*, *Eucalyptus tereticornis*, *Eucalyptus pilularis*, and *Corymbia maculata*. The use of these habitats is dependent on prevailing climatic conditions and corresponding food availability (Saunders 2008) with a preference across inland slopes of the Great Dividing Range for box-ironbark and grassy woodlands (Garnett and Baker 2021). Due to the variable production of nectar and lerps across this species' range, it is considered important to protect and manage a broad range of habitats to provide a range of foraging resources (Saunder and Tzatos, 2011). General habitat for the species is considered any foraging habitat. Habitat critical to the survival of the Swift Parrot includes those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot, or are otherwise identified by the recovery team (Saunders and Tzatos, 2011). Site fidelity is highly important for the long-term survival of the species at both breeding and non-breeding sites. Over 100 sites have been identified on mainland locations as being used repeatedly by the species over ≥2 years. Notwithstanding, areas where site fidelity has not yet been established may be attributable to long-term resource availability cycles and observational limitations and are still considered important habitat for the species (Saunders, 2008). **SPRAT profile distribution in relation to the Project:** The entire alignment is mapped within the mapped distribution where the species or species habitat is likely to or may occur. Only a very small section at Gowrie is within the mapped distribution where the species or species habitat is likely to occur. **Species records:** The nearest records of the species are from the Toowoomba area, the closest of which is 4.5 km east of the Project footprint and undated. However, the exact locations of the records have been generalised to protect the species, and so they are not highly accurate. There are also multiple records of the species within Durikai State Forest, ~40 km from the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Potential	No	General habitat for the species, as described in the literature, was recorded within the Project footprint. Suitable vegetation structural types, including dry sclerophyll eucalypt woodland, eucalypt open forest and brigalow open forest commonly occur within the Project footprint. Associate floristic species described in the literature, and detected in the Project footprint, include: *Eucalyptus albens* and *Eucalyptus tereticornis*. There is potential for the species to occur within the Project footprint, albeit this would likely be considered a rare and sporadic occurrence. As suitable foraging habitat and some scattered regional records are present, there is a small potential for the species to disperse into areas of the Project footprint however this is likely to be strongly dependent on long-term habitat resource availability cycles.	Potential
Poephila cincta cincta	Southern black-throated finch	E	E	The southern black-throated finch currently is confined to north Queensland with subpopulations in the central and northern Desert Uplands, southern Einasleigh Uplands, southern Wet Tropics and northern Brigalow Belt bioregions (Garnett and Baker, 2021). However, historically the subspecies had a wider distribution, occurring further south in north-eastern NSW and southeast Queensland (Black-throated finch Recovery Team, 2007). The subspecies occurs mainly in grassy, open woodlands and forests, generally dominated by *Eucalyptus*, *Corymbia* and *Melaleuca* and occasionally in tussock grasslands or freshwater wetlands, often along or near watercourses or in the vicinity of water. Some more commonly associated eucalypts that occur in woodlands and forests in the preferred foraging habitat of the subspecies, include: *Eucalyptus crebra*, *E. camaldulensis*, *E. melanophloia*, *E. brownii*, *E. similis*, and *E. tereticornis*. In south-eastern Queensland, it was formerly recorded in open forest on ridges, on grassy hillsides, and on 'mountain flats' (Lord 1956). However, virtually all recent records of the black-throated finch southern subspecies south of the tropics are from riverine habitat. It has been absent from Brisbane and its surrounds since the 1930s (Lord 1956; Woodall 1987) or 1940s (BTF Recovery Team 2004) and appears to have become extinct around most of Rockhampton during the early to mid-1970s, despite having been numerous there during the 1950s (Blakers et al. 1984; BTF Recovery Team 2004; Longmore 1978). It was last recorded in the Rockhampton region during 1988–89 (BTF Recovery Team 2004). There have been very few records of the subspecies south of 23° S since the late 1970s, and there have been almost no records from this region since 1995 (Barrett et al. 2003; Blakers et al. 1984; BTF Recovery Team 2004). Black-throated Finches (southern) were recorded from the Severn River, near Ballandean in southern Queensland, in the early 1980s and mid 1990s (BTF Recovery	SPRAT WildNet	Unlikely	No	Preferred habitat for the species, as described in the literature, was detected within the Project footprint, including grassy open woodlands, woodlands and open forests dominated by *Eucalyptus*, especially areas where there is access to seeding grasses and water. Associated floristic species described in the literature, and detected in the Project footprint, include: *Eucalyptus crebra*, *E. camaldulensis*, *E. melanophloia*, and *E. tereticornis*. Notwithstanding, recent research on the current range of the species and the complete absence of contemporary records in the entire southern Brigalow Belt and SEQ bioregions, strongly indicates that the species is unlikely to disperse into areas of the Project footprint. The National recovery plan for the southern black-throated finch states that in the last 20 years it is estimated that the species extent of occurrence has decreased by approximately 80% if the species former extent. The population of the species has also been estimated to decrease by 50%. This dramatic decrease in occurrence extent and decrease in estimated population	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
				Team 2004) and there is a single record from Stanthorpe in 2002 (BTF recovery Team 2008, pers. comm.) (as cited on SPRAT). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside of the mapped distribution where the species or species habitat is likely to or may occur (>400 km north of the Project footprint). **Species records:** The nearest database records are located near Toowoomba approximately 4 km from the alignment. However, the location has been generalised to 2 km and the date of the record has not been provided (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes				indicates that the species is unlikely to occur within the Project footprint.	
Rostratula australis	Australian painted snipe	E	E; Ma	The Australian painted snipe inhabits shallow freshwater (occasionally brackish) ephemeral and permanent wetlands or flooded brackish wetlands, especially where inundation is temporary but also permanent wetlands with shallow zones (Conservation Advice, 2013; Draft National Recovery Plan, 2019). Preferred habitat for this species is located in wetlands with complex shorelines and a matrix of shallow water, small islands, exposed wet mulch, and low, dense cover of emergent grass, sedges, rushes or reeds, often scattered with Muehlenbeckia, canegrass or *Melaleuca* spp. (~<1 m) (del Hoyo et al. 2020 and Garnett and Baker, 2021) (~1 m). During non-breeding periods, the species is known to utilise wetlands where trees shrubs or samphire is present, as well as sewage farms, dams, bores and irrigation schemes, rice fields, swamps and waterlogged grassland where they feed on invertebrates and seeds from the water's edge (Garnett and Baker, 2021, and Marchant and Higgins, 1993), this is considered general habitat. **SPRAT profile distribution in relation to the Project:** The entire alignment is within the mapped distribution where the species or species habitat is likely to occur. **Species records:** There are numerous records of the species distributed throughout coastal sub-coastal and inland areas of southern Qld and across the Australian continent. The nearest record is along Mosquito Creek Road south of Devine State Forest, >7 km from Project footprint. There are also numerous records throughout the Toowoomba region (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Potential	Yes – the Australian Painted Snipe was recorded on the Glenlovely offset site near Yelarbon in October 2023, approximately 300 m from the Project footprint	The species may occur within the Project footprint when suitable breeding and foraging conditions exist, albeit this may be considered a relatively uncommon and/or sporadic occurrence. General habitat for the species occurs within the Project footprint, along the majority of the alignment. The most substantial areas of habitat are between the border and Whetstone State Forest (~42 km), with the remainder of the alignment containing only very small patches of habitat. Preferred habitat was found in ephemeral RE 11.3.27i and 11.3.27 shallow, freshwater wetland areas that contained a mosaic of ground cover including areas of bare ground, mud and tufted hydrophytic wetland species. Many of the associate floristic assemblage species occur in the Project footprint. Vegetation communities detected, included dominant hydrophytic sedge and emergent aquatic vegetation in RE 11.3.27, 11.3.27b, and 11.3.27i.	Likely
Turnix melanogaster	Black-breasted button-quail	V	V	Black-breasted button-quail occurs in vine thickets, softwood scrubs in the Brigalow belt, mature hoop pine (*Araucaria cunninghamii*) plantations, especially where there is lantana (*Lantana camara*); dry sclerophyll forest adjacent to rainforest; and *Acacia* and *Austromyrtus* scrubs on sandy coastal soils (Marchant & Higgins, 1993 and Garnett and Baker, 2021). Preferred habitat for this species is located in dry forest described as bottle tree scrub, comprising brigalow (*Acacia harpophylla*), belah (*Casuarina cristata*) and bottle tree (*Brachychiton rupestris*), with a shrub understorey and thick litter layer. In some coastal areas, particularly north of Brisbane, associated with vegetation behind dunes, including dry vine thickets, *Acacia* thickets and areas densely covered in shrubs, particularly midgen berry (*Austromyrtus dulcis*) (Mathieson and Smith, 2009). Habitat considered critical to the survival of the black-breasted button-quail includes: • Vine thickets and rainforest vegetation types that are periodically water-stressed. These include: semi-evergreen vine thicket, and *Brachychiton* scrubs that may incorporate bottle trees (*Brachychiton* sp.), brigalow (*Acacia harpophylla*) and belah (*Casuarina cristata*). Low thickets or woodlands with a dense understorey but little ground cover, typically dominated by *Acacia* spp. In littoral situations, dry vine scrubs, acacia thickets and areas densely covered in shrubs, particularly midgen berry *Austromyrtus dulcis*. **SPRAT profile distribution in relation to the Project:** Approximately a third of the alignment, between Gowrie and the Condamine River, is within the mapped distribution where the species or species habitat may occur. **Species records:** The nearest record of the species is from 1999, located 1.5 km north of the Project footprint in Kingsthorpe. Closest records are isolated by clearing for urban development and agriculture (ALA, 2023). Other records are undated and generalised to within 10 km. The species is now considered to be confined to south-eastern Qld from near Byfield in the north to the Border Ranges in the south and as far west as Palmgrove NP and Barakula State Forest (Garnett and Baker, 2021). **Records in the Project footprint:** No **Records in the locality:** Yes, however they are older than 20 years or generalised within 10 km.	SPRAT WildNet Publications	Potential	No	Very limited preferred habitat for the species occurs within the Project footprint. Associate floristic assemblage species: *Acacia harpophylla, Casuarina cristata* were found throughout the Project footprint. Areas close to the nearest historical record have been subject to significant habitat loss due to land clearing, agricultural impacts, residential and road development. For these reasons, if an extant population remains near Kingsthorpe, the ability of the species to disperse into nearby areas of the Project footprint appear to be unlikely.	Unlikely

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Mammals									
Chalinolobus dwyeri	Large-eared pied bat	E	V (at time of the referral) (uplisted to E effective 15 Nov 2023, after controlled action date)	There are scattered records of the large-eared pied bat in Queensland within the sandstone escarpments of the Carnarvon, Expedition Ranges and Blackdown Tablelands. Additional records also exist in the Scenic Rim near the NSW/Queensland border. The large-eared pied bat is known to roost predominantly in western facing caves and overhangs in sandstone cliffs and forage within 700 m of the day roost in nearby high-fertility forest or woodland near watercourses (DERM, 2011; Williams and Thompson, 2018). Surveys in the Brigalow Belt Bioregion of NSW and species habitat modelling by Pennay and Gosper (2002) largely supports this hypothesis. The species has also been recorded roosting in culverts and/or fairy martin nests in Queensland (Schulz, 1998). All reported communal roosts are from the northwestern slopes of NSW, the Pilliga Sandstone region and one from a mine at Woods Reef (now collapsed). No reports of maternity roosts are found in Queensland (Pennay, 2008). Additional records exist in the Scenic Rim near the NSW/Queensland border. The populations in this area appear to be reliant on the presence of roosts in volcanic rock types (Hoye 2005). Despite the large range, it has been suggested that the species is far more restricted within the species' range than previously understood (NSW DECC 2007d). Critical habitat to the survival of the large-eared pied bat are areas with the presence of diurnal roosts for shelter and breeding, including caves and overhangs (sandstone cliffs) but also disused mine shafts and abandoned fairy martin nests (DERM, 2011). The species preferred habitat is regarded as all roosting and breeding habitat, whilst general habitat is considered any foraging habitat. **SPRAT profile distribution in relation to the Project:** The majority of the alignment is within the mapped distribution where the species or species habitat may occur. **Species records:** The nearest record of the species is from 1997, approximately 40 km west of the Project footprint. All other records are >50 km from the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Potential	No	Limited suitable foraging habitat for the species occurs within the Project footprint. No preferred habitat of caves, overhangs in sandstone cliff breeding/roosting habitat were recorded within the Project footprint. Although some potential foraging habitat occurs within forest or woodland near watercourses within the Project footprint, no *C. dwyeri* were detected in initial targeted surveys or surveys of Wondul National Park, Bringalily Sate Forest and the Canning Creek offset property in March/April 2023 (Williams, 2023). Additionally, sandstone areas investigated in Wondul NP are considered only marginal roosting habitat and it is not known whether this species would forage as far as those potential habitat areas within the Project footprint (9.9 km away). A key requirement for foraging habitat for this species is proximity to roosting habitat, which is absent from the Project study area.	Unlikely
Dasyurus hallucatus	Northern quoll	-	E	The northern quoll was historically common across the northern third of Australia, occurring near-continuously from the Pilbara to Brisbane (Braithwaite & Griffiths, 1994). However, the current distribution in Qld is discontinuous, with the species occurring in rocky and/or high rainfall areas including: Cape Cleveland/Mt Elliott, Mareeba, Crediton, Eungella, Clarke Range, Cleveland, Cape Upstart, Cape Gloucester and Condor Range (Hill and Ward, 2010). The Northern Quoll is known to occur as far south as Gracemere and Mt Morgan, south of Rockhampton, as far north as Weipa in Queensland and extends as far west into central Queensland to the vicinity of Carnarvon Range NP (McGoldrick 2013; Woinarski et al. 2008). There are occasionally records as far south in Queensland as Maleny on the sunshine coast hinterland (DERM 2009a). The species is highly fragmented in the state and surveys Woinarski and colleagues (2008) indicated severe reductions from the species' former distribution. Northern quolls do not have highly specific habitat requirements. They occur in a variety of habitats, including open dry sclerophyll forest and woodland, riparian woodland, low dry vine thicket, the margins of notophyll vineforest, mangroves, sugarcane farms and in urban areas. However, they are most abundant in hilly or rocky areas close to permanent water. Shelter sites are also non-specific and include rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings (Oakwood, 2002). The species preferred habitat is considered as high quality denning/breeding and foraging habitat, whilst general habitat is regarded as low quality denning and foraging habitat and dispersal habitat. **SPRAT profile distribution in relation to the Project:** A portion of the alignment, between Gowrie and Millmerran, is within the mapped distribution where the species or species habitat is likely to or may occur. Only the Project footprint around Gowrie is within the likely to occur distribution. **Species records:** There are a number of old historical records in close proximity to the Alignment. The nearest records are: one between Goombungee and Highfields (<16 km from Alignment, 1965), one west of Ravensbourne NP (<34 km from Alignment, 1966), one in Crows Nest NP (<35 km from Alignment, 1960) and one in Clifton (<38 km from Alignment, 1985). However, the most recent records within 100 km of the Project footprint are along North Maclagan Road north-east of Quinalow (1990) and in Bunya Mountains NP (1990) (ALA, 2023).	SPRAT WildNet Publications	Unlikely	No	General habitat as described in the literature for the species occurs within the Project footprint however the footprint is located outside of the historic range for the species. Suitable vegetation structural types, including open dry sclerophyll forest and woodland, and riparian woodland, occur within the Project footprint. Suitable microhabitat features, such as tree hollows, hollow logs and termite mounds were recorded within the Project footprint at a range of REs. Habitat critical to the survival of the species, specifically rocky outcrops, were limited to small areas of RE 11.7.7. Notwithstanding, as the present distribution of the northern quoll has contracted throughout its former range and in Queensland it is now fragmented into a number of populations largely in central to far northern Queensland, it is unlikely the species would occur within the Project footprint.	Unlikely

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				Records in the Project footprint: No **Records in the locality:** No					
Dasyurus maculatus maculatus	Spotted-tailed quoll (southeastern mainland population)	E	E	The spotted-tailed quoll occurs in five broad geographic regions, including the eastern Darling Downs-Inglewood Sandstone provinces of the Brigalow Belt South Bioregion (S. Burnett n.d., pers. comm. cited in Long & Nelson, 2004). As per the National Recovery Plan for the species (DELWP, 2016), the spotted-tailed quoll occurs in a wide range of habitat types, primarily depending on forests, which all appear to be in relatively high (>600 mm/year) and predictable seasonal rainfall areas. The southern species, *D. m. maculatus*, has been found to inhabit a wide range of habitats, from coastal heathland, scrub and dunes, to dry sclerophyll forests, rainforest and heathy woodland. It has also been recorded (less frequently) in grassland or pastoral areas adjacent to forested areas. Their home range is generally large (from several hundred to several thousand hectares in size). Day time dens include hollow logs, tree hollows, clumps of vegetation, caves and hollow bounder tumbles, rock crevices, windrows, under buildings and underground burrows. Multiple dens are used, usually relocating every 1 to 4 days. The species preferred habitat is considered as high quality denning/breeding and foraging habitat, whilst general habitat is regarded as low quality denning and foraging habitat and dispersal habitat. Additionally, habitat critical to the survival of the spotted-tailed quoll includes large patches of forest with adequate denning sites and relatively high densities of medium-sized mammalian prey (DELWP, 2016). **SPRAT profile distribution in relation to the Project:** The majority of the alignment is within the mapped distribution where the species or species habitat may occur. **Species records:** Five records occur in close proximity to the Project footprint: one in Pittsworth (<2 km, 1980), one in Inglewood (<3 km, 2019), one west of Toowoomba Wellcamp Airport (<6 km, 1991), one south of Hodgson Vale (<18 km, 1979) and the other in Yelarbon State Forest (20 km) (ALA, 2023). These records may no longer be representative of this current species distribution, given the scale of anthropogenic development and disturbance around the Toowoomba region over the past 30 - 40 years. Given this species occurs throughout other areas of similar habitat within the Inglewood Sandstones biogeographic subregion, it is possible that the Whetstone, Western Creek and Kumbarilla State Forests represent under-surveyed/data-deficient areas of potential habitat within the spotted-tailed quoll's Queensland distribution. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes – a spotted-tailed quoll was recorded in Bringalily State Forest, approximately 4.5 km from the Project footprint	General and preferred habitat for the species occurs within the Project footprint. Suitable vegetation structural types, including dry sclerophyll forest, grassland and pastoral areas adjacent to forested areas, occur within the Project footprint. Potential habitat was surveyed in REs 11.3.14, 11.3.17, 11.3.2, 11.3.25, 11.3.27i, 11.3.4, 11.4.10, 11.4.3, 11.5.1, 11.5.14, 11.5.20, 11.5.4, 11.7.7, 11.8.4, 11.8.5, 11.9.5 and 11.9.9a. Suitable microhabitat features, such as tree hollows and hollow logs were recorded within the Project footprint, particularly within RE 11.3.25 fringing creeks and drainage lines. As suitable foraging habitat and a paucity of scattered regional records are present, there is potential for the species to disperse into areas of the Project footprint such as Bringalily State Forest which shares habitat similar to those found in the Inglewood Sandstones biogeographic subregion; representing an under-surveyed and data deficient area. Areas of the Project footprint within proximity to Toowoomba historical records may be considered unviable due to the widespread landscape fragmentation and agricultural practices over the past 40 years or more. However, their presence is likely to be strongly dependent on long-term habitat resource availability and may be considered an uncommon and/or sporadic occurrence.	Likely
Nyctophilus corbeni	South-eastern long-eared bat	V	V	The south-eastern long-eared bat is mainly found inland of the Great Dividing Range, with most records in Queensland from within the Brigalow Belt South bioregion. It is found in a wide range of mainly woodland vegetation types including: brigalow woodland, belah woodland, black box woodland, smooth-barked apple woodland, river red gum forest, buloke woodlands and box, ironbark and cypress pine woodlands (Schulz and Lumsden, 2010). However, box, ironbark and cypress pine woodlands seem to be the preferred habitat in Queensland. It has been suggested that the home range of the south-eastern long-eared bat is probably large, since it is more abundant in extensive stands of vegetation than in smaller patches of woodland. Abundance of the species is higher in habitats that have a distinct tree canopy and a dense, cluttered understorey layer (Threatened Species Scientific Committee, 2015). Southern Brigalow Belt habitat is poorly understood. However, studies in NSW in comparable habitat have found the following (Law et al. 2016; Law et al. 2018): • Areas of high stem density, particularly those containing dead trees, provide significant roosting habitat for *N. corbeni* and this is likely to be a key factor explaining the species rarity. • Dense stands with many hollows provide shelter and options for roost switching on a regular basis. • Small maternity colonies (<10 bats) have been recorded in hollows and fissures often in exposed locations of trees with a small diameter at breast height (typically 23 to 39 cm) that were usually dead (82.5% of roosts). • *Allocasuarina luehmannii* is most commonly used for roosting (~50%). • The species avoids roosting in commercially thinned stands and selected old regrowth. The species preferred habitat is regarded as any combined foraging, roosting and breeding habitat. General habitat for the species is regarded as any foraging and roosting habitat combined and foraging habitat only **SPRAT profile distribution in relation to the Project:** The entire alignment is within the mapped distribution where the species or species habitat may occur.	SPRAT WildNet Publications	Likely	Yes	General and preferred habitat for the species occurs within the Project footprint. The species was captured within the Project footprint along an access track located within eucalypt woodland with a very dense secondary tree layer of *Allocasuarina luehmannii* in Bringalily State Forest during spring surveys. During subsequent microbat surveys in March/April 2023, ten *N. corbeni* were captured in harp traps (three within the Canning Creek offset site and seven within Bringalily SF immediately adjacent to the offset site) (Williams, 2023). GPS and radio-tracking revealed the species to use the following tree species for roosting in the area (although none were within the Project footprint): *Acacia harpophylla*, *Acacia* sp. (likely *Acacia burrowii*), *Angophora leiocarpa*, *Eucalyptus chloroclada*, and *Alphitonia excelsa*. Roosts were typically under bark in dead trees, or live trees with dead stems/large branches. Two roosts were in hollows, however all tracking was conducted during the non-breeding season. Habitat for the species occurs along the alignment between Bringalily and east of Yelarbon (~70 km). Suitable vegetation structural types, including brigalow woodland to open forest, box, ironbark and cypress pine woodlands are common within the Project footprint.	Known

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				Species records: The nearest record of the species is from 2006, in the Bringalily State Forest <3 km from the Project footprint. Yelarbon State Forest also has recorded several sightings, <15 km from the rail alignment, although they were in 1999. All other records are either recorded earlier than 2006 or are >50 km from the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes				Suitable REs were detected within the project footprint, including RE 11.3.1, 11.3.14, 11.3.17, 11.3.2, 11.3.25, 11.4.10, 11.5.1, 11.5.4, 11.5.20, 11.7.7, 11.8.4 and 11.9.5. *Allocasuarina luehmannii*, a species commonly used by the south-eastern long-eared bat for roosting was commonly recorded within the Project footprint, particularly between Whetstone and Bringalily State Forests. Suitable REs with suitable microhabitat features, including a dense subcanopy and canopy stratum, hollow-bearing trees and exfoliating bark were recorded within the Project footprint, particularly in large areas of connected woodland between Whetstone and Bringalily State Forest.	
Petauroides volans	Greater glider (southern and central)	E	V (at time of the referral) (uplisted to E effective 5 July 2022, after controlled action date)	Recently, McGregor et al. (2020) genetically confirmed *Petauroides volans* as comprising three distinct species, geographically delineated across the range of *Petauroides*. *P. volans* has been retained as the most southerly distributed species, occurring from Bundaberg south to Victoria. In general, the habitat of *Petauroides* spp. is restricted to tall, expansive *Eucalyptus* forests (Grzimek, 1990). Possingham et al. (1994) found there must be a patch of old growth forest at least 20 ha in size to sustain a population. However, simulations suggest small habitat patches (≥3 ha) can contribute to the persistence of greater gliders, depending on the surrounding landscape context. Eyre et al. (2022) therefore suggests that 'any RE that has been identified as greater glider habitat, no matter how fragmented, will have value for greater gliders either now (if hollow-bearing trees present), or in the future with restoration'. Breeding and denning habitat for *Petauroides* spp. must also include large, old living trees with hollows, which the species uses to create den sites (Lindenmayer et al. 1993; Smith et al. 2007). A study located in the southern section of the Brigalow Belt Bioregion found the species only foraged and created den sites within myrtaceous trees, and that *E. fibrosa* and *E. tereticornis* were preferred significantly more than expected by their availability in the forest (Smith et al., 2007). Foraging habitat must be within close proximity to breeding and denning habitat, connected by tall trees within gliding distance of each other. The species preferred habitat is considered any breeding/denning and foraging habitat, whilst general habitat is considered foraging habitat only and dispersal habitat. In general, the species requires at least 2 to 4 live den trees for every 2 ha of habitat (TSSC, 2016). However, within the Brigalow Belt Bioregion, Smith et al (2007) determined 4 to 20 den trees were required per glider. The species has a relatively small home range (1 to 4 ha) and has a low dispersal ability (TSSC, 2016). Therefore, the species is heavily reliant on locally dominant available hollow-bearing trees. Overall, the greater glider is vulnerable to habitat loss and disturbance due to their specialised diet of eucalypt leaves and strict dependence on mature trees with large shelter/den hollows (McGregor et al., 2020). **SPRAT profile distribution in relation to the Project:** Almost the entire alignment is within the mapped distribution where the species or species habitat is likely to or may occur. Patches of the alignment that are just outside of the species distribution are between Pittsworth and Bringalily. **Species records:** The nearest record of the species is from the Highfields area, approximately 10 km north-east of the Project footprint in 2010 and 2016. There are also records of the species from Yelarbon State Forest in 1999, approximately 17 km from the Project footprint and multiple other records within 50 km (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	No	General and preferred habitat for the species, as described in the literature, was detected within the project footprint. Suitable remnant eucalypt woodland to open forest occurs within the Project footprint. Areas of eucalypt woodland/open forest to the west of the Project footprint (between Canning Creek and the Qld/NSW border) are dominated by largely intact mature box, ironbark and red gum communities, including areas within highly connected State Forests. Areas of eucalypt woodland/remnant forest to the east of the Project footprint were generally more fragmented. Preferred feed trees, *Eucalyptus crebra*, *E. fibrosa and E. tereticornis* were recorded within the Project footprint, particularly within RE 11.7.7, 11.3.25, 11.5.1, and 11.5.20. Suitable remnant eucalypt woodland /forest communities with large eucalypt trees (a surrogate for hollow-bearing trees) were recorded within the Project footprint, particularly within RE 11.3.17, 11.3.25, 11.3.27i, 11.4.10, 11.5.1, 11.5.20, 11.7.7, 11.8.4 and 11.9.9a. However, during surveys conducted in December 2023 (ERM, 2024) only three isolated patches of suitable remnant eucalypt woodland/forest communities with large eucalypt trees were recorded within the Project footprint, in RE 11.3.25. These patches were small and had poor connectivity between each of them and the state forests. The trees observed in these patches featured *E. tereticornis* and/or *E. camaldulensis* and were comparatively short, averaging approximately 15 m, with a maximum height of 20 m. No individuals, signs or scats were observed during these surveys.	Potential

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Petrogale penicillata	Brush-tailed rock-wallaby	V	V	In Queensland, populations of the brush-tailed rock-wallaby occur, or did occur, throughout the Great Dividing Range from the border with NSW to Nanango, 100 km northwest of Brisbane. Brush-tailed rock-wallaby preferred habitat includes refuge habitat, foraging habitat, with each habitat element considered critical to the survival of the species (Menkhorst and Hynes, 2010). Refuge habitat includes rock faces or outcrops with large tumbled boulders, ledges and caves (often with vegetation cover) that provide shelter and some protection from predators. According to Short (1982), preferred rocky habitat includes loose piles of large boulders containing a maze of subterranean holes and passageways, cliffs with many mid-level ledges (with some caves and/or ledges covered by overhangs) and isolated rock stacks. General habitat is considered as the routes the species takes in between each habitat type. Foraging habitat includes forest and woodland with a grassy understorey. The national recovery plan (Menkhorst and Hynes, 2010) states that 'precise vegetation community type may not be critical in habitat selection as brush-tailed rock-wallabies eat a wide variety of plant material (although mainly grasses) and animals will forage in artificial clearings and pastures'. **SPRAT profile distribution in relation to the Project:** Two very small portions of the alignment are within the mapped distribution where the species or species habitat may occur. This is a small area around Gowrie and another south of Millmerran. **Species records:** The nearest record of the species is 1.2 km from the Project footprint on Gowrie Mountain in 2018 (ALA, 2022). There is also a record from 1992 ~12 km from the Project footprint east of Bulli State Forest. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Potential	No	Limited preferred and general habitat for the species, as described in the literature, was detected within the Project footprint. The Project footprint is also located west of the Great Dividing Range. Refuge habitat – rocky outcrops and large rocks were recorded within a small area of RE 11.7.7. However, no ledges, caves, cliffs, rock stacks or large boulders containing subterranean holes and passages were present. Feeding habitat – woodland with a grassy understorey occurs within the Project footprint. However, the areas between potential refuge habitat e.g., at Gowrie Mountain, and feeding habitat within the Project footprint has been heavily fragmented and developed for residential dwellings, roads, cropping and agriculture providing area of habitat highly exposed to threats from predators in these areas. As per the conservation advice, one of the species largest threats is habitat loss, in which fragmented habitats would significantly decrease the amount of connected general habitat for the species. Due to heavily fragmented habitat within the Project footprint, only incurring small areas of general habitat, and no suitable refuge habitat present, it is considered that the species is unlikely to occur.	Unlikely
Phascolarctos cinereus	Koala	E	V (at the time of the referral) (uplisted to E effective 12 Feb 2022, after controlled action date)	In Queensland, the koala's distribution extends inland from the east coast: from the Wet Tropics interim biogeographic regionalisation of Australia bioregion, into the Einasleigh Uplands bioregion in the north of the state; from the Central Mackay Coast bioregion, through the Brigalow Belt North bioregion to the Desert Uplands and Mitchell Grass Downs bioregions, and from the Southeast Queensland bioregion, through the Brigalow Belt to the Mulga Lands and Channel Country bioregions in the southwest of the state (TSSC, 2012). Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by *Eucalyptus* species. Although koalas are generally found in higher densities where food trees are growing on more fertile soils and along watercourses, they are also known to occur in modified or regenerating native vegetation communities, as well as urban and rural landscapes where food trees or shelter trees may be highly scattered (DAWE, 2021). For instance, in agricultural and fragmented landscapes of south-east Queensland, scattered paddock trees have been found, along with roadside vegetation, to be disproportionately important to local koala populations (Barth et al. 2019). Locally important koala trees within the Brigalow Belt bioregion, include: *Eucalyptus brownii*, *E. camaldulensis*, *E. chloroclada*, *E. conica*, *E. coolabah*, *E. crebra*, *E. drepanophylla*, *E. dura*, *E. exserta*, *E. fibrosa*, *E. laevopinea*, *E. largiflorens*, *E. longirostrata*, *E. major*, *E. melanophloia*, *E. microcarpa*, *E. moluccana*, *E. ochrophloia*, *E. orgadophila*, *E. populnea*, *E. punctate*, *E.* saligna, *E. sideroxylon* and *E. tereticornis* (Youngentob et al. 2021). According to the draft recovery plan for the koala (DAWE, 2021b), koala habitat includes forests or woodlands; roadside and railway vegetation and paddock trees; safe intervening ground matrix for travelling between trees and patches to forage and shelter and reproduce; and access to vegetated corridors or paddock trees to facilitate movement between patches. Preferred habitat for the species is considered as both foraging and breeding habitat, whilst general habitat is regarded as any present dispersal habitat. The draft recovery plan for the koala (DAWE, 2021b) does not define habitat critical to the survival of the Koala. **SPRAT profile distribution in relation to the Project:** The entire alignment is within the mapped distribution where the species or species habitat is likely to occur. **Species records:** The nearest and most recent records of the species are from the area west of Pittsworth, directly adjacent to the Project footprint in 2023 (ALA, 2023). There are numerous database records both historic and recent of the species surrounding the	SPRAT WildNet Publications	Likely	Yes	Both preferred and general habitat for the species, as described in the literature, was detected within the project footprint albeit very patchily in some areas. Twenty-six (26) koalas were directly recorded and 62 koalas indirectly recorded (via scat and tracks) within the Project footprint. Koalas were detected east of Yelarbon, in the northern section of Bringalily State Forest, near Millmerran, and between Brookstead and Gowrie. Suitable eucalypt woodland to open forest is widespread within the Project footprint. Areas of eucalypt woodland/open forest to the west of the Project footprint (between Canning Creek and the Qld/NSW border) are dominated by largely intact mature box, ironbark and red gum communities, including areas within highly connected state forests. Areas of eucalypt woodland/forest to the east of the Project footprint were generally more fragmented. However, habitat occurred within roadside vegetation and scattered paddock trees within agricultural landscapes, particularly around the Pittsworth area. Habitat within the Project footprint includes remnant and regrowth eucalypt or mixed eucalypt woodland/open forest and non-remnant communities with scattered eucalypt paddock trees. Remnant and non-remnant grassland and pasture is also considered koala habitat where these areas are used for travelling between trees and woodland/forest patches across the landscape. Therefore, only areas that had intensive cropping regimes and other treeless areas, including roads, were	Known

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				Project footprint, with a concentration of records near Pittsworth, Millmerran and the region surrounding Toowoomba. **Records in the Project footprint:** No **Records in the locality:** Yes				removed as potential habitat during the assessment. Locally important koala trees recorded within the Project footprint, include: *Eucalyptus camaldulensis*, *E. chloroclada*, *E. crebra*, *E. fibrosa*, *E. melanophloia*, *E. orgadophila*, *E. populnea* and *E. tereticornis*. Ancillary habitat trees, including *Acacia harpophylla*, *A. salacina*, *Corymbia erythrophloia* and *C. tesselaris* were also recorded within the Project footprint.	
Potorous tridactylus tridactylus	Long-nosed potoroo (northern)	V	V	The long-nosed potoroo (northern) is sparsely distributed along the coast and Great Dividing Range of SEQ (Van Dyck and Strahan, 2008). There is no consistent pattern to the habitat of the species, which can be found in wet eucalypt forests, rainforest, wet and dry woodland to coastal heaths and scrubs (Seebeck, 1995; Mason 1997). The main habitat features appear to be access to some form of dense vegetation for shelter (Bennett 1987) and the presence of an abundant supply of fungi for food (Claridge et al. 1992). Due to the limited knowledge regarding the species preferred habitat any vegetation delineated as some form of dense vegetation for shelter (Bennett 1987) and the presence of an abundant supply of fungi for food (Claridge et al. 1992) is regarded as preferred habitat. The species has also often been recorded in gullies and near creeks, which provide refuge during fire and drought. **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside the mapped distribution where the species or species habitat is likely to or may occur. The mapped distribution is however very close to the alignment at its northern extent at Gowrie. **Species records:** Nearest record is from 2015 and is south of Toowoomba, approximately 25 km from Project footprint. All other records restricted to the east of Toowoomba and Warwick (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet	Unlikely	No	Preferred habitat for the species, as described in the literature, was not detected within the Project footprint. Vegetation communities at the northern extent of the Project footprint are predominantly non-remnant cropping and agricultural land with sections of remnant grassland (11.3.21 and 11.8.11) and small patches of 11.8.5 regrowth that are not considered habitat for the species.	Unlikely
Pseudomys novaehollandiae	New Holland mouse	V	V	The New Holland mouse has a fragmented distribution across Queensland. The species is typically found from coastal areas, up to 100 km inland on sandstone country (Menkhorst et al., 2008; Wilson & Laidlaw, 2003). Across its range, the preferred habitat for this species is open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes (TSSC, 2010). Soil type is believed to be an important indicator of habitat suitability for the New Holland mouse, with deeper top soils and softer substrates preferrable for digging burrows. In Victoria, this species has been recorded on deep siliceous podsols, sandy clay, loamy sands, sand dunes and coastal dunes (Wilson & Laidlaw, 2003). Other factors including slope, geology and an area's sun exposure may also influence site selection (Wilson & Laidlaw, 2003). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside the mapped distribution where the species or species habitat is likely to or may occur. The mapped distribution where the species or species habitat may occur is however very close to the alignment at its northern extent at Gowrie. **Species records:** The nearest records of the species are recorded within the Toowoomba Range, approximately 30 to 40 km from the Project footprint. No other records are located within 50 km (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	WildNet SPRAT	Unlikely	No	Preferred habitat for the species, as described in the literature, was not detected within the project footprint. Suitable sandy soil substrates are common throughout the project footprint from Goondiwindi to Millmerran, particularly on Landzone 5 and 3 (REs 11.5.1, 11.5.4, 11.3.18, 11.3.7). However, suitable vegetation structural types including heathland, open woodlands with a heathland understorey and vegetated sand dunes were not recorded within the project footprint. Fauna surveys along the alignment did not result in detection of the species	Unlikely

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Pteropus poliocephalus	Grey-headed flying-fox	-	V	The grey-headed flying-fox occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria (Tidemann 1998). However, only a small proportion of this range is used at any one time, as the species selectively forages where food is available. The species preferred habitat contains areas suitable for both foraging and roosting. Foraging habitat includes a range of vegetation communities such as rainforests, open forests, closed and open woodlands, *Melaleuca* swamps, *Banksia* woodlands, commercial fruit crops and introduced tree species in urban areas (Department of Agriculture, Water and the Environment, 2021a). However, the primary food source for the species is blossom from *Eucalyptus* and related genera. Grey-headed flying-foxes forage over extensive areas and have been known to fly as far as 40 km to feed, before returning to their roost the same night (Eby, 1991). Grey-headed Flying-foxes roost in large aggregations, known as camps, in the exposed branches of trees. Camps are typically located near water, such as lakes, rivers or the coast (van der Ree et al. 2005) and can occur in a range of vegetation types and vegetation patch sizes. However, during food shortages, colonies may utilise highly modified vegetation in urban and suburban areas (van der Ree et al. 2005). According to the recovery plan for the grey-headed flying-fox (Department of Agriculture, Water and the Environment, 2021b), habitat critical to the survival of the species includes vegetation communities that contain: *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera*. Habitat critical to the survival of the grey-headed flying-fox also includes vegetation communities which either: contain native species that are known to be productive as foraging habitat during the final weeks of grey-headed flying fox gestation, and during the weeks of birth, lactation and conception (August to May), contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or contain native and/or exotic species used for roosting at the site of a nationally important grey-headed flying-fox camp (Department of Agriculture, Water and the Environment, 2021b). **SPRAT profile distribution in relation to the Project:** The majority of the alignment is within the mapped distribution where the species or species habitat is likely to or may occur. The area between Gowrie and Yandilla is within the mapped distribution where the species or species habitat is likely to occur, with the species' may occur distribution extending to the western edge of Whetstone State Forest. **Species records:** Flying-fox camp locations were researched on the Queensland Government Flying Fox Locations maps prior to the field survey efforts in 2016. One camp in Pittsworth (<1 km from the Project footprint) was recorded to have 400 individuals during one monitoring event in 2012. The nearest mapped camp with grey-headed flying-foxes regularly recorded at the time was located in Highfields (~8 km from the Project footprint). Four other camps in Toowoomba and one camp in Oakey were also used by the species, all >10 km from the footprint. There are several camps in the Toowoomba and Highfields regions where up to 2500 individuals of the species have been recorded as recently as 2021. One camp east of Highfields had up to 9,999 individuals recorded in 2016 (DCCEEW, 2023). Outside of these established camps, several individuals were recorded in Inglewood in 2022 directly adjacent to the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications National Flying-fox Monitoring viewer	Likely	Yes	Preferred habitat for the species, as described in the literature, was detected within the project footprint. The most substantial areas of habitat are in the southern half of the alignment, between from Bringalily State Forest to west of Yelarbon. Another substantial area of habitat is mapped between Brookstead and Pittsworth. A single individual was recorded foraging within the Project footprint. Additionally, despite the nearest regularly used grey-headed flying-fox camp being located in Toowoomba, a camp of 500-1,000 individuals was observed in Inglewood, approximately 3 km from the Project footprint. Suitable vegetation structural types including open forest, closed and open woodland and introduced tree species in urban areas occur are common throughout the project footprint. Associate floristic species described in the literature, including *Eucalyptus tereticornis, E. albens, E. crebra* occur within the project footprint.	Known
Reptiles									
Anomalopus mackayi	Five-clawed worm-skink	E	V	The five-clawed worm-skink is known from the upper Condamine River Floodplain from Warwick in the south to Jimbour in the north with species recorded in Allora, Bongeen, Cecil Plains and Oakey. In general, the species is known to occur in both remnant and non-remnant woodlands and grasslands (not subject to cropping or heavy grazing) on alluvial, cracking clay soils or self-mulching, friable basalt soils (DSEWPAC, 2011). The species shelters under coarse woody debris, decaying leaf litter or artificial debris where there is enough soil moisture retention. Where these habitat features are present, it is regarded as preferred habitat. It often lives in permanent deep tunnel-like burrows and deep soil cracks. The species has also been found sheltering under artificial materials such as discarded railway sleepers, sheet metal and hay bales in areas modified by agriculture and other human activities (DEWHA, 2008; DoE, 2021).	SPRAT WildNet DES Species Profile Publications	Likely	No	Preferred habitat for the species, as described in the literature, was detected within the project footprint and has been mapped in sections along the entire alignment. Suitable alluvial and cracking clay soils are common throughout the project footprint, particularly on Landzone 3 and 4. Suitable REs were detected within the project footprint, including 11.3.17, 11.3.2, 11.3.21, 11.3.25, 11.3.4, 11.4.10, 11.8.11, 11.8.4, 11.8.5 and 11.9.9a	Likely

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				In Queensland, suitable REs include: 11.3.21, 11.3.25, 11.8.5, 11.8.15, 13.3.3 and 13.3.4. Known important habitat, includes: • All habitat within floodplains and riparian zones, uncultivated grassy headlands and strips between cropped areas, road reserves, travelling stock routes and remnant vegetation on vacant lands, and • Habitat within the known/likely-to occur distribution of the species. **SPRAT profile distribution in relation to the Project:** The entire alignment is within the mapped distribution where the species or species habitat is likely to or may occur. The only portion of the alignment within the species' may occur distribution is at Whetstone State Forest, with the remainder within the species' likely to occur distribution. **Species records:** The nearest records of the species are from just outside the Project footprint (200 m) east of Pittsworth from 2002 and 2009 (ALA, 2023). It is likely that this species has been poorly surveyed across much of its southern Queensland distribution and therefore it may occur in areas along the Project footprint where no records exist. **Records in the Project footprint:** No **Records in the locality:** Yes				Suitable microhabitat features, including coarse woody debris, leaf litter and artificial materials (e.g., railway sleepers) were recorded within the project footprint. Known important habitat, as described in the literature, was recorded within the project footprint, including floodplains and riparian zones, uncultivated grassy headlands and strips between cropped areas, road reserves and travelling stock routes.	
Delma torquata	Collared delma	V	V	The collared delma is endemic to Queensland, where it has been recorded at the Bunya Mountains, Blackdown Tablelands NP, Expedition NP, Western Creek (near Millmerran), Toowoomba Range and the western suburbs of Brisbane (Davidson 1993; Peck and Hobson 2007). The collared delma has been recorded from a number of different soil types throughout south-east Queensland, including sandy loams, grey and black cracking clays, stony lithosols and basalt derived Podzolics). Land zones (LZs) mentioned are LZ 3, LZ 9 and LZ 10 (Brigalow Belt Reptiles Workshop, 2010), but species have also recently been recorded in LZ12 (AusEcology, 2015 & 2018 observations). In the eastern parts of the species' range (i.e., the Toowoomba Range), general habitat is commonly associated with exposed rocky outcrops on ridges or slopes in vegetation communities dominated by narrow-leafed ironbark (*Eucalyptus crebra*) (Brigalow Belt Reptiles Workshop 2010). The most westerly records were made in popular box (*Eucalyptus populnea*) open woodland on alluvial plains (Brigalow Belt Reptiles Workshop 2010; Venz 2010 pers. comm.) which is also considered general habitat for the species. Associated REs include: 11.3.2, 11.9.10, 11.10.1 and 11.10.4. The presence of logs, bark, rocks, and other coarse woody debris, in conjunction with a present leaf litter layer of 30 to 100 mm thick appear to be an essential characteristic of the microhabitat for the species (DoE, 2021). Collared delma have mostly been detected under rocks or coarse woody debris. They have also been found in termite holes and have been observed moving through low grass (DSEWPAC, 2011). Given the difficulty in detecting this species, the Commonwealth environment department considers that an occurrence of important habitat for the collared delma is a surrogate for an 'important population' of the species" (DoE, 2021). Known important habitat, includes: • Habitat within the Known/Likely-to occur distribution of the species and the Toowoomba Range, • Habitat between grazed or cropped areas, along road reserves, and travelling stock routes, especially the Donnybrook Stock Route region. **SPRAT profile distribution in relation to the Project:** The entire alignment is within the mapped distribution where the species or species habitat may occur. **Species records:** The nearest records of the species are within the Toowoomba Range, approximately 12 km and 13 km east of the Project footprint in 2003 and 2021, respectively. There is also an older record from 1998 at the boundary of Western Creek State Forest, approximately 29 km west of the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet DES Species Profile	Potential	Yes - ~13 km from the Project footprint	Marginal general habitat for the species, as described in the literature, was detected within the project footprint. Collared delma were not detected during ecological surveys within the Project footprint, however, were recorded during additional surveys at two sites in eucalypt forest in Ballard, approximately 14 km from the northern-most end of the alignment, in 2023 (Allen et al., 2023). The area between Bringalily State Forest and Millmerran contain only small and isolated areas that may be marginal habitat. Suitable sandy loams and grey and black cracking clay soil occurs within the project footprint. Suitable poplar box open woodland on alluvial plains occurs along the project footprint within the western section of the species range. Suitable REs were detected within the project footprint, including 11.3.2 and 11.9.10. Suitable microhabitat features, including dense leaf litter, logs, bark, rocks and other coarse woody debris were recorded in some sections of the Project footprint (including within RE 11.3.2) but are generally absent.	Potential

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Egernia rugosa	Yakka skink	V	V	The yakka skink is endemic to Queensland and has a patchy known distribution extending from the coast to the hinterland of sub-humid to semi-arid eastern Australia. The species is known to occur in open dry sclerophyll forest, woodland and scrub (Brigalow Belt Reptiles Workshop 2010), with the core habitat of this species present within the Mulga Lands and Brigalow Belt South (TSN, 2008). Land zones (LZ) mentioned are LZ 3, LZ 4, LZ5, LZ7, LZ9, LZ 10 and LZ12 (DoE, 2021). The species might also use LZ8 (not core habitat) and LZ12 (in Wet Tropics Bioregion only) (DoE, 2021). Preferred habitat for the yakka skink occurs in a wide variety of vegetation types, including: brigalow (*A. harpophylla*), mulga (*A. aneura*), bendee (*A. catenulata*), poplar box (*Eucalyptus populnea*), belah (*Casuarina cristata*), ironbark (*Eucalyptus* spp), cypress pine (*Callitris glaucophylla*) and lancewood (*A. shirleyi*) woodlands and open forests (DSEWPAC, 2011). Chapple (2003) also observed the species in ecotonal forest in rainforest and wet/dry sclerophyll forest. Microhabitat for the yakka skink consists of cavities under and between logs or tree stumps, root cavities, abandoned burrows (e.g., rabbit warrens) and under rocks. The species is known to take refuge in large hollow logs. They will also excavate deep burrow systems, sometimes under dense vegetation (DoE, 2021). In cleared habitat, this species can persist where there are shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens. Known important habitat, includes: • Any contiguous patch of habitat, particularly remnant vegetation, where a colony is known or identified, and • Any microhabitat where colonies are likely to be found. **SPRAT profile distribution in relation to the Project:** The majority of the alignment (between Gowrie and Whetstone State Forest) is within the mapped distribution where the species or species habitat may occur. **Species records:** The closest record is from 1994 at Bunya Mountains NP, approximately 70 km north of the Project footprint (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet DES Species Profile	Potential	No	Preferred habitat for the species, as described in the literature, was detected within the project footprint and generally occurs between Yelarbon and Gowrie. Suitable Landzones occur within the project footprint, including Landzones 3, 4, 5, 7 and 9. Multiple suitable REs occur within the project footprint, including (but not limited to) 11.3.2, 11.4.3, 11.4.10 and 11.9.5. Suitable microhabitat features (within suitable REs) occur within the project footprint, including areas with hollow logs, rocks and burrows in some restricted areas. Although preferred habitat for the species occurs within the Project footprint, the species has not been detected within over 50 km of the Project. This species can also be difficult to detect and, as such, it is considered to only have the potential to occur.	Potential
Elseya albagula	Southern snapping turtle	CE	CE	The southern snapping turtle is a habitat specialist (TSSC 2014). Within the river system, preferred habitat is considered to feature clear, flowing, well-oxygenated waters. Water quality is an important aspect of the species ability to utilise habitat as due to its physiological adaptation to extract oxygen from water via cloacal respiration (DoEE 2017; TSSC 2014). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside the mapped distribution where the species or species habitat is likely to or may occur. The southern edge of the distribution is approximately 60 km to the north of the alignment. **Species records:** Although the mapping does not predict that the species will be within the Project footprint, an individual was found in a creek in Toowoomba <16 km the footprint in 2014. It is likely that this individual did not naturally disperse and was released. Other than the record in Toowoomba, the next nearest record was found in Fernvale in 2021, >80 km from the railway alignment (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNET DES Species Profile	Unlikely	No	Preferred habitat as described in the literature, and species records are absent from the Study area and surrounding region (ALA 2023). As such, the species is unlikely to occur in the impact assessment area.	Unlikely
Furina dunmalli	Dunmall's snake	V	V	The distribution of Dunmall's snake extends from the Central Queensland region (Clermont and Carnarvon areas) to the Queensland border and northern NSW, with the species mainly occurring in the Brigalow Belt Bioregion in Queensland. The species is rarely seen, but most records indicate sites at elevations between 200 to 500 m above sea level (DoE, 2021). Preferred habitat for the species has been found in a wide range of habitats such as forests and woodlands on black alluvial cracking clay and clay loams. Characteristic flora species associations on these soils include brigalow (*A. harpophylla*) and other *Acacia* spp., bulloak (*Allocasuarina leuhmannii*) or cypress pine (*Callitris* spp) forests. It has also been recorded on sandstone derived soils with open woodland and forests growing on it, consisting of lemon-scented gum (*Corymbia citriodora*), ironbarks (*E. crebra* and *E. melanophloia*), bulloak (*Casuarina leuhmannii*) and white cypress pine (*Callitris glaucophylla*). (DoE, 2021). The species is thought to seek shelter under fallen timber and in ground litter, and potentially may use cracks in alluvial clay soils. The species is nocturnal, cryptic, secretive species that is very rarely encountered. (DSEWPAC, 2011). Known important habitat, includes:	SPRAT WildNet DES Species Profile	Likely	Yes – incidentally recorded in Bringalily State Forest	Preferred habitat for the species, as described in the literature, was detected within the project footprint and has been mapped along almost the entire alignment. The species was recently incidentally recorded in Bringalily State Forest beside a drainage line in bulloak forest in November 2023. Suitable REs containing adequate microhabitat features in the form of leaf litter and coarse woody debris, include: 11.5.1, 11.3.2, 11.3.14,11.5.20, 11.5.4, 11.7.7, 11.9.5.	Known

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
				• Habitat within the Known/Likely to occur distribution of the species and any habitat corridors in between. **SPRAT profile distribution in relation to the Project:** The entire alignment is within the mapped distribution where the species or species habitat may occur. **Species records:** The nearest record of the species was recorded in 2011 ~50 m from the Project footprint along Millmerran - Inglewood Road in Bringalily State Forest (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes					
Tympanocryptis condaminensis	Condamine earless dragon	E	E	At the time when the grassland earless dragon (*T. pinguicolla*) was included in the EPBC Act list of threatened species, on 16 July 2000, the species was believed to occur in the Darling Downs in Queensland. This part of the species range is now described as a new species, the Condamine earless dragon (*T. condaminensis*). As provided by section 184(d) of the EPBC Act, the Delegate of the Minister of the Environment amended the EPBC Act list of threatened species by updating the name of *T. pinguicolla* to *T. pinguicolla* and *T. condaminensis*, effective from 5 May 2016." (DoE, 2021; Melville, 2014). The Condamine earless dragon currently occurs in the eastern Darling Downs region of south-east Queensland, where it occurs on the Condamine floodplain, with records at Oakey, Mt Tyson, Brookstead, Bongeen and Bowenville. The population extent of occurrence is estimated to be less than 2,000 km, with the area of actual anticipated occupancy around 76 km^2 (TSSC, 2016). The species is active during the day and will seek shelter in preferred habitat of soil cracks (cracking clay) and under/within ground cover, such as surface rocks, rocky outcrops, tussocks, root masses of thistles and coarse surface debris (Melville, 2018). The pre-European habitat for the Condamine earless dragon was natural grassland (RE 11.3.21). However, this has been extensively cleared, and currently the species is found on black cracking clay soils that in general are intensively cropped, this has also been considered as preferred habitat. The species can occur in general habitat featuring mixed cropping farmland, headlands (thin, less than 10-m-wide strips of grassland on paddock verges), small fragmentary remnant or 'regrowth' grassland and stubble fields (Melville, 2018). However, a recent study by Starr and Leung (2006), found Condamine earless dragon numbers were more abundant and had a better body-condition in sorghum stubble than grasslands and grass verges. **SPRAT profile distribution in relation to the Project:** Patches of the alignment between Millmerran and Gowrie are within the mapped distribution where the species or species habitat is likely to or may occur. **Species records:** Numerous records of this species are located within 10 km of the alignment, the most recent of which is from 2015 (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT WildNet Publications	Likely	Yes	Preferred habitat for the species, as described in the literature, was detected within the project footprint approximately 13 km north-east of Millmerran. Habitat is restricted to the northern portion of the alignment between Millmerran and Gowrie (~80 km) and mostly patchily distributed. Condamine earless dragon was detected in an existing rail reserve located between Millmerran and Brookstead during preliminary field surveys. During more recent surveys between September 2023 and mid-February 2024, 76 dragons were captured to the north of the Project footprint in the Condamine River floodplain (Allen et al., 2023; JP Emery pers. comm., 2024). Genetic samples were taken from 32 individuals. General habitat was found in remnant grassland including RE 11.3.21 and 11.8.11, as well as non-remnant areas (e.g., crop fields and grass verges) with cracking clay soil and/or sorghum stubble. All habitat in non-remnant grasslands (within the species known range) were found to provide habitat for the species.	Known
Uvidicolus sphyrurus	Border thick-tailed gecko	-	V	The border thick-tailed gecko occurs in the New England Tableland, Nandewar and Brigalow Belt South Bioregions of northern NSW and SEQ in an area bounded by Durikai State Forest (Queensland) to the north, the Great Dividing Range (NSW) to the east, the Liverpool Range (NSW) to the south and Moree/Mt Kaputar NP (NSW) to the west (NSW OEH, 2013p; Spark pers. comm., 2001b). The nocturnal border thick-tailed gecko shelters by day and is most commonly found in undisturbed remnant habitat on rocky outcrops and stony hills within eucalypt and cypress-pine open forest or woodland between 500 to 1100m above sea level (NSW OEH 2013p; NSW SC 2010b). The species is found in preferred habitat featuring granitic substrates, as well as regenerating habitat on basalt and metasediment lower slopes and flats (i.e. more fertile and less rugged sites) (Spark pers. comm. 2008 cited in NSW SC 2010b). It most often occurs on steep rocky or scree slopes, especially on granite and it may prefer sites with easterly aspects and the base of rocky escarpments (NSW OEH, 2013p). Sheltering occurs in well-shaded microhabitats amongst boulders, rock slabs, fallen timber and debris, bark on tree trunks and deep leaf litter (NSW OEH 2013p; Spark unpub. data cited in NSW SC 2010b). Rough-barked Apple (*Angophora floribunda*) logs may be moist drought refuge (NSW SC 2010b). Habitat often has dense canopy cover that creates a sparse grass/herb ground cover and abundant litter (Spark unpub. data cited in NSW SC 2010b). Studies have found the majority of sites occupied by *Uvidicolus sphyrurus* had undergone mild fires 20 to 30 years ago (Spark pers. comm. 2001b). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside the mapped distribution where the species or species habitat is likely to or may occur. The mapped distribution is ~10 km east of the alignment at Inglewood, near Lake Coolmunda.	SPRAT WildNet	Unlikely	No	Preferred habitat as described in the literature, and species records are absent from the Study area and surrounding region (ALA 2018). As such, the species is unlikely to occur in the impact assessment area.	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
				Species records: The nearest records of the species are >50 km to the east of the alignment in Durikai State Forest (2007) and Arcot State Forest (2011) (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No					
Myuchelys (Wollumbinia) belli	Bell's turtle	E	V (at the time of the referral) (uplisted to E effective 15 March 2023, after controlled action date)	The species is restricted to upland streams (between 600 and 1100 m altitude) that contain permanent pools deeper than about 2 m, granite boulders and bedrock. The general habitat for this species is often complex, with underwater caverns formed by boulders, logs and overhanging banks. In areas of lower velocity, the typical substratum is coarse granitic sand overlain by fine silt, algal growth, and dense beds of macrophytes (DoEE 2019b). It is absent from areas away from flowing streams, such as farm ponds and natural wetlands (DoEE 2019b). **SPRAT profile distribution in relation to the Project:** The entirety of the alignment is outside the mapped distribution where the species or species habitat is likely to or may occur. The mapped distribution is ~60 km south-east of the alignment at Inglewood. **Species records:** No species records occur within 10 km of the impact assessment area, with the closest records being around Girraween National Park >90 km away (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT	Unlikely	No	General habitat as described in the literature, and species records are absent from the Study area and surrounding region (ALA 2023). As such, the species is unlikely to occur in the impact assessment area.	Unlikely
Fish									
Maccullochella peelii	Murray cod	-	V	Murray cod are main-channel specialists and are frequently found in the main channels of rivers and larger tributaries (DoEE 2018). Preferred habitat and microhabitat consists of complex structural features in streams such as large rocks, snags (pieces of large submerged woody debris), overhanging stream banks and vegetation, tree stumps, logs, branches and other woody structures. Such structures reduce or influence stream flows and provide Murray Cod with shelter from fast-flowing water. They also serve as predatory ambush points for foraging, particularly during the day (DoEE 2019a). **SPRAT profile distribution in relation to the Project:** The Condamine River is within the mapped distribution where the species or species habitat is likely to occur. Parts of the alignment that intersect with rivers and creeks from Bringalily to Yelarbon are within the mapped distribution where the species or species habitat may occur. **Species records:** The closest known records (within 10 km of the impact assessment area) occur in Dumaresq River and the southern reach of Boonal Anabranch from 2005 to 2011 (ALA, 2023). Another recent record occurs on Lake Coolmunda (2019) (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT	Likely	Yes	Preferred habitat for the species occurs where areas of deep stream occur throughout the southern portion of the impact assessment area, such as in some reaches of Bringalily Creek. Habitat is restricted to three sections of the alignment: small sections at the southern extent of the alignment, between Bringalily and Brookstead, and a very small section of Gowrie Creek. Most areas in the impact assessment area are unsuitable due to the ephemeral nature of the systems. The Murray Cod was confirmed to be present during eDNA surveys, at the Macintyre River (south of the B2G Project footprint) and Canning Creek (Hydrobiology 2023).	Known
Bidyanus bidyanus	Silver perch	-	CE	Silver perch are a highly migratory freshwater fish and are endemic to the Murray-Darling system (including all states and sub-basins) (Allen *et al*. 2002). Silver perch are consistently reported by anglers and researchers to show a general preference for faster-flowing water, including rapids and races, and more open sections of river and preference for submergent macrophytes, which may be important nursery areas for juveniles (DoEE 2018). Adult silver perch are omnivorous, taking a variety of small prey including zooplankton, aquatic insects, molluscs, small crustaceans and worms as well as algae (NSW DPI, 2006). **SPRAT profile distribution in relation to the Project:** The Macintyre River is within the mapped distribution where the species or species habitat is likely to occur. The Condamine River is within the mapped distribution where the species or species habitat may occur. Oakey Creek near Gowrie is within the mapped distribution where the species or species habitat is likely to or may occur, however this is ~12 km from the Project footprint. **Species records:** An historical species record occurs in Back Creek, near Millmerran (within 10 km of the impact assessment area; ALA 2023). Additionally there are two records in Toowoomba from 2014, approximately 15 km from the alignment. **Records in the Project footprint:** No **Records in the locality:** Yes	SPRAT	Unlikely	No	Despite an historical record in proximity to the Project footprint, the species is unlikely to occur in the impact assessment area due to the absence of fast-flowing water systems in the impact assessment area. eDNA surveys at ten sites throughout the Project footprint also failed to detect the species (Hydrobiology 2023).	Unlikely

Scientific name	Common name	NC Act	EPBC Act	Desktop assessment - Known distribution / specific habitat requirements	Source	Likelihood of occurrence* (desktop)	Detected in surveys	Habitat assessment data – ground truthed survey data	Likelihood of occurrence (Final)
Invertebrates									
Adclarkia cameroni	Brigalow woodland snail	V	E	The Brigalow woodland snail is endemic to south-east Queensland, where it occurs on the Condamine River floodplain, especially in the area around Dalby and Chinchilla (Stanisic, 2011). The species inhabits a small number of remnant and scattered *Acacia harpophylla* (brigalow) and eucalypt woodland patches (such as road verges and riparian corridors) on alluvial black soils. The species general habitat occurs under logs and leaf litter and requires both canopy and on-ground timber cover for survival and egg-laying (Stanisic, 2011). Desiccation is the greatest threat to land snail eggs and hence ground debris, as well as an over-storey of trees and shrubs is required in order to maintain high levels of relative humidity at the substrate level. **SPRAT profile distribution in relation to the Project:** The section of the alignment between Pittsworth and Millmerran is within the mapped distribution where the species or species habitat is likely to or may occur. A very small section along the south arm of the Condamine River is within the species' likely to occur distribution. **Species records:** The nearest record to the project footprint is approximately 40 km to the north-west near Bowenville, Qld (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet Publications	Potential	Yes	General habitat for the species, as described in the literature, was detected within the Project footprint. Snail surveys conducted by Boobook recorded Brigalow Woodland Snails at 11 survey sites between Brookstead and Canning Creek. Habitat is restricted to approximately 80 km of the alignment from the northern edge of Bringalily State Forest to Pittsworth. Suitable brigalow and eucalypt woodland communities on alluvial grey-black soils occur within the Condamine River floodplain (within the project footprint). REs include: 11.3.4, 11.3.25, 11.4.3 and 11.4.10 however these were often fragmented patches with limited course woody debris and leaf litter. The areas were found to be impacted from agricultural practices often resulting in poorly developed or no good shrub layer present.	Known
Adclarkia dulacca	Dulacca woodland snail	E	E	The Dulacca woodland snail is endemic to south-east Queensland, where it occurs in a small number of isolated, fragmented populations in the area between Miles and Dulacca, south to Meandarra (Stanisic, 2011). The species general habitat can be located in various remnant and scattered habitats, including vine thicket and *Acacia harpophylla* (brigalow) woodland patches on rocky outcrops with clay to loam soils, *Eucalyptus* (ironbark) communities and *Acacia shirleyi* woodlands on ridges (with and without rock), and *Eucalyptus woollsiana* woodland (Eddie, 2016; Stanisic, 2011). These habitat locations are separated by areas of unsuitable habitat, affecting both dispersal and colonisation, and restricting genetic exchange within the species. The Dulacca woodland snail is also able to persist in areas of brigalow regrowth and even cleared paddocks, however, only where logs, woody debris or other suitable microhabitat sites/features remain (Eddie, 2016). This species will also shelter under loose bark at tree bases. The Dulacca woodland snail inhabits microhabitats under rocks and timber and requires both canopy and ground-layer timber cover for survival and egg-laying (Stanisic et al., 2010). Desiccation is the largest threat facing land snail eggs, thus the necessity for extensive ground debris and a tree and shrub overstorey, in order to maintain high levels of relative substrate humidity. **SPRAT profile distribution in relation to the Project:** The section of the alignment between Pittsworth and Millmerran is within the mapped distribution where the species or species habitat may occur. **Species records:** All known records are restricted to a small area of southern central Queensland, 44 km from the Project footprint between Barakula and Yuleba State Forests (ALA, 2023). **Records in the Project footprint:** No **Records in the locality:** No	SPRAT WildNet	Potential	No	Limited general habitat for the species, as described in the literature, was detected within the project footprint. *Acacia harpophylla* (brigalow) woodland patches were commonly recorded across the project footprint; however, none of these patches contained rocky outcrops.	Unlikely

EPBC and NC Act status: CE – Critically Endangered, E – Endangered, V – Vulnerable, NT – Near Threatened, Mi – Migratory, Ma – Marine

APPENDIX

O

Matters of National Environmental Significance Report

Appendix E Survey adequacy assessment

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND RAIL

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
MNES and MSES Listed Birds						
Australasian bittern (*Botaurus poiciloptilus*)	EN	EN	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017). BirdLife Australia's Bittern Survey Guide - Guidelines for surveying Australasian and Australian Little Bitterns (BirdLife Australia, n.d.)	Broadcast surveys in suitable habitat for call responses and direct sightings. Broadcast stations to be placed at wetland edges, at least 250 m apart. Observations of targeted foraging habitat in the early morning or evening. Area searches in suitable habitat for direct sightings, nests, feathers and indicative footprints are also adequate. General state methods: Surveys at suitable wetlands from mid-October to end March. Optimal survey time for 'booming' males is the 2 hours around dawn and 2 hours around sunset. Intensive listening surveys: Fortnightly visits between late October and late March, particularly when the water level is declining. Listening surveys should be conducted for a minimum of 30 minutes, with 1½ hours survey effort per survey, with a minimum of 2 people per survey. Intensive transect surveys: Transect surveys at wetlands to be repeated at regular intervals during the breeding season (October – February). Habitat conditions should be recorded during each survey.	Area searches – 8 hours for 5 days at 1 site (surveyed twice). *Total: 16 hours* Call playback – 5 hours for 5 days at 1 site (surveyed twice). *Total: 10 hours* Camera traps – 10 traps for 4 nights at 1 site (surveyed twice). *Total: 80 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing). Diurnal searches – 4 hours for 5 days at 1 site (surveyed twice). Total: 8 hours Habitat assessments – 4 hours at 1 site (surveyed twice). *Total: 8 hours* Dawn survey – 4 hours for 2 days at 1 site (surveyed twice). *Total: 8 hours* Dusk survey – 4 hours for 2 days at 1 site (surveyed twice). *Total: 8 hours*	Broadcast/call playback surveys were undertaken for a total of 10 hours in suitable Australasian bittern habitat. The survey effort included area searches for a total of 80 hours. Dawn and dusk surveys were undertaken for a total 8 hours each in suitable habitat within the vicinity of the Project footprint during the breeding season. The survey effort conducted within the species suitable habitat exceeds the required 1½ hours survey effort per survey. All surveys were conducted by 2 suitably qualified persons. The surveys did not include fortnightly visits during the breeding season. The surveys did not include intensive transect surveys through wetlands. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is considered partially adequate for detecting Australasian bittern due to survey hours almost meeting the required effort in suitable habitat.*

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
Australian painted snipe (*Rostratula australis*)	EN	EN	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017).	Area searches and transect should be conducted throughout suitable wetlands, with detection either by sighting or flushing. Targeted stationary observations should be conducted at dawn and dusk in suitable foraging habitat. Additionally, a brief spotlight survey may be beneficial after dusk. Land-based area searches / line transects for sites less than 50 ha when the wetland holds water should be conducted for 10 hours over 3 days. Targeted stationary observations should be conducted for 10 hours over 5 days.	Camera trap – 51 traps for 4 nights across 6 sites (surveyed twice). *Total hours: 2,448 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing). Area searches – 8 hours for 5 days at 6 sites (surveyed twice). *Total: 96 hours* Diurnal searches – 4 hours for 5 days at 6 sites (surveyed twice). Total: 48 hours Habitat assessments – 4 hours at 6 sites (surveyed twice). *Total: 48 hours* Dawn survey – 4 hours for 2 days at 6 sites (surveyed twice). *Total: 48 hours* Dusk survey – 4 hours for 2 days at 6 sites (surveyed twice). *Total: 48 hours*	The survey effort included area searches, habitat assessments and diurnal searches in suitable wetlands. Area searches did not exceed the 10 hours over 3 days requirement. The dawn and dusk survey effort do not meet the targeted stationary observations of 10 hours over 5 days. Spotlighting surveys were undertaken during the survey effort however these did not target bird species and are therefore not considered in the Australian painted snipe survey effort. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is partially adequate for detecting Australian painted snipe due to survey hours almost meeting the required effort in suitable habitat.*
Black-breasted button-quail (*Turnix melanogaster*)	VU	VU	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017).	Species is typically detected by observation of birds flushed out from an area after disturbance such as walking through long grass. Area searches of suitable habitat with detection of flushed birds. Land-based area searches in areas of less than 50 ha should be conducted for 15 hours over 3 days. Species may be indirectly detected by distinctive foraging platelets identified in leaf litter.	Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours* Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours* Camera traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 hours* UniSQ baited camera traps – 100 traps spaced 2 km apart along	Area searches did not exceed the 15 hours over 3 days requirement. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is not adequate for detecting black-breasted button-quail due to area searches not meeting the required survey effort. Additional area searches will be required to meet survey adequacy.*

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
					unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing). Additional habitat assessments and opportunistic observations at 10 sites.	
Curlew sandpiper (*Calidris ferruginea*)	CE	CE, Mi, Ma	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017). Industry guidelines for avoiding, assessing, and mitigating impacts on EPBC Act listed migratory shorebird species (DoE 2017)	There are no species-specific survey guidelines for the curlew sandpiper, however recommended general techniques include: ∘ Observations from vantage points over suitable foraging or roosting habitat, using binoculars or telescopes conducted at appropriate periods of the tidal cycle; ∘ Transect surveys by boat around offshore islands, lakes, coastlines and rivers; ∘ Aerial surveys over large foraging habitat at appropriate periods of the tidal cycle; ∘ Diurnal surveys in appropriate habitat, including flushing surveys; and ∘ Count surveys during the non-breeding season (September to March). Survey coverage in tidal areas should include the entire area of contiguous habitat where the shorebirds may occur, as well as all of the habitat used by the same population of shorebirds. Surveys for migratory shorebirds should be conducted during the months when majority of shorebirds are in the area (typically September to March), as well as during the northern hemisphere breeding season (mid-April to mid-August) for non-breeding population extents. Survey timing and effort for roosting shorebirds: - Timing – as close to time of high tide as possible, and at a maximum of no more than 2 hours either side of high tide. - Surveys must be undertaken during dry periods and low winds. - Surveys must only be undertaken during times of no disturbance (i.e., development activities).	Camera traps – 51 traps for 4 nights across 6 sites (surveyed twice). *Total hours: 2,448 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing). Area searches – 8 hours over 5 days at 6 sites (surveyed twice). *Total: 96 hours* Diurnal searches – 4 hours over 5 days at 6 sites (surveyed twice). Total: 48 hours Habitat assessments – 4 hours at 6 sites (surveyed twice). *Total: 48 hours*	As there are no species-specific guidelines for curlew sandpiper, general search techniques were undertaken throughout the survey period, including camera traps, area searches, diurnal searches, habitat assessments and dawn and dusk surveys. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *As there are no species-specific guidelines, the survey effort is considered adequate for detecting Curlew Sandpiper.*

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
				- Survey effort – four surveys during the period when most shorebirds are in the area (September to March), with replicate surveys required. Generally, one survey in December, two surveys in January, and one survey in February will be adequate to fulfil this requirement. Survey timing and effort for foraging shorebirds: - Timing – as close to time of low tide as possible, and at a maximum of no more than 2 hours either side of low tide. - Survey effort – four surveys including two surveys at spring low tide and two surveys at neap low tide. As well as one survey during the northern hemisphere breeding season (mid-April to mid-August).	Bird surveys – total of 14.6 hours over 44 sites Dawn survey – 4 hours over 2 days at 6 sites (surveyed twice). *Total: 48 hours* Dusk survey – 4 hours over 2 days at 6 sites (surveyed twice). *Total: 48 hours*	
Painted honeyeater (*Grantiella picta*)	VU	VU	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017).	There are no national species-specific survey guidelines for the painted honeyeater, however recommended general techniques for most honeyeaters include: - Diurnal area searches or transect-point surveys in favoured habitat; and - Diurnal transect surveys along watercourses or roads.	Call playback – 5 hours over 5 days at 8 sites (surveyed twice). *Total: 80 hours* Stag watching – 40 minutes before and after dusk for 2 nights at 8 sites (surveyed twice). *Total: 1,280 minutes*	As there are no species-specific guidelines for painted honeyeater, general search techniques were undertaken throughout the survey period, including camera traps, area searches, diurnal searches, habitat assessments and dawn and dusk surveys.

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
			Targeted Species Survey Guidelines - Painted honeyeater, (*Grantiella picta*) (DES, n.d (a))	Diurnal bird surveys involve 100 x 100 m survey plots, by one observer for 5 minutes, with at least 6 replicates during the survey period. Typically, diurnal bird surveys are spread out over different days, and should be conducted twice 2 hours after sunrise, twice in mid-morning (2-4 hours after sunrise) and twice during periods 4 hours after sunrise and 2 hours before sunset. Queensland guidelines for the species include on-foot area searches during the breeding season, specifically targeting foraging and breeding habitat (woodlands with abundant mistletoe). Area searches should be undertaken for a minimum of 4 hours over 4 days, per 50 ha of suitable habitat areas.	Dawn survey – 4 hours over 2 days at 8 sites (surveyed twice). *Total: 64 hours*	Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021, being within the species breeding season. *As there are no species-specific guidelines, the survey effort is considered adequate for detecting painted honeyeater.*
					Dusk survey – 4 hours over 2 days at 8 sites (surveyed twice). *Total: 64 hours*	
					Bird surveys – total of 14.6 hours over 44 sites	
					Area searches – 8 hours over 5 days at 8 sites (surveyed twice). *Total: 128 hours*	
					Diurnal searches – 4 hours over 5 days at 8 sites (surveyed twice). *Total: 96 hours*	
					Habitat assessments – 4 hours at 8 sites (surveyed twice). *Total: 64 hours*	
					Camera traps – 225 traps for 4 nights at 8 sites (surveyed twice). *Total: 14,400 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					Additional habitat assessments and opportunistic observations at 10 sites.	
Red goshawk (*Erythrotriorchis radiatus*)	EN	VU	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as	Area searches in sub-coastal woodland, ground searches along riverbanks for nests within the tallest trees. Area searches should be undertaken for 80	Stag watching – 40 minutes before and after dusk for 2 nights at 12 sites (surveyed twice). *Total: 160 hours*	Area searches were undertaken in all survey sites across the Project footprint. The survey effort did not focus on detecting nests, and therefore the area

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
			threatened under the EPBC Act (DEWHA 2017).	hours over 10 days (for one nest). In areas of 50 ha, survey effort is reduced to 50 hours over 8 days. Vehicle transects can be conducted by driving slowly through tropical woodland tracks and scanning tall trees for nests. Soaring birds can be detected from high vantage points.	Dawn survey – 4 hours over 2 days at 12 sites (surveyed twice). *Total: 192 hours*	search effort does not meet the required effort to find one nest (50 hours over 8 days). Additional surveys were undertaken including dawn and dusk surveys, bird surveys, diurnal surveys, camera traps and call playback. Quantifiable vehicle transects were not conducted; however, nests and individuals were searched for while driving at and between sites and near significant watercourses. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is partially adequate for detecting red goshawk due to the extent of general bird surveys completed during the two survey periods. The primary recommended survey method of searching for nests cannot be confidently deemed as adequate due to the lack of quantification of driving while observing for nests and soaring birds. This likely would have met the survey requirements had it been quantified as contributing towards survey efforts conducted by Cardno.*
					Dusk survey – 4 hours over 2 days at 12 sites (surveyed twice). *Total: 192 hours*	
					Bird surveys – total of 14.6 hours over 44 sites	
					Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours*	
					Diurnal searches – 4 hours over 5 days at 12 sites (surveyed twice). *Total: 96 hours*	
					Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours*	
					Camera traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 hours* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					Additional habitat assessments and opportunistic observations at 10 sites.	
Regent honeyeater (*Anthochaera phrygia*)	CE	CE	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017).	Area searches in suitable habitat during the morning, detection is generally by sighting. The survey effort guide for area searches in areas of less than 50 ha is 20 hours over 10 days. Targeted searches of woodland patches where heavily flowering trees are present. These searches should be conducted nearby waterbodies (i.e., dams and	Dawn survey – 4 hours for 2 days at 12 sites (surveyed twice). *Total: 96 hours*	Area searches were undertaken in all survey sites across the Project footprint; however, do not meet the requirement for 20 hours over 5 days. The species was not targeted during the survey period, however general bird surveys including dawn and dusk
					Dusk survey – 4 hours over 2 days at 12 sites (surveyed twice). *Total: 96 hours*	

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
				creek lines) with a survey effort of 20 hours over 5 days). Detection may be possible by call during the non-breeding season.	Bird surveys – total of 14.6 hours over 44 sites	surveys were undertaken. These surveys, however, do not meet the required survey effort. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is not adequate for detecting regent honeyeater due to area searches, and dawn and dusk surveys not meeting the required survey effort.*
					Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours*	
					Diurnal searches – 4 hours over 5 days at 12 sites (surveyed twice). *Total: 96 hours*	
					Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours*	
					Camera traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 hours* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					Additional habitat assessments and opportunistic observations at 10 sites.	
Squatter pigeon (southern) (*Geophaps scripta scripta*)	VU	VU	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017).	Area searches or transect surveys in suitable habitat for 15 hours over 3 days in areas less than 50 ha. Flushing surveys in suitable habitat for 10 hours over 3 days in areas less than 50 ha.	Dawn survey – 4 hours over 2 days at 9 sites (surveyed twice). *Total: 72 hours*	Area searches were undertaken for 8 hours over 5 days, not meeting the requirement for 15 hours over 3 days. However, active diurnal searches bring this closer to the requirement for areas less than 50 ha, totaling 12 hours over 5 (or more) days at 9 sites. Additional surveys were undertaken including dawn and dusk surveys targeting birds, and bird surveys. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021.
					Dusk survey – 4 hours over 2 days at 9 sites (surveyed twice). *Total: 72 hours*	
					Bird surveys – total of 14.6 hours over 44 sites	
					Area searches – 8 hours over 5 days at 9 sites (surveyed twice). *Total: 144 hours*	

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
					Diurnal searches – 4 hours over 5 days at 9 sites (surveyed twice). *Total: 72 hours*	*Survey effort is considered adequate for detecting squatter pigeon (southern) as additional bird surveys were undertaken in suitable habitat for the species.*
					Habitat assessments – 4 hours at 9 sites (surveyed twice). *Total: 72 hours*	
					Camera traps – 148 traps for 4 nights at 9 sites across the two survey periods. *Total:10,656 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					Additional habitat assessments and opportunistic observations at 10 sites.	
Swift parrot (*Lathamus discolor*)	EN	CE, Ma	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2017).	Area searches or transect surveys within the species' suitable habitat. Surveys should be undertaken during the early morning and afternoon when the species is most active / vocal. Area or transect surveys in areas less than 50 ha should be undertaken for 20 hours over 8 days. Additionally, vehicle transects may be beneficial in detecting the species call, particularly in large, expansive areas. Targeted surveys should be undertaken in patches of heavily flowering eucalypts, surveying for 20 hours over 8 days. All surveys on the Australian mainland should be conducted between March and July.	Dawn survey – 4 hours over 2 days at 12 sites (surveyed twice). *Total: 192 hours*	Area searches were undertaken in all survey sites across the Project footprint; however, do not meet the requirement for 20 hours over 5 days. The species was not targeted during the survey period, however general bird surveys including dawn and dusk surveys were undertaken. These surveys, however, do not meet the required survey effort. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021, bordering the optimal time for species detection. *Survey effort is not adequate for detecting swift parrot due to area searches and dawn and dusk surveys not meeting the survey effort requirement.*
					Dusk survey – 4 hours over 2 days at 12 sites (surveyed twice). *Total: 96 hours*	
					Bird surveys – total of 14.6 hours over 44 sites	
					Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours*	
					Diurnal searches – 4 hours over 5 days at 12 sites (surveyed twice). *Total: 96 hours*	
					Habitat assessments – 4 hours at 12 sites (surveyed twice).	

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
					Total: 96 hours	
					Camera traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 hours* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					Additional habitat assessments and opportunistic observations at 10 sites.	
MNES and MSES Listed Bats						
Large-eared pied bat (*Chalinolobus dwyeri*)	EN	VU	Survey Guidelines for Australia's Threatened Bats (DEWHA 2010)	Prior to undertaking surveys, rocky outcrops, caves and mines within the area should be identified through a desktop assessment. Field surveys should include: - Passive acoustic detection – recorders to be placed near mines, rocky outcrops, caves and foraging habitat. Unattended detectors should be left overnight at multiple locations, with a total 16 detector nights over a minimum of 4 nights in areas less than 50 ha. - Active acoustic detection – walking or driving transects using hand-held detectors. Transects should begin at dusk and be carried out for 6 detector hours over a minimum of 3 nights in areas less than 50 ha. - Roost searches – ground-based surveys for caves, mines, rock overhangs and crevices should be undertaken over several days. - Harp trapping and mist-net trapping – set overnight in forest flyways and riparian zones, near scarps and cliffs. Traps should be set for 16 trap or net nights over a minimum of 4 nights in areas less than 50 ha. A combination of the above survey methods is optimal for detecting the species. Surveys are best conducted from October to March.	Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours*	Field surveys included acoustic surveys by two consultancies, for a combined total of 1,170 detector nights, exceeding the 16 detector nights over 4 nights requirement for areas of habitat <50 ha. Attended bat detector surveys were conducted for 4 hours over 4 nights, totaling 96 hours and exceeding the requirement. Harp-trapping was undertaken by two consultancies, for a combined total of 1,209 nights, exceeding the 16 trap nights over 4 nights requirement for areas of habitat <50 ha. Additional surveys were conducted, including habitat assessments, camera trapping, diurnal searches, spotlighting and area searches to detect the species. Surveys were undertaken between 19 October and 11 November 2020, 8 – 27 March 2021, and 17 March to 3 April 2023, being the optimal time to detect the species. *Survey effort is considered adequate for detecting large-eared pied bat.*
					Diurnal searches – 4 hours over 5 days at 12 sites (surveyed twice). *Total: 96 hours*	
					Camera traps – 149 traps for 4 nights at 12 sites (surveyed twice). *Total: 11,920 hours* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					Harp traps – 15 harp traps for 4 nights at 12 sites (surveyed twice). *Total: 1,200 nights* Harp traps (BAAM) – a total of 95 harp traps over 25 locations, for 5 nights on the offset property and 9	

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
					nights in Bringalily State Forest. Undertaken from 17 March to 3 April 2023.	
					Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours*	
					Spotlighting – 2 x 200 m transects at 10 sites (surveyed twice). *Total: 40 x 200 m transects*	
					Unattended bat detectors – 14 for 4 nights at 10 sites (surveyed twice). *Total: 1,120 detector nights* Unattended bat detectors (BAAM) – a total of 13 acoustic recorders for 2-6 nights were located across the offset property, B2G study area and Bringalily State Forest. *Total: 50 bat detector nights.*	
					Attended bat detectors – 4 hours over 4 nights at 12 sites (surveyed twice). *Total: 96 hours*	
					Additional habitat assessments and opportunistic observations at 10 sites.	
South-eastern long-eared bat (*Nyctophilus corbeni*)	VU	VU	Survey Guidelines for Australia's Threatened Bats (DEWHA 2010)	Prior to undertaking surveys, a desktop assessment should determine the trapping effort through researching digital aerial photography of the Project Area for vegetation remnants. Field surveys should include:	Area searches – 8 hours over 5 days at 10 sites (surveyed twice). *Total: 160 hours*	The survey effort included attended and unattended bat detectors and harp trapping by two consultancies. Despite being included in the survey guidelines, the relevance of attended and unattended acoustic bat detectors is limited due to calls of *Nyctophilus*
					Diurnal searches – 4 hours over 5 days at 10 sites (surveyed twice). *Total: 80 hours*	

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
				- Passive acoustic detection – there is no indication of the minimum survey effort for acoustic detection. - Harp trapping and mist net trapping – in woodland, mallee and forest, in open fly-ways and within cluttered vegetation. Additionally, effort should be focused over the water if waterbodies are present in the area. Harp traps and mist nets should be deployed for 20 harp/mist-net nights over a minimum of 5 nights for areas less than 50 ha. Surveys are best conducted from October to April.	Camera traps – 149 traps for 4 nights at 10 sites across the two survey periods. *Total: 11,920 hours* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	species being unable to be separated to the species level. Harp-trapping was undertaken by two consultancies, with one deploying 25 traps for 5 nights, exceeding the 20 trap nights for 5 nights requirement for areas of habitat <50 ha. Additional surveys were conducted, including habitat assessments, camera trapping, diurnal searches, spotlighting and area searches to detect the species. Surveys were undertaken between 19 October and 11 November 2020, 8 – 27 March 2021, and 17 March to 3 April 2023, being the optimal time to detect the species. *Survey effort is considered adequate for detecting south-eastern long-eared bat.*
					Harp traps – 15 harp traps for 4 nights at 10 sites (surveyed twice). *Total: 1,200 hours* Harp traps (BAAM) – a total of 95 harp traps over 25 locations, for 5 nights on the offset property and 9 nights in Bringalily State Forest. Undertaken from 17 March to 3 April 2023.	
					Habitat assessments – 4 hours at 10 sites (surveyed twice). *Total: 80 hours*	
					Spotlighting – 2 x 200 m transects at 10 sites (surveyed twice). *Total: 40 x 200 m transects*	
					Unattended bat detectors – 14 for 4 nights at 10 sites (surveyed twice). *Total: 1,120 detector nights* Unattended bat detectors (BAAM) – a total of 13 acoustic recorders for 2-6 nights were located across the offset property, B2G study area and Bringalily State Forest. *Total: 50 bat detector nights.*	
					Attended bat detectors – 4 hours over 4 nights at 10 sites (surveyed twice). *Total: 80 hours*	

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
					Additional habitat assessments and opportunistic observations at 10 sites.	
MNES and MSES Listed Mammals						
Brush-tailed rock-wallaby (*Petrogale penicillata*)	VU	VU	Survey Guidelines for Australia's Threatened Mammals (DSEWPC 2011a) Species Profile and Threats Database: *Petrogale penicillata* — Brush-tailed Rock-wallaby (DoE 2023).	In areas up to 5 ha in size, the following techniques are recommended: - Baited camera trapping – cameras should be located at a water source, near refuge exists and known shelter sites. Camera traps should be baited with lucerne. - Daytime searches for shelter sites, escarpment and cliff-line habitats, activity (i.e., tracks, scats and rock shelters worn smooth from resting) and basking/active wallabies, conducted on ground beneath suitable habitat using binoculars and are best undertaken at down or dusk. Daytime observations should not be undertaken during summer or in hot weather. - Detection of predator scats, owl casts or remains, with specific focus on predatory bird/mammal nests/dens. Surveys should be undertaken by a minimum of 2 experienced investigators.	Diurnal searches – 2 x 100 m transects for 5 days at 12 sites (surveyed twice). *Total: 48 x 100 m transects.* Camera traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing). Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours* Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours* Additional habitat assessments and opportunistic observations at 10 sites.	The survey effort consisted of camera trapping in all survey sites across the Project footprint, for a total of 960 trap nights. Area searches were undertaken for a total of 960 hours by two suitably qualified personnel. Additionally, habitat assessments were conducted in all survey sites across the Project footprint to determine suitable habitat for the species. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is considered adequate for detecting brush-tailed rock-wallaby.*
Greater glider (southern and central) (*Petauroides volans*)	EN	VU	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2022) Guide to greater glider habitat in Queensland (Eyre et al., 2022) Survey Guidelines for Australia's Threatened	Requires two 30-person minute spotlight searches of 100 x 100 m survey site across multiple nights. This can include spotlighting up one side of the 100 x 100 m area and then spotlighting back the other side of the 100 x 100m area. Scat and sign search can coincide with the systematic diurnal active searches, within 50 x 50 m quadrates of the survey site. It is recommended that counting of hollow bearing trees is replaced with counting large trees due to	Spotlighting – 2 x 200 m transects at 4 sites (surveyed twice). *Total: 16 x 200 m transects* Stag watching – 40 minutes before dusk and 40 minutes after dusk for 2 nights at 4 sites (surveyed twice). *Total: 1,280 minutes* Habitat assessment – 4 hours at 4 sites (surveyed twice).	Cardno spotlighting efforts were undertaken in suitable habitat, consisting of 2 x 200 m transects, with a total of 16 transects conducted throughout the two survey periods. Additionally, habitat assessments, area searches, stag watching, diurnal searches were conducted to detect the species or species habitat.

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
			Mammals (DSEWPC, 2011a) Regional habitat selection of large gliding possums at forest stand and landscape scales in southern Queensland, Australia I. Greater glider (*Petauroides volans*) (Eyre, 2006) T. Eyre pers. comm. (2024)	large observer bias in estimating hollow-bearing trees. Bright nightlight lowers the detectability of greater gliders (Eyre, 2006). Spotlighting should include (at a minimum) two 200 m transects per 5 ha sites, with 100 m spacing between survey transects. Guidelines in Queensland are currently being reviewed and longer transects are now recommended (e.g., 300 m x 30 m).	*Total: 32 hours* Area searches – 8 hours over 5 days at 4 sites (surveyed twice). *Total: 64 hours* Diurnal searches – 2 x 100 m transects over up to 5 days at 4 sites (surveyed twice). *Total: 16 x 100 m transects.* Camera traps – 46 traps for 4 nights at 4 sites across the two survey periods. *Total: 1,472 trap nights* Additional habitat assessments and opportunistic observations at 10 sites. Targeted habitat assessments – 2 x 13 sites + 4 additional using updated habitat assessment methodology as per Eyre et al. (2022). *Total: 30 habitat assessments* Targeted spotlighting – 1 x 200 m transect at 13 sites. *Total: 13 x 200 m transects*	Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. Further targeted greater glider habitat assessment and spotlighting surveys were conducted from 18 – 22 December 2023. These habitat assessment surveys collected specific data to assess habitat according to the Guide to greater glider habitat in Queensland (Eyre et al., 2022). *Survey effort is considered adequate for detecting greater glider (southern and central).*
Koala (*Phascolarctos cinereus*)	EN	VU	A review of koala habitat assessment criteria and methods (Youngentob et al., 2021) Conservation Advice for Phascolarctos cinereus (Koala) (DAWE 2022)	Survey effort must be determined on a case-by-case basis, so no timing can be provided for the below survey techniques. Direct observation surveys should be undertaken between August and January during the peak activity season. Direct observations: - Strip transects; - Nocturnal spotlighting; - Call playback;	Call playback – 1 hour over 4 nights at 12 sites (surveyed twice). *Total: 24 hours* Genetic analysis – 1 sample per site for 36 sites. *Total: 36 samples* Koala Rapid Assessment Method – 35 sites.	Targeted Koala surveys were conducted through genetic analysis and Koala rapid assessments. Additionally, call playback, spotlighting, stag watching, habitat assessments, area searches, diurnal searches and camera traps were undertaken throughout the two survey periods. UniSQ have undertaken Koala capture and collaring surveys within the Project footprint.

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
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				- Remote sensor activated cameras in areas where fresh scats and/or scratchings have been detected; - Mark-resight or mark-recapture; - Detection dogs; and - Radio or satellite collars. Indirect observations: - Scratchings; - Spot Assessment Technique (SAT); - Scats – Regularised grid based SAT; - Scats – Koala optimised Rapid assessment methodology; and - Faecal standing crop assessment.	Spotlighting – 2 x 200 m transects at 12 sites (surveyed twice). *Total: 48 x 200 m transects.*	Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. Species was recorded during the field surveys. *Survey effort is considered adequate for detecting Koala.*
					Habitat assessment – 4 hours at 12 sites (surveyed twice). *Total: 96 hours*	
					Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours*	
					Diurnal searches – 2 x 100 m transects for 5 days at 12 sites (surveyed twice). *Total: 48 hours*	
					Camera traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					UniSQ Koala capture and tagging – 34 Koalas captured and tagged	
					UniSQ Scat collection and SNA metabarcoding – 30 scat samples collected	
					Additional habitat assessments and opportunistic observations at 10 sites.	
Spotted-tailed quoll (SE mainland population) (*Dasyurus maculatus maculatus*)	EN	EN	Survey Guidelines for Australia's Threatened Mammals (DSEWPC 2011a)	Sampling units of 100 ha are most appropriate due to the species large home ranges. Spotted-tailed quoll (SE mainland population) surveys should be	Spotlighting – 2 x 200 m transects at 12 sites (surveyed twice). *Total: 48 x 200 m transects*	The surveys consisted of hair tube trapping, however these were not deployed for the recommended 14 consecutive days.

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
				conducted during the species breeding season, being April to August. The following survey techniques are recommended for the spotted-tailed quoll (SE mainland population): - Daytime searches in areas of suitable habitat for den sites, activity, scats and latrines. - Hair sampling devices (hair funnel) surveys – placed 100 m apart and using a mixture of sardines, tuna oil and flour for bait. Hair funnels are to be set for a minimum of 14 consecutive nights. - Remote camera trapping – two cameras should be placed per 100 ha (i.e., 500 m apart, S. Burnett pers. comm., 2024) and left for a minimum of three weeks.	Habitat assessment – 4 hours at 12 sites (surveyed twice). *Total: 96 hours*	Camera trapping was undertaken during the two survey periods; with additional UniSQ baited camera trapping deployed for consecutive months since mid-2023. Additionally, the surveys consisted of spotlighting, habitat assessments, Elliot / cage trapping, area and diurnal searches, although it is noted that these are poor at detecting spotted-tailed quolls. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021, being outside the recommended survey timeframe. However, it is noted that detections of males during the breeding season may occur in areas that are not considered habitat due to their very wide-ranging behaviour during this time. *Survey effort is not adequate for detecting spotted-tailed quoll due to hair-tube trapping and camera trapping not meeting the survey effort requirement.*
					Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours*	
					Diurnal searches – 2 x 100 m transects for 5 days at 12 sites (surveyed twice). *Total: 48 hours*	
					Hair tube traps – 20 traps for 4 nights at 12 sites (surveyed twice). *Total: 1,920 hair tube nights.*	
					Elliot (b) / cage traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 trap nights.*	
					Camera traps – 10 traps for 4 nights at 12 sites (surveyed twice). *Total: 960 trap nights* UniSQ baited camera traps – 100 traps spaced 2 km apart along unconfirmed dirt roads in bushland areas in Bringalily SF since mid-2023 (continuing).	
					Additional habitat assessments and opportunistic observations at 10 sites.	
MNES and MSES Listed Reptiles						
Collared delma (*Delma torquata*)	VU	VU	Survey Guidelines for Australia's Threatened Reptiles (DSEWPC 2011b)	Effective survey methods include: - Active searches – during warm conditions. Optimal survey times include early morning	Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours*	The field surveys consisted of diurnal searches for 3 hours over 5 days at

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
			Species profile and threats database – Delma torquata (Collared delma) (DoE 2023) Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DSEWPC 2011c)	(within 4 hours of dawn) and during the evening on warm nights; - One-off hand searches (including raking through leaf litter) in appropriate habitats; and - Turning rocks and logs / timber. Surveys for Collared Delma should be conducted for a minimum over three days, with at least one replicate survey employing <u>all</u> of the recommended techniques if the species has not yet been detected. Effective survey methods include: - One-off diurnal searches – searching microhabitats, turning woody debris, rocks, raking the surface soil or leaf litter beneath trees, etc. Surveys should be conducted during the coolest part of the day, for a minimum of 1.5 person hours per hectare, over a minimum of 3 days. - Tile grids – grids of 50 tiles placed at 5 m intervals in suitable habitats. A minimum of 2 grids should be used for sites less than 2 ha in size; 1 grid per 2 ha for sites up to 40 ha and 20 grids for sites greater than 40 ha. Tile grids should be trialled as a supplementary method, as species may take up to 6 months to move in.	Pitfall trapping – 4 pitfall traps 4 nights at 3 sites (surveyed twice). *Total: 96 pitfall trap nights.* Funnel traps – 16 funnel traps for 4 nights at 4 sites (surveyed twice). *Total: 512 funnel trap nights.* Reptile monitoring trap grids – 1 grid of traps per site for 20 sites. Traps are monitored monthly on 4-6 occasions so far. Each grid measures 40 x 40 m, containing 5 rows of 5 different artificial habitats (placed 10 m apart). *Total: 20 reptile monitoring grid traps* Diurnal searches – 3 hours over 5 days at 4 sites (surveyed twice). *Total: 24 hours* Additional habitat assessments and opportunistic observations at 10 sites. Active searches in suitable microhabitat for 20 minutes by two people at 44 sites. *Total: 29.3 person hours*	numerous sites, exceeding the required 1.5 hours over 4 days. The surveys further consisted of pitfall trapping, funnel trapping and habitat assessments. Artificial habitat trap grids have been deployed at 20 sites since mid-2023, with four collared delma recorded at 2 sites, under timber carpet and tin, approximately 14 km from the Project footprint. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is adequate for detecting collared delma based on hours searched.*
Condamine (Darling Downs) earless dragon (*Tympanocryptis condaminensis*)	EN	EN	Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DSEWPC, 2011c) J.P. Emery pers. comm. (2024)	There are no species-specific survey guidelines for Condamine earless dragon, however, effective surveys include: - One-off diurnal searches – searching microhabitats, turning woody debris, rocks, raking the surface soil or leaf litter beneath trees, etc. Surveys should be conducted	Artificial burrows – 58 traps across 2 target sites, 6 trap nights per site. *Total: 969 trap nights* Pitfall traps – 6 traps for 4 nights at 12 sites (surveyed twice). *Total: 576 trap nights*	Survey effort is adequate for the Condamine earless dragon as diurnal searches were undertaken in accordance with the Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DSEWPC 2011c), as well as additional surveys conducted.

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
				during mid-morning (8:30 am – 12:30 pm), however this is temperature dependent, for a minimum of 1.5 person hours per hectare, over a minimum of 3 days. - Driving / walking transects – driving roads at a slow pace (e.g., 5 km/hr driving speed) whilst looking for basking / foraging individuals. Driving and walking transects should be undertaken during mid-morning (8:30 am – 12:30 pm), however this is temperature dependent. Whilst an effective method, this is not an officially established survey method.	Funnel traps – 2 traps for 4 nights at 12 sites (surveyed twice). *Total: 192 trap nights*	Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. The species has been recorded on numerous occasions (58 records) since the September 2023 survey. *Survey effort is considered adequate for detecting Condamine earless dragon*.
					Reptile monitoring grid traps – 1 trap per site for 20 sites. Traps are monitored monthly on 4-6 occasions so far. Each grid measures 40 x 40 m, containing 5 rows of 5 different artificial habitats (placed 10 m apart). *Total: 20 reptile monitoring grid traps*	
					Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 960 hours*	
					Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 192 hours*	
					Diurnal searches – 3 hours over 5 days at 12 sites (surveyed twice). *Total: 72 hours*	
					Spotlighting – 6 hours over 4 nights at 12 sites (surveyed twice). *Total: 144 hours*	
					Additional habitat assessments and opportunistic observations at 10 sites.	
					Active searches in suitable microhabitat for 20 minutes by two people at 44 sites. *Total: 29.3 person hours*	
Dunmall's snake (*Furina dunmalli*)	VU	VU	Survey Guidelines for Australia's Threatened Reptiles (DSEWPC 2011b)	There are no survey methods known to reliably detect the species, however the recommended survey techniques include:	Pitfall traps – 10 traps for 4 nights at 7 sites (surveyed twice). *Total: 560 trap nights*	The survey effort consisted of diurnal searches for 3 hours over 5 days, totaling 42 hours across the two survey

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
			Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DSEWPC 2011c)	- One-off diurnal searches – searching microhabitats, turning woody debris, rocks, raking the surface soil or leaf litter beneath trees, etc. Surveys should be conducted during the coolest part of the day, for a minimum of 1.5 person hours per hectare, over a minimum of 3 days. - Spotlighting – targeting water-inundated gilgais, wetlands, riparian habitats and roads between dusk and early morning hours. These surveys are most effective on warm, humid evenings and should be conducted for a minimum of 1.5 person hours per hectare, over a minimum of 3 days. - Transect surveys – transects strategically designed and positioned in large habitat patches of more than 10 ha. - Opportunistic road surveys – actively searching for reptiles whilst driving along roads, particularly following heavy rain events and during warm evenings. - Pitfall and funnel trapping – six 20 L (500 mm deep) buckets evenly distributed under a 30 m drift fence in optimal microhabitats. At least 2 replicates should be conducted per habitat type, checking the traps every morning and evening over four days.	Funnel traps – 20 traps for 4 nights at 7 sites (surveyed twice). *Total: 1,120 trap nights* Reptile monitoring grid traps – 1 trap per site for 20 sites. Traps are monitored monthly on 4-6 occasions so far. Each grid measures 40 x 40 m, containing 5 rows of 5 different artificial habitats (placed 10 m apart). *Total: 20 reptile monitoring grid traps* Area searches – 8 hours over 5 days at 7 sites (surveyed twice). *Total: 112 hours* Habitat assessments – 4 hours at 7 sites (surveyed twice). *Total: 56 hours* Diurnal searches – 3 hours over 5 days at 7 sites (surveyed twice). *Total: 42 hours* Spotlighting – 6 hours over 4 nights at 7 sites (surveyed twice). *Total: 84 hours* Additional habitat assessments and opportunistic observations at 10 sites. Active searches in suitable microhabitat for 20 minutes by two people at 44 sites. *Total: 29.3 person hours*	periods, and therefore, exceeding the 1.5 hours over 3 days requirement. Spotlighting was undertaken for 6 hours over 4 nights, totaling 84 hours across the two survey periods, and therefore, exceeding the 1.5 hours over 3 days requirement. Pitfall trapping and funnel trapping was conducted, with 10 pitfall traps and 20 funnel traps for 4 nights, totaling 560 pitfall trap nights and 1,120 funnel trap nights. The pitfall traps and funnel traps were placed in suitable habitat, with 6 pitfalls placed along a 30 m drift fence. Grid traps have been deployed at 20 sites since mid-2023. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is considered adequate for detecting Dunmall's snake.*
Five-clawed worm-skink (*Anomalopus mackayi*)	EN	VU	Survey Guidelines for Australia's Threatened Reptiles (DSEWPC 2011)	Effective surveys include:	Pitfall traps – 8 traps for 4 nights at 6 sites (surveyed twice).	The survey effort consisted of diurnal searches for 3 hours over 5 days,

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
			Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DSEWPC 2011c)	- One-off diurnal searches – searching microhabitats, turning woody debris, rocks, raking the surface soil or leaf litter beneath trees, etc. Surveys should be conducted during the coolest part of the day, for a minimum of 1.5 person hours per hectare, over a minimum of 3 days. - Hay bale plots – hay bales deployed in suitable habitat, in 4 m x 4x fenced plots over a long period (6 months), periodically checking underneath.	*Total: 284 trap nights*	totaling 48 hours across the two survey periods, and therefore, exceeding the 1.5 hours over 3 days requirement. Additional surveys including spotlighting, pitfall and funnel trapping, area searches and habitat assessments were undertaken to detect the species. Hay bale plots were not deployed; however, 20 reptile monitoring grids were placed across the Project footprint. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is considered adequate for detecting five-clawed worm-skink.*
					Funnel traps – 16 traps for 4 nights at 6 sites (surveyed twice). *Total: 768 trap nights*	
					Reptile monitoring grid traps – 1 trap per site for 20 sites. Traps are monitored monthly on 4-6 occasions so far. Each grid measures 40 x 40 m, containing 5 rows of 5 different artificial habitats (placed 10 m apart). *Total: 20 reptile monitoring grid traps*	
					Area searches – 8 hours over 5 days at 8 sites (surveyed twice). *Total: 640 hours*	
					Habitat assessments – 4 hours at 8 sites (surveyed twice). *Total: 128 hours*	
					Diurnal searches – 3 hours over 5 days at 8 sites (surveyed twice). *Total: 48 hours*	
					Spotlighting – 6 hours over 4 nights at 8 sites (surveyed twice). *Total: 96 hours*	
					Additional habitat assessments and opportunistic observations at 10 sites.	
					Active searches in suitable microhabitat for 20 minutes by two people at 44 sites. *Total: 29.3 person hours*	

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
Yakka skink (*Egernia rugosa*)	VU	VU	Survey Guidelines for Australia's Threatened Reptiles (DSEWPC 2011) Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DSEWPC 2011c) Targeted Species Survey Guidelines – Yakka Skink (*Egernia rugosa*) (DES, n.d (b)).	Effective surveys include: - One-off diurnal searches – searching microhabitats, turning woody debris, rocks, raking the surface soil or leaf litter beneath trees, etc. Surveys should be conducted during the coolest part of the day, for a minimum of 1.5 person hours per hectare, over a minimum of 3 days. - Spotlighting – targeting water-inundated gilgais, wetlands, riparian habitats and roads between dusk and early morning hours. These surveys are most effective on warm, humid evenings and should be conducted for a minimum of 1.5 person hours per hectare, over a minimum of 3 days. - Transect surveys – transects strategically designed and positioned in large habitat patches of more than 10 ha. - Elliot and cage trapping – Colony sites through diurnal surveys in suitable habitat should be targeted. One large Elliot-style trap (15.5 cm x 15 cm x 46 cm) and one cage trap places as close as possible to burrow entrances. At least 2 replicates should be conducted per habitat type, checking the traps every morning and evening over four days.	Pitfall traps – 5 traps for 4 nights at 3 sites (surveyed twice). *Total: 120 trap nights* Funnel traps – 10 traps for 4 nights at 3 sites (surveyed twice). *Total: 240 trap nights* Reptile monitoring grid traps – 1 trap per site for 20 sites. Traps are monitored monthly on 4-6 occasions so far. Each grid measures 40 x 40 m, containing 5 rows of 5 different artificial habitats (placed 10 m apart). *Total: 20 reptile monitoring grid traps* Area searches – 8 hours over 5 days at 4 sites (surveyed twice). *Total: 320 hours* Habitat assessments – 4 hours at 4 sites (surveyed twice). *Total: 64 hours* Elliot traps (a) – 20 traps for 4 nights at 4 sites (surveyed twice). Diurnal searches – 3 hours over 5 days at 4 sites (surveyed twice). *Total: 24 hours* Spotlighting – 6 hours over 4 nights at 4 sites (surveyed twice). *Total: 48 hours* Additional habitat assessments and opportunistic observations at 10 sites.	The survey effort consisted of diurnal searches for 3 hours over 5 days, totaling 24 hours across the two survey periods, and therefore, exceeding the 1.5 hours over 3 days requirement. Spotlighting was undertaken for 6 hours over 4 nights, totaling 48 hours across the two survey periods, and therefore, exceeding the 1.5 hours over 3 days requirement. Elliot / cage trapping was deployed where presence of yakka skink burrows within a survey site was known or suspected. 20 reptile monitoring grids were placed across the Project footprint. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is considered adequate for detecting yakka skink.*

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
					Active searches in suitable microhabitat for 20 minutes by two people at 44 sites. *Total: 29.3 person hours*	
MNES and MSES Snails						
Brigalow woodland snail (*Adclarkia cameroni*)	VU	EN	Conservation Advice *Adclarkia cameroni* brigalow woodland snail (TSSC 2016a)	There are no formal survey guidelines for this species. The species conservation advice provides effective survey techniques include nocturnal spotlighting and turning logs and raking accumulated leaves. Surveys for live individuals should be conducted during October to March, particularly following storm and rain events. Shells of dead individuals can be detected at any time of the year (C. Eddie pers. comm., 2024). Adequate survey effort for the species is two person-hours targeting areas of favourable microhabitat.	Targeted searches (Boobook) – total of 5 days covering 20 sites. Each site searched for a minimum of 2 person hours or until all microhabitat areas had been searched (in <2 person hours). Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours* Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours* Microhabitat assessments (Boobook) – total of 5 days covering 20 sites (50 x 100 plots). Additional habitat assessments and opportunistic observations at 10 sites.	The survey effort consisted of targeted species searches, area searches, habitat assessments and microhabitat assessments. Surveys were undertaken by Cardno between 19 October and 11 November 2020 and 8 – 27 March 2021 being within the optimal survey timeframe for the species. Targeted searches and microhabitat assessments by land snail specialists from Boobook were undertaken from 22 – 26 August 2022; and whilst not the optimal survey timeframe for detecting live individuals, survey conditions onsite were favourable for the species. Both live and dead individuals were detected during these surveys. Brigalow woodland snail was detected at 11 out of 20 sites during targeted searches conducted by Boobook. *Survey effort is considered adequate for detecting brigalow woodland snail.*
Dulacca woodland snail (*Adclarkia dulacca*)	EN	EN	Conservation Advice *Adclarkia dulacca,* Dulacca woodland snail (TSSC 2016b)	There are no formal survey guidelines for this species. The species conservation advice provides effective survey techniques include nocturnal spotlighting and turning logs and raking accumulated leaves. Surveys for live individuals should be conducted during October to March, particularly following storm and rain events. Shells of dead individuals can be detected at any time of the year (C. Eddie pers. comm., 2024). Adequate survey effort	Targeted searches (Boobook) – total of 5 days covering 20 sites. Each site searched for a minimum of 2 person hours or until all microhabitat areas had been searched (in <2 person hours). Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours*	The survey effort consisted of targeted species searches, area searches, habitat assessments and microhabitat assessments. Surveys were undertaken by Cardno between 19 October and 11 November 2020 and 8 – 27 March 2021 being within the optimal survey timeframe for the species.

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
				for the species is two person-hours targeting areas of favourable microhabitat.	Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours* Microhabitat assessments (Boobook) – total of 5 days covering 20 sites (50 x 100 plots). Additional habitat assessments and opportunistic observations at 10 sites.	Targeted searches and microhabitat assessments by land snail specialists from Boobook were undertaken from 22 – 26 August 2022; and whilst not the optimal survey timeframe for detecting live individuals, survey conditions onsite were favourable for the species. Survey methods employed were appropriate to detect the species if it was present, noting that the site is well beyond the currently known range of the species. *Survey effort is considered adequate for detecting Dulacca woodland snail.*
MNES Only Bats						
Grey-headed flying-fox (*Pteropus poliocephalus*)	-	VU	Survey Guidelines for Australia's Threatened Bats (DEWHA 2010)	Appropriate databases (i.e., held by the Department of Environment and Climate Change (NSW), Queensland Parks and Wildlife Service, the Victorian Department of Sustainability and Environment, the Australasian Bat Society) should be searched for the locations of camps prior to the field survey. Additionally, a search of the Eby and Law (2008) database will inform food plants occurring in each vegetation type, and therefore the vegetation within the Project Area. This data should be ground-truthed by a verified botanist to confirm vegetation communities and the presence of grey-headed flying-fox food plants. Grey-headed flying-foxes can be detected directly through sighting, or indirectly through calls, scats and distinctive odours. Daytime searches for camps can be conducted to detect day roosts. The ground and foliage should be examined for scats. Field surveys should include walking transects (100 m apart) at night-time for feeding and flying bats. The species distinct odour can provide signs of their presence. Additionally, audio recordings during night-time surveys may also record the presence of the species. The survey efforts have not been outlined, however the surveys must show that historic camps were	Desktop searches of the Queensland flying-fox camp locations were conducted in 2016, prior to ecological surveys. Vegetation communities and regional ecosystems were ground-truthed using quaternary surveys conducted by both Cardno and Ausecology along the alignment. Habitat assessments – 4 hours at 12 sites (surveyed twice). *Total: 96 hours* Area searches – 8 hours over 5 days at 12 sites (surveyed twice). *Total: 192 hours* Dusk surveys – 4 hours over 2 days at 12 sites (surveyed twice). *Total: 96 hours* Spotlighting – 2 x 200 m transects at 12 sites (surveyed twice). *Total: 48 x 200 m transects*	Habitat assessments, area searches, dusk surveys and spotlighting were conducted at all survey sites across the Project footprint. Flying-fox camp locations were researched on the Queensland Government Flying Fox Locations maps prior to the field survey efforts in 2016. One camp in Pittsworth (<1 km from the Project footprint) was recorded to have 400 individuals during one monitoring event in 2012. The nearest mapped camp with grey-headed flying-foxes regularly recorded at the time was located in Highfields (~8 km from the Project footprint). Four other camps in Toowoomba and one camp in Oakey were also used by the species, all >10 km from the footprint. However, during ecological surveys for the Project, a camp with 500+ individuals was found in Inglewood (though as the permanency of the camp for grey-headed flying foxes has not been studied it cannot be recognised as an important camp for this species).

Species	Status		Species guideline source	Required effort as per species guidelines (including the area extent for which the methodology is applicable)	Survey effort conducted on the Project	Justification for survey adequacy for environmental approvals
	NC Act	EPBC Act				
				researched on the above databases, as well as a comprehensive vegetation survey undertaken.	Additional habitat assessments and opportunistic observations at 10 sites.	More recently, flying-fox camp locations were researched again on the Queensland Flying Fox Monitoring database. Surveys were undertaken between 19 October and 11 November 2020 and 8 – 27 March 2021. *Survey effort is considered adequate for detecting grey-headed flying-fox.*
MNES Only Fish						
Murray cod (*Maccullochella peelii*)	-	VU	Survey guidelines for Australia's threatened fish (DSEWPC 2011d)	Effective survey methods in detecting the Murray cod include: - Boat-based electrofishing, when in accordance with the Australian Code of Practice, and operated in a way to minimise damage to fish; - Daytime snorkelling, spotlighting at night and the use of underwater cameras should be conducted in clear waters throughout the species distribution, at any time of the year; - Lure fishing and angling using barbless hooks, in all habitat types, generally best conducted between March and May; - The use of doppler imaging equipment in turbid waters throughout the species distribution at any time of the year; - Fine mesh fyke nets in stream structures, billabongs, swamps, farm ponds, dams and irrigation channels from early September to early January; and - Larval drift nets downstream of breeding habitats from early September to early January. Surveys for detecting Murray cod are best conducted between March and May.	Aquatic surveys using AusRivAS physical habitat assessment protocol – 20 sites. Fish surveys using a range of trapping methods across 6 sites, including backpack electrofishing, seine netting (2 – 5 mm mesh) and fyke nets. Where fyke nets were used, two nets were deployed overnight (one 3 mm stretched mesh and one 4 mm stretched mesh). Trapping methods were determined based on the suitability of the techniques for the site at the time of surveys. eDNA-Hydrobiology – 10 sites, a total of 30 eDNA samples (3 samples per site).	Surveys for detecting Murray cod included aquatic surveys, fish surveys and eDNA surveys, with a total 30 eDNA samples taken. Murray cod were trapped during the fish surveys and detected via eDNA. Site selection for eDNA sampling was based on the results of the aquatic habitat assessments and fish surveys. Collection methods for the eDNA samples used a Smith-Root eDNA sampler with 5 µm Smith-Root self-preserving filters following Smith-Root protocol (Hydrobiology, 2023). Filtration collection methods have been shown to have higher rates of species detectability compared to precipitation methods (Peioto et al., 2021). Although these methods are not included in the guidelines, eDNA sampling is considered a highly effective and less invasive modern technique for detecting aquatic fauna, particularly elusive or rare species (Rees et al., 2014). Sampling was undertaken in fish habitat during November 2022. *Survey effort is adequate for detecting Murray cod.*

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APPENDIX

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Matters of National Environmental Significance Report

Appendix F Species and community profiles

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Inland Rail is a subsidiary of
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INLAND RAIL

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
ALA	Atlas of Living Australia
DoE	Department of the Environment
DCCEEW	Department of Climate Change, the Environment, Energy and Water
DERM	Department of Environment and Resource Management
DES	Department of Environment and Science
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MNES	Matters of National Environmental Significance
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Committee

1. SPECIES AND COMMUNITY PROFILES

This document outlines and describes the profiles for all Matters of National Environmental Significance (MNES) including listed threatened ecological communities (TECs) and listed threatened species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) known, likely, and potential to occur within the Border to Gowrie Project (the Project).

All listed threatened species profiles describe their status, characteristics, known distribution, distribution in relation to the Project Area, biology and reproduction, habitat, threatening processes, threat abatement/recovery plans and a summary of the priority actions listed in the relevant threat abatement and recovery plans.

- Threatened ecological communities;
- Threatened flora; and
- Threatened fauna, including:
  - Invertebrates;
  - Fish;
  - Reptiles;
  - Mammals; and
  - Birds.

In each of the profiles, commentary is provided on the distribution of the community or species in relation to the Project. This commentary is based on the distribution for each community or species, general ecology and habitat requirements based on desktop assessments and all field surveys conducted to date as part of the Border to Gowrie Project. Species habitat definitions are included for those species for which habitat mapping has been undertaken (refer to rdEIS O: MNES Technical Report, Section 3.4). Where 'suitable habitat' has been used to describe habitat function, this incorporates both general and preferred habitat. The purpose of these profiles is to provide species specific information in a single place and to reduce duplication throughout the MNES Technical Report in referencing to key aspects of the species distribution and ecology.

2. THREATENED ECOLOGICAL COMMUNITIES

2.1 BRIGALOW (*ACACIA HARPOPHYLLA* DOMINANT AND CO-DOMINANT)

2.1.1 STATUS

EPBC Act – Endangered, effective 4 April 2001

2.1.2 ECOLOGY

2.1.2.1 CHARASTERISTIC AND DEFINING FEATURES

Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow) Threatened Ecological Community (TEC) is a low woodlands or forest community dominated by Brigalow (*Acacia harpophylla*), with pockets of belah (*Casuarina cristata*) and poplar box (*Eucalyptus populnea* subsp. bimbil). The TEC generally consists of a dense canopy layer, with a sparse understorey and ground cover (refer to Plate 2-1). Tree heights within the TEC range from 9 m in low rainfall areas (averaging approximately 500 mm per annum) to 25 m in high rainfall areas (averaging approximately 750 mm per annum). In Queensland, approximately 85% of the TEC occurs on undulating Cainozoic clay plains and on gently undulating landscapes associated with sedimentary rocks (DoE, 2024). Additionally, 10% is associated with rivers and creek flats, with the remaining 5% associated with old loamy and sandy plains, basalt plains and hills, or hills and lowlands on metamorphic or granitic rocks (DoE, 2024). Brigalow flowers from April to October, however seed sets tend to be very low (DoE, 2024). This TEC has been extensively cleared for agriculture, with most surviving remnants along roadsides and paddock edges (Butler, 2007; OEH, 2017).

PLATE 2-1 BRIGALOW TEC

In Queensland, the brigalow TEC occur within the following 16 analogous regional ecosystems:

- RE 6.4.2 – *Casuarina cristata* +/- *Acacia harpophylla* open forest on clay plains;
- RE 11.3.1 – *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains;
- RE 11.4.3 – *Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains;

- RE 11.4.7 – Open forest of *Eucalyptus populnea* with *Acacia harpophylla* and/or *Casuarina cristata* on Cainozoic clay plains;
- RE 11.4.8 – *Eucalyptus cambageana* open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains;
- RE 11.4.9 – *Acacia harpophylla* shrubby open forest with Terminalia oblongata on Cainozoic clay plains;
- RE 11.4.10 – *Eucalyptus populnea* or *E. pilligaensis*, *Acacia harpophylla*, *Casuarina cristata* open forest on margins of Cainozoic clay plains;
- RE 11.5.16 – *Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains/remnant surfaces;
- RE 11.9.1 – *Acacia harpophylla-Eucalyptus cambageana* open forest on Cainozoic fine-grained sedimentary rocks;
- RE 11.9.5 – *Acacia harpophylla* and/or *Casuarina cristata* open forest on Cainozoic fine-grained sedimentary rocks;
- RE 11.9.6 – *Acacia melvillei* ± *A. harpophylla* open forest on Cainozoic fine-grained sedimentary rocks;
- RE 11.11.14 – *Acacia harpophylla* open forest on deformed and metamorphosed sediments and interbedded volcanics;
- RE 11.12.21 – *Acacia harpophylla* open forest on igneous rocks, colluvial lower slopes;
- RE 12.8.23 – *Acacia harpophylla* open forest on Cainozoic igneous rocks;
- RE 12.9-10.6 – *Acacia harpophylla* open forest on sedimentary rocks; and
- RE 12.12.26 – *Acacia harpophylla* open forest on Mesozoic to Proterozoic igneous rocks (TSSC, 2001).

2.1.2.2 KNOWN DISTRIBUTION

Brigalow TEC extends from south of Charters Towers in Queensland, in a broad swathe east of Blackall, Charleville and Cunnamulla, south to northern NSW near Narrabri and Bourke (refer to Plate 2-2) (DoE, 2024). In Queensland, the TEC predominantly occurs within the Brigalow Belt North, Brigalow Belt South, Darling Riverine Plains and Southeast Queensland bioregions. In NSW, remnants of Brigalow TEC mostly occur north of Burke, west of Narrabri and north of Moree (Butler, 2007).

PLATE 2-2 DISTRIBUTION RANGE OF BRIGALOW TEC

Source: DoE (2024)

2.1.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

The brigalow (*Acacia harpophylla* dominant and co-dominant) TEC has been identified as occurring within the Study Area and within the Project footprint (refer to Figure 2-1).

Figure 2.1 : Brigalow TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 2.1 : Brigalow TEC Mapping

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Figure 2.1 : Brigalow TEC Mapping

Project Title : B2G Inland Rail

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Burrow Pit
Site 2

Whetstone

30

29

28

27

26

25

Yelarbon

Macintyre Brook

Glenarbon

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Brigalow TEC

GTRE : Vegetation Condition

Regrowth

Major Watercourse Lines

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 2.1 : Brigalow TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 2.1 : Brigalow TEC Mapping

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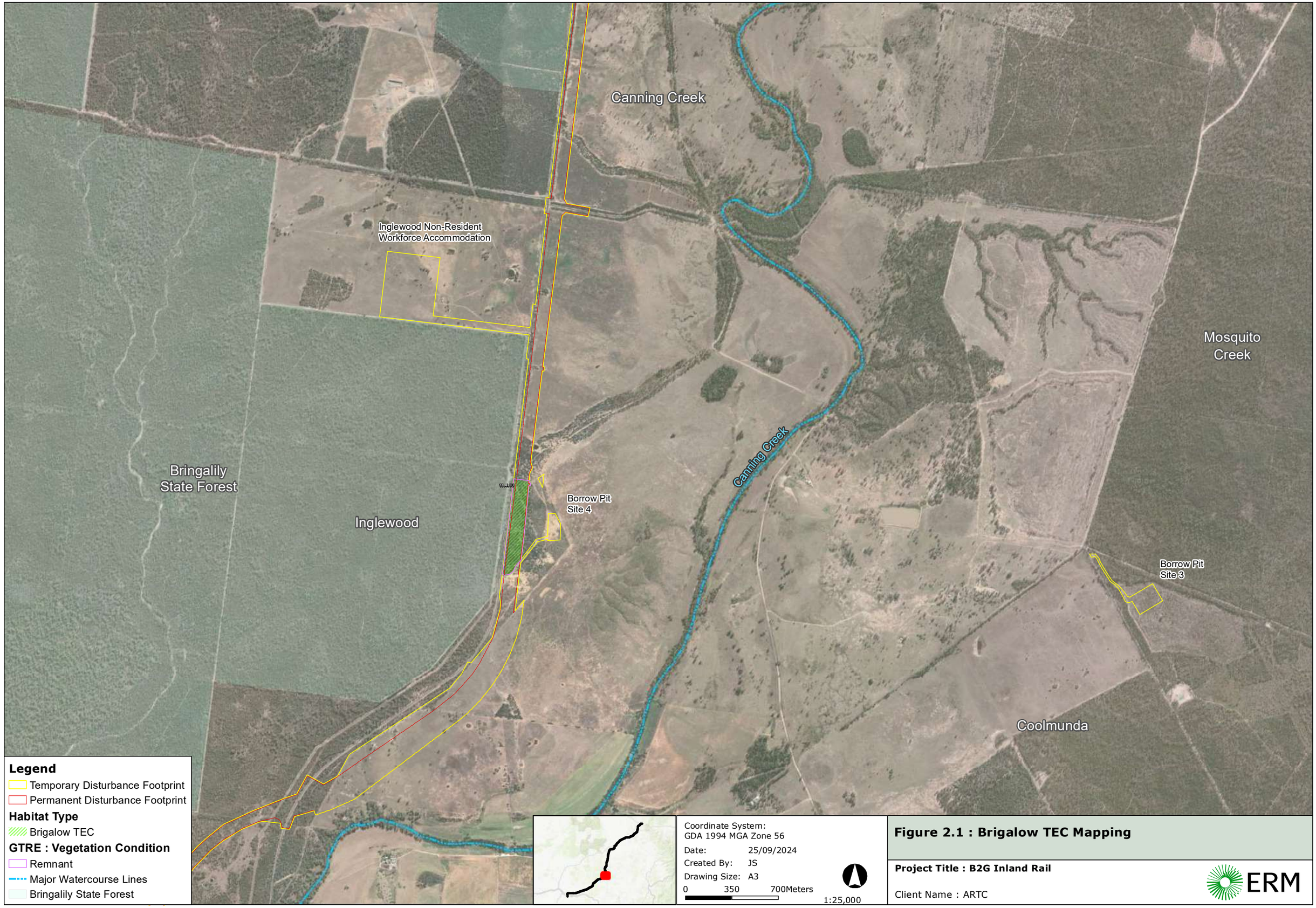

Figure 2.1 : Brigalow TEC Mapping

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ERM_ANZ_2023_A3_Landscape_MNES.mxd

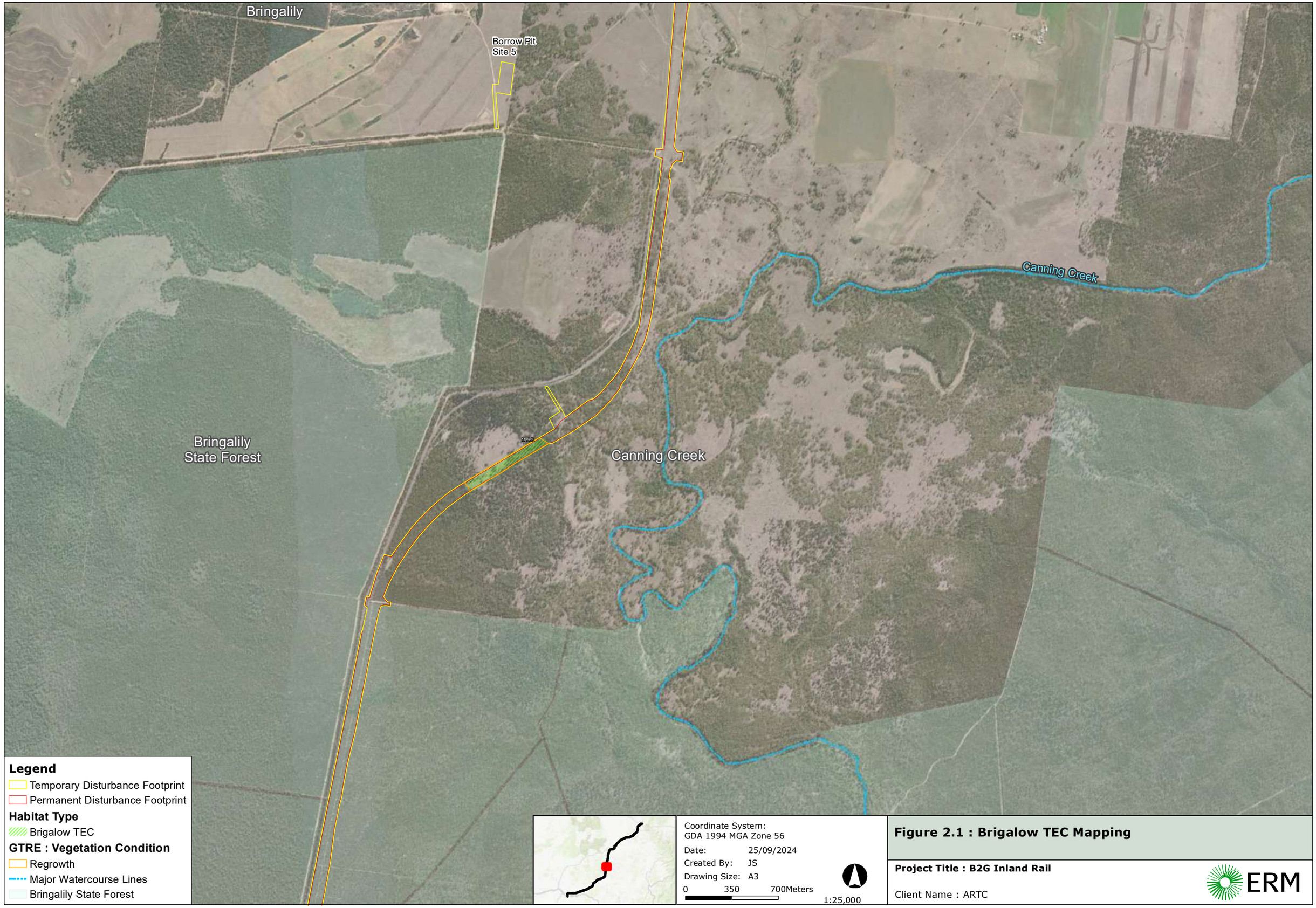

Figure 2.1 : Brigalow TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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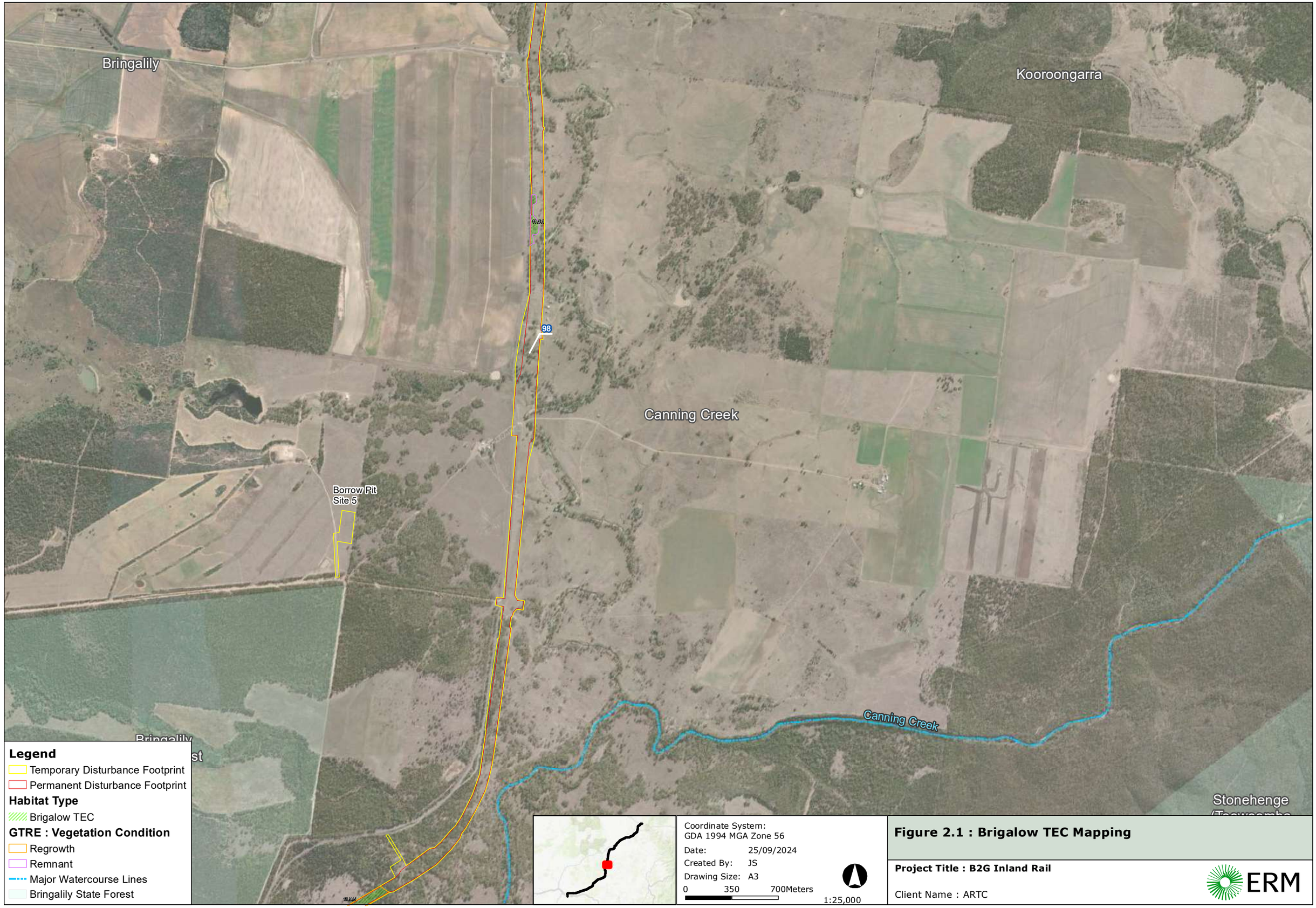

Figure 2.1 : Brigalow TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 2.1 : Brigalow TEC Mapping

Project Title : B2G Inland Rail

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Springside (Qld)

166

167

Yarranlea

Pittsworth

Scrubby Mountain

Kincora

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Brigalow TEC

GTRE : Vegetation Condition

Regrowth

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

1:25,000

Figure 2.1 : Brigalow TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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2.1.3 THREATENING PROCESSES

The following have been identified as potentially threatening processes to Brigalow TEC:

- Land clearing and fragmentation;
- Extreme fire weather;
- Invasion and establishment of weed species (e.g., buffel grass and climbing weeds);
- Invasion by pest animals including cattle (*Bos taurus*), feral pigs (*Sus scrofa*), cane toads (*Rhinella marina*), cats (*Felis catus*), foxes (*Vulpes vulpes*) and goats (*Capra aegagrus hircus*);
- Overgrazing and trampling by domestic stock;
- Changes in hydrological regimes;
- Spray drift of herbicides and pesticides;
- Fragmentation resulting in edge effects and risk of loss of small, scattered remnants;
- Clearing and damage from road and rail maintenance activities;
- Lack of viability of seed set;
- Lack of knowledge;
- Lack of pollinators; and
- Logging for fence posts (DoE, 2024; OEH, 2017).

2.1.4 EPBC STATUTORY DOCUMENTS

There is no adopted or made Recovery Plan for this ecological community and one is not currently required. The following approved conservation advice has been identified for this community and has been deemed to be sufficient for the recovery of the community:

- Approved Conservation Advice for the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (DoE, 2013).

The following Threat Abatement Plan has been adopted for this ecological community:

- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (DSEWPC, 2011).

2.1.5 PRIORTY RECOVERY AND THREAT ABATEMENT ACTIONS

The threats outlined in the conservation advice for Brigalow (*Acacia harpophylla* dominant and co-dominant) include the following:

- Land clearing – Majority of the TEC occurs as fragments within substantially modified landscapes. Mining in the Bowen Basin and logging for fence posts in the Brigalow Belt South, Nandewar and Darling Riverine Plains bioregions of NSW continue to be major threats to this TEC;
- Fire – Through the incursion of exotic pasture grasses, however fire has been historically rare in this vegetation type. As a result of climate change, the increase in temperatures and drier conditions will increase the TECs susceptibility to fire impacts;
- Weeds – Adversely impact the structure and function of brigalow ecosystems making them less suitable for native species. Exotic grasses increase the fire load within brigalow drawing fire into the ecosystem during a fire event and increasing the fire severity;

- Pest animals – The most widespread and problematic pest animal within Brigalow is the feral pig, alongside goats, cane toads, cats and foxes. Additionally, noisy miner (Manorina melanocephala) have become a native pest within the TEC;
- Inappropriate grazing regimes altering soil structure, leaf litter and woody debris – Grazing alters the vegetation structure of herbs and shrubs in the understorey and prevents new recruitment and growth of shrubs and trees; and
- Climate change – Presents conditions different to those which have historically been encountered within the range of this TEC. Species associated with this TEC may be vulnerable to the effects of hotter, drier conditions. Isolated fragments with little connectivity impact species movement and resource availability, with species struggling to move further afield. Additionally, flora may be subject to increased frequency and intensity of fire in hotter and drier conditions.

Objectives and actions outlined in the conservation advice for Brigalow (*Acacia harpophylla* dominant and co-dominant) include the below:

- Prevent the clearing of this TEC where it occurs as fragments and regrowth. If clearing of brigalow is required, mitigate impacts by avoiding high quality fragments dissection of fragments;
- Manage both vertebrate pests and exotic flora incursion targeting high biomass of exotic grasses within brigalow ecological communities and surrounding areas, avoiding the application of fertiliser, tree thinning and soil disturbance;
- Manage grazing pressure to allow regeneration of microhabitat, that is provided from shrubs and understorey vegetation, to give other woodland bird species the opportunity to avoid aggression from noisy miners;
- Encourage land managers to conserve native flora and fauna within and close to this TEC by managing stock rates, leaving trees and regrowth in paddocks to provide connectivity between patches, connecting shade-lines keeping them as wide as possible and allowing standing dead trees, ground timber and leaf litter to rot where it falls;
- Undertake regeneration of high value sites and revegetation of degraded sites, increasing the size of community managed land for conservation through conservation agreements with landholders and establishing adequate buffer zones to protect remnants;
- Devise and implement water management, sediment erosion and pollution control along with monitoring plans; and
- Develop and disseminate conservation information in conjunction with land managers, local/state authorities, and indigenous groups to establish sustainable management guidelines and technical material to address fire management, plant pathogens, invasive animal management and weed management.

2.1.6 REFERENCES

Butler, D.W. (2007). Recovery plan for the "Brigalow (*Acacia harpophylla* dominant and co-dominant" endangered ecological community (draft of 1 May 2007). Report to the Department of the Environment and Water Resources, Canberra. Queensland National Parks and Wildlife Service, Brisbane.

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Department of Sustainability, Environment, Water, Population and Communities (2011). Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads. Canberra, ACT: Commonwealth of Australia. Available from: http://www.environment.gov.au/resource/threat-abatement-plan-biological-effects-including-lethal-toxic-ingestion-caused-cane-toads. In effect under the EPBC Act from 06-Jul-2011.

Office of Environment and Heritage, NSW (2017). Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions. Available from: https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10109 [Accessed 31 August 2018].

Threatened Species Scientific Committee (2001). Brigalow (*Acacia harpophylla* dominant and co-dominant), advice to the Minister for the Environment and Water Resources from the Threatened Species Scientific Committee on a public nomination for an ecological community listing on the Environment Protection and Biodiversity Conservation Act 1999 [Accessed 15 January 2024].

2.2 NATURAL GRASSLANDS ON BASALT AND FINE-TEXTURED ALLUVIAL PLAINS OF NORTHERN NEW SOUTH WALES AND SOUTHERN QUEENSLAND

2.2.1 STATUS

EPBC Act – Critically Endangered, effective 7 January 2009

2.2.2 ECOLOGY

2.2.2.1 CHARACTERISTIC AND DEFINING FEATURES

The Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Queensland (Natural grasslands) TEC occurs on basalt and fine-textured alluvial plains of northern NSW and southern Queensland (DEWHA, 2009). Natural grasslands TEC change with seasonal conditions and are dominated by perennial tussock grasses, including Mitchell grasses (*Astrebla* spp.), plains grass (*Austrostipa aristiglumis*), Queensland bluegrass (*Dichanthium sericeum*), kangaroo grass (*Themeda australis*), yabila (*Panicum queenslandicum*) or one of 13 other indicator grass species (refer to Plate 2-3). The composition of the grassland will change according to seasonal rainfall, temperature, fire, and management. This TEC occurs on fine textured soils and cracking clays derived from basalt or alluvium, particularly on flat to low slops less than 1 degree (DEWHA, 2009).

This TEC consists of limited trees or shrubs, however has a large diversity of herb species, including legumes, orchids, daisies and lilies (OEH, 2014). When trees are present, they typically occur as scattered individuals, including weeping myall (*Acacia pendula*), white box (*Eucalyptus albens*), fuzzy box (*E. conica*), coolabah (*E. coolabah*), yellow box (*E. melliodora*), poplar box (*E. populnea*) or forest red gum (*E. tereticornis*) (TSSC, 2009).

PLATE 2-3 NATURAL GRASSLANDS TEC

In Queensland, this TEC is considered to be analogous to the following two regional ecosystems:

- RE 11.3.21 – *Dichanthium sericeum* and/or *Astrebla* spp. grassland on alluvial plains (cracking clay soils); and
- RE 11.3.24 – *Themeda avenacea* grassland on alluvial plains (basalt derived soils) (TSSC, 2009).

Although not listed within the listing advice, the following RE was precautionarily included where it met the description and condition thresholds of this TEC:

- RE 11.8.11 – *Dichanthium sericeum* grassland on Cainozoic igneous rocks.

2.2.2.2 KNOWN DISTRIBUTION

The Natural grasslands TEC can be found on the Liverpool Plains and the Moree Plains of NSW and the Darling Downs of Queensland (refer to Plate 2-4) (OEH, 2014).

PLATE 2-4 DISTRIBUTION RANGE OF NATURAL GRASSLANDS TEC

Source: DoE (2024)

2.2.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

The natural grasslands TEC has been identified as occurring within the Study Area and the Project footprint (refer to Figure 2-2).

Figure 2.2 : Natural Grasslands TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Stoneleigh (Qld)

Linthorpe

Southbrook

Springside (Qld)

Pittsworth

Broxburn

180

176

170

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Natural Grasslands NSW and QLD TEC Area

GTRE : Vegetation Condition

Remnant

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 2.2 : Natural Grasslands TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3

0 350 700Meters

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Figure 2.2 : Natural Grasslands TEC Mapping

Project Title : B2G Inland Rail

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ERM

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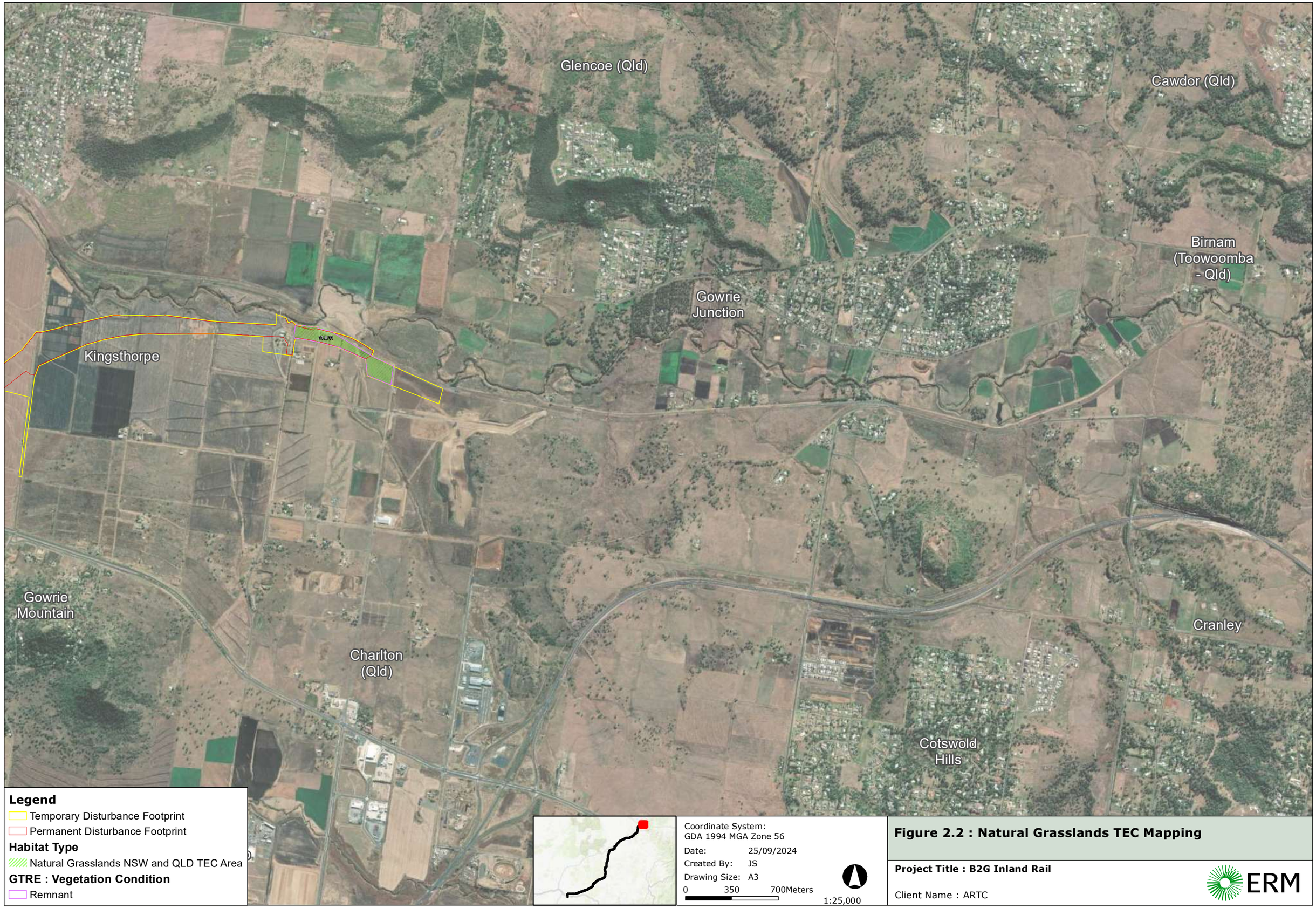

Figure 2.2 : Natural Grasslands TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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2.2.3 THREATENING PROCESSES

Threats to the Natural grasslands TEC include:

- Clearing for cropping and mining;
- Grazing by introduced livestock;
- Invasion of weed species including coolatai grass (*Hyparrhenia hirta*), lippia (*Phyla nodiflora*), African love grass (*Eragrostis curvula*) and buffel Grass (*Cenchrus ciliaris*);
- Invasion of pest animals, including the house mouse (*Mus* spp.);
- Dryland salinity;
- Changed flood regimes;
- Changed fire regimes; and
- Feral animals such as pigs (OEH, 2014).

2.2.4 EPBC STATUTORY DOCUMENTS

No threat abatement/recovery plans have been identified as being relevant for this community. As per the TEC SPRAT profile, a recovery plan is not required, and the approved conservation advice (DAWE, 2008) is effective, efficient, and responsive to guide the implementation of priority management actions for the TEC. The TEC's conservation advice is as follows:

- Approved Conservation Advice for Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (DAWE, 2008).

2.2.5 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The TEC's conservation advice lists the following priority actions as relevant to the TEC:

- General habitat loss, disturbance and modification:
  - Monitor known occurrences to identify key threats or the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Identify occurrences of high conservation priority;
  - Undertake survey work in potential habitat to locate remnants;
  - Avoid slashing during peak flowering season from spring to summer;
  - Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on the ecological community;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities as appropriate) in areas where the ecological community occurs do not adversely impact on known sites;
  - Manage disruptions to water flows and any changes to hydrology which may result in changes to the water table levels, increased salinity and increased run off or sediment; and
  - Investigate formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure.

- Invasive weeds:
  - Identify and remove weeds in the local area, which could become a threat to the ecological community, using appropriate methods;
  - Develop and implement a management plan for the control of weeds such as Lippia (*Phyla canescens*), Coolatai Grass (*Hyparrhenia hirta*), African Love Grass (*Eragrostis curvula*) and Buffel Grass (*Cenchrus ciliaris*) in the region;
  - Manage sites to prevent introduction of invasive weeds, which could become a threat to the ecological community, using appropriate methods; and
  - Implement good hygiene measures for mowing and grading equipment and observe appropriate state protocols for moving stock.
- Trampling, browsing or grazing:
  - Develop and implement a stock management plan for known sites on leased crown land;
  - Manage known sites on private property to ensure appropriate cattle and sheep grazing regimes are conducted outside the growing season, i.e. when plants are not fertile;
  - Manage total grazing pressure; and
  - Provide and/or promote incentives for good management.
- Animal predation or competition:
  - Develop a management plan to be implemented for the control of the house mouse (*Mus domesticus*) in the local region.
- Fire:
  - Develop and implement a suitable fire management strategy for the ecological community;
  - Identify appropriate intensity and interval of fire to promote seed germination; and
  - Avoid burning (or grazing or slashing) during peak flowering season (spring to summer).
- Conservation information:
  - Raise awareness of the Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Queensland ecological community within the local community. The production of region specific fact sheets or information brochures such as that produced for land managers in the Darling Downs could benefit regions such as the Liverpool and Moree Plains.

2.2.6 REFERENCES

Department of the Environment, Water, Heritage and the Arts (DAWE) (2008). Approved Conservation Advice for Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/88-conservation-advice.pdf. In effect under the EPBC Act from 07-Jan-2009.

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2.3 WHITE BOX-YELLOW BOX-BLAKELY'S RED GUM GRASSY WOODLAND AND DERIVED NATIVE GRASSLAND (ALSO KNOWN AS BOX-GUM GRASSY WOODLAND AND DERIVED GRASSLAND)

2.3.1 STATUS

EPBC Act – Critically endangered, effective 17 May 2006

2.3.2 ECOLOGY

2.3.2.1 CHARACTERISTIC AND DEFINING FEATURES

White box-yellow box-Blakely's red gum grassy woodland and derived native grassland TEC is an open woodland community, with a patchy shrub layer, tussock grasses and a tree layer dominated by white box (*Eucalyptus albens),* yellow box (*E. melliodora*) and/or Blakely's red gum (*E. blakelyi*). Tree cover is generally discontinuous and consists of widely spaced trees of medium height (refer to Plate 2-5).

White box-yellow box-Blakely's red gum grassy woodland and derived native grassland TEC varies in structural composition with location and site conditions, however, trees form a separated canopy layer with foliage rarely exceeding 30% or approximately 30 trees per hectare (DCCEEW, 2023). Dominant tree species within the TEC include white box (*Eucalyptus albens),* yellow box (*E. melliodora*) and/or Blakely's red gum (*E. blakelyi*), which may co-occur or exist in various combinations.

The shrub layer is generally patchy, with shrubs either scattered or dominant over a localised area. High quality shrub layer is typically made up of western wattle (*Acacia decora*) and silver wattle (*A. dealbata*). Through grazing practices, shrub layer compositions and species may differ, with *Cassinia* spp. dominating where prolonged grazing exists. Additionally, common fringe-myrtle (*Calytrix tetragona*), *Cryptandra* spp., *Indigofera* spp. grey guinea-flower (*Hibbertia obtusifolia*), urn heath (*Melichrus urceolatus*) and peach heath (*Lissanthe strigosa*) may also be present where grazing persists (DCCEEW, 2023).

The ground layer is dominated by tussock grasses, with the following genera present across the TECs range: *Austrostipa*, *Bothriochloa*, *Chloris*, *Cymbopogon*, *Dichanthium*, *Microlaena*, *Poa*, *Themeda*, *Rytidosperma* or *Sorghum* (DCCEEW, 2023)

White box-yellow box-Blakely's red gum grassy woodland and derived native grassland TEC occurs on hilly to undulating landscapes where soils are of moderate fertility derived from alkaline and acid volcanics, sediments, granites, serpentinites and metamorphics (DCCEEW, 2023). The TEC typically occurs where average annual rainfall is 400 – 900 mm at latitudes between 700 – 1,200 m (DCCEEW, 2023).

PLATE 2-5 WHITE BOX-YELLOW BOX-BLAKELY'S RED GUM GRASSY WOODLAND AND DERIVED NATIVE GRASSLAND TEC

In Queensland, white box-yellow box-Blakely's red gum grassy woodland and derived native grassland TEC is considered to be analogous to the following regional ecosystems REs:

- RE 11.3.23 – *Eucalyptus conica*, *E. tereticornis*, *Angophora floribunda* ± *E. melliodora* ± *E. nobilis* grassy woodland;
- RE 11.3.26 – *Eucalyptus moluccana* or *E. microcarpa* woodland to open forest on margins of alluvial plains;
- RE 11.5.20 – *Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains;
- RE 11.8.2 – *Eucalyptus tereticornis*, *E. melliodora* woodland on Cainozoic igneous rocks;
- RE 11.8.2a – *Eucalyptus tereticornis* and *E. melliodora* occurring on low hills;
- RE 11.8.8 – *Eucalyptus albens, E. crebra* woodland on Cainozoic igneous rocks;
- RE 11.9.9a – *Eucalyptus albens* ± *E. crebra* ± *E. tereticornis* ± *Callitris baileyi* woodland;
- RE 11.9.13 – *Eucalyptus moluccana* or *E. microcarpa* or *E. woollsiana* (restricted to south of bioregion) open forest;
- RE 12.8.16 – *Eucalyptus crebra*, generally with *E. tereticornis* and *E. melliodora* ± *E. albens* grassy woodland (only at the far western edge of the bioregion);
- RE 13.3.1 – *Eucalyptus blakelyi* grassy woodland or open forest +/- *E. caliginosa* +/- *E. conica* +/- *E. bridgesiana* +/- *E. melliodora* on Cainozoic alluvial plains;
- RE 13.3.4 – *Eucalyptus conica*, *E. microcarpa* or *E. moluccana*, *E. melliodora* grassy woodland;
- RE 13.9.2 – *Eucalyptus moluccana* open forest;
- RE 13.11.2 – *Eucalyptus laevopinea, E. banksii, E. melliodora* open forest;
- RE 13.11.3 – *Eucalyptus crebra*, *E. dealbata*, *E. albens* grassy woodland;
- RE 13.11.4 – *Eucalyptus melanophloia*, *E. dealbata*, *E. albens* ± *Callitris glaucophylla* grassy woodland;

- RE 13.11.8 – Woodland of *E. melliodora* and/or *E. microcarpa*/*E. moluccana* on rolling hills, depressions, and lower slopes around drainage lines;
- RE 13.11.8a – *Eucalyptus woollsiana* or *E. moluccana* woodland in the west of the bioregion;
- RE 13.12.8 – Woodland of *E. melliodora* and/or *E. microcarpa*/*moluccana* +/- *conica*, on undulating plains and lower slopes in granite basins; and
- RE 13.12.9 – Woodland to open forest of *E. blakelyi* and/or *E. calignosa* or *E. mckieana* on plains and rolling hills in granite basins (TSSC 2006).

2.3.2.2 KNOWN DISTRIBUTION

White box-yellow box-Blakely's red gum grassy woodland and derived native grassland TEC is broadly distributed in an arc along the western slopes and tablelands of the Great Dividing Range, from southern Queensland through NSW to central Victoria (DCCEEW, 2023) (refer to Plate 2-6).

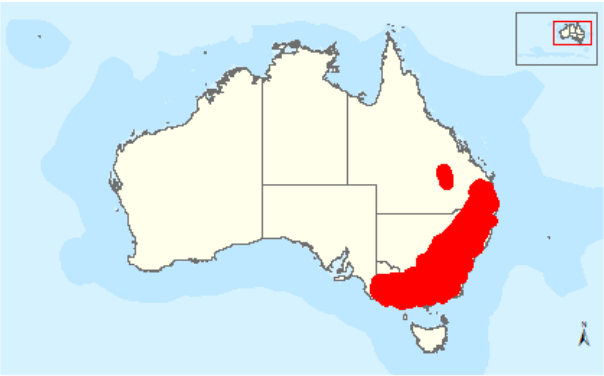

PLATE 2-6 DISTRIBUTION RANGE OF WHITE BOX-YELLOW BOX-BLAKELY'S RED GUM GRASSY WOODLAND AND DERIVED NATIVE GRASSLAND TEC

Source: DoE (2024)

2.3.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

The White box-yellow box-Blakely's red gum grassy woodland and derived native grassland TEC is predicted to occur within the Study Area and has been confirmed to occur within the Project footprint (refer to Figure 2-3).

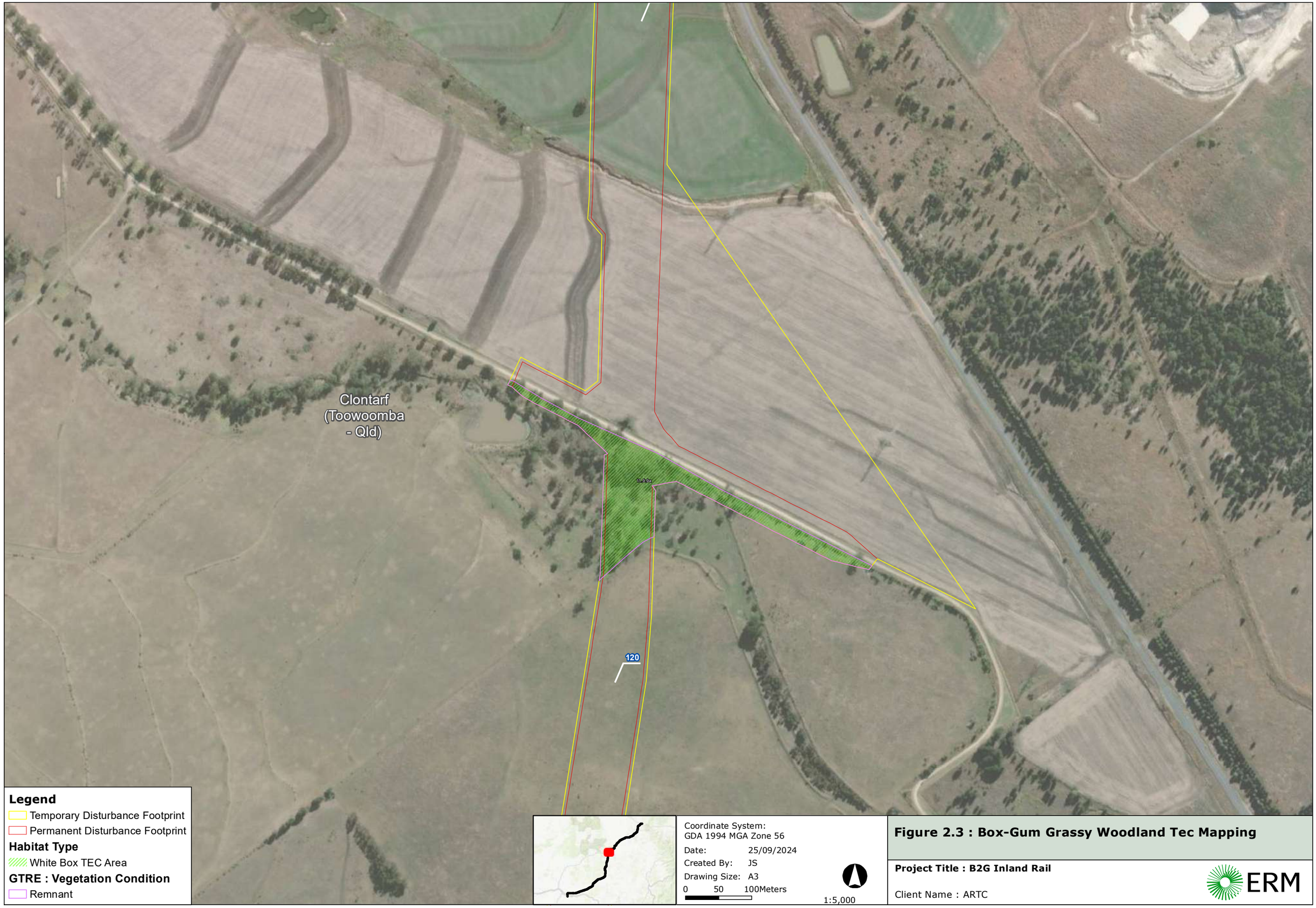

Figure 2.3 : Box-Gum Grassy Woodland Tec Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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2.3.3 THREATENING PROCESSES

The following have been identified as potentially threatening processes to White box-yellow box-Blakely's red gum grassy woodland and derived native grassland TEC:

- Habitat loss, degradation, and fragmentation as a result of agricultural, forestry, mining, infrastructure, and residential development;
- Degradation through over grazing and trampling by livestock;
- Degradation of remnants by non-native plant species;
- Increased nutrient status due to application of fertilisers to native groundcover;
- Altered fire regimes;
- Invasion of weed species;
- Hydrological changes, dryland salinity, soil erosion and acidification;
- Predation, hunting and persecution causing changes in the native faunal assemblage;
- Climate change (increase in severity of droughts and elevated temperatures);
- Tree dieback, senescence and lack of regeneration;
- Habitat simplification and removal of woody debris;
- Lack of community knowledge; and
- Human disturbance by off road vehicles, camping, other recreational activities (OEH 2017).

2.3.4 EPBC STATUTORY DOCUMENTS

The following recovery plan has been identified for this community:

- National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (DECCW, 2010).

The following threat abatement plans has been identified as being relevant for this community:

- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (DSEWPC, 2011); and
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (DoE, 2017).

2.3.5 PRIORTY RECOVERY AND THREAT ABATEMENT ACTIONS

Threats identified in the National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland include:

- Land use and management change;
- Agricultural and horticultural development;
- Public Infrastructure upgrades in travelling stock routes (TSRs);
- Firewood collection and 'tidying up';
- Changed fire regimes;
- Increase in soil nutrients and use of chemicals;
- Mowing and slashing regimes;
- Revegetation management;

- Weed invasion;
- Climate change;
- Salinity;
- Acid soils;
- Declining tree health and regeneration;
- Increased grazing pressure from invasive herbivores;
- Disease – Phytophthora cinnamomi; and
- Collection and removal of native flora.

Recovery actions identified in the National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland include:

- Collect baseline data on the locations, quality and management regimes of remnant sites;
- Extent and condition mapping;
- Component species surveys;
- Protection of existing habitat in priority areas including on private land; and
- Engagement with the community, particularly where remnants occur on private land to provide information on appropriate management and with Aboriginal communities.

Summary of baseline information actions undertaken to date:

- The establishment of databases comprising of information on CMN members (land managers with Box-Gum Grassy Woodland remnants), remnant locations, composition of flora and fauna species and remnant condition from surveys of CMN members' sites and other sites;
- Minimum condition criteria and assessment method developed to assist land managers in identification of listed ecological communities;
- Development of regional models using remote sensing;
- Mapping of Box-Gum Grassy Woodland extent; and
- Surveys conducted during research programs through various organisations.

The threats outlined in the threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads include:

- Predation by cane toads (*Rhinella marina*);
- Larval competition with frog tadpoles or mosquitoes;
- Parasite transfer;
- Competition for terrestrial food; and
- Competition for shelter sites.

Threat abatement actions for cane toads (*Rhinella marina*) include:

- $11 million in funding from the Australian Government provided for the development of a broad-scale control method;
- $9 million in funding from the Australian Government for research and management activities;
- Identification of native species, ecological communities and off-shore islands that are known to have a high to moderate risk;

- Identify the impacts that toads have on listed native species and ecological communities;
- Where the impact is expected to be high on native species and ecological communities establish support research techniques in aiding the recovery of priority native species and ecological communities; and
- Develop a prioritisation tool to aid in the direction of resources for the protection of native species and ecological communities.

The threats outlined in the threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) include:

- Impacts on plant species composition and succession;
- Alterations to nutrient, water cycling and water quality;
- Predation of native fauna and flora including small mammals, birds, reptiles, frogs, crayfish, eggs, invertebrates, fungi and all part of plants including fruit, seeds, roots, tubers, bulbs and foliage;
- Digging and disturbance to substrate resulting in the destruction of plants threatening their survival and recruitment of new plants altering the floral composition and soil structure; and
- Disturbance caused by pigs can increase the incursion and recruitment of weeds and provide reservoirs for endemic animal diseases.

Threat abatement actions for feral pics (*Sus scrofa*) include:

- Implementation of control measures including trapping, aerial and ground shooting, poisoning and fencing;
- Using tracking dogs to detect and flush out feral pigs by commercial harvesters;
- Manipulating habitat by reducing watering points and crop waste; and
- Manage feral pigs within a policy, legislative and planning framework.

The consequences of potential infection outlined in the threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi* include:

- Inability of infected plants to develop new shoots, flowers, fruit and seed;
- Complete loss of some flora populations;
- Dramatic alteration to the structure and composition of native plant communities;
- A severe reduction in primary productivity and functionality;
- Irreversible habitat loss and degradation of dependent flora and fauna; and
- Loss of shelter and nesting sites and food sources resulting in major declines of fauna.

Objectives and actions outlined in the threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi* include:

- Identifying and prioritising the protection of biodiversity assets that are, or may be, impacted by Phytophthora including listed threatened species, ecological communities and areas where non-listed species or ecological communities that may become eligible for listing under the EPBC Act occur;
- Reduce the spread and mitigate the impacts of Phytophthora to protect priority biodiversity assets and areas where non-listed species or ecological communities that may become eligible for listing under the EPBC Act;

- Inform the community through education on the impacts that Phytophthora has on biodiversity and actions to mitigate these impacts; and
- Encourage research on Phytophthora species and option to manage infestations and protect biodiversity assets.

2.3.6 REFERENCES

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2.4 SEMI-EVERGREEN VINE THICKETS OF THE BRIGALOW BELT (NORTH AND SOUTH) AND NANDEWAR BIOREGIONS

2.4.1 STATUS

EPBC Act – Endangered, effective 4 April 2001

2.4.2 ECOLOGY

2.4.2.1 CHARACTERISTIC AND DEFINING FEATURES

Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar bioregions TEC (SEVT TEC) is considered an extreme form of dry seasonal subtropical rainforest (DoE, 2024). The SEVT occurs in subtropical, seasonally dry climates where soils are of high to medium fertility. The SEVT TEC is generally characterised by the prominence of trees with microphyll sized leaves (2.5 – 7.5 cm long) and the presence of bottle trees (*Brachychiton* spp.) as emergents. Thickets typically have an uneven canopy, approximately 4 – 9 m high, with mixed evergreen, semi-evergreen and deciduous emergent tree species 9-18 m high and prominent vines (DCCEEW, 2023) (refer to Plate 2-7). The main canopy is dominated by rainforest species such as red olive plum (*Cassine australis* var. *angustifolia*), wilga (*Geijera parvifolia*), native olive (*Notelaea microcarpa* var. *microcarpa*) and peach bush (*Ehretia membranifolia*). Currant bush (*Carissa ovata*) is often present and typical vines include gargaloo (*Parsonsia eucalytophylla*) and wonga vine (*Pandorea pandorana*).

Within Queensland, the SEVT TEC predominantly occurs on undulating plains on fine grained sedimentary rocks and on basalt hills and plains, however the TEC also occasionally occurs on coastal dunes, quaternary alluvium, tertiary clay plains, old loamy and sandy plains or hills and lowlands on metamorphic rocks (DCCEEW, 2023).

PLATE 2-7 SEMI-EVERGREEN VINE THICKET TEC

In Queensland, SEVT TEC occurs within the following REs:

- RE 11.2.3 – Microphyll vine forest ("beach scrub") on sandy beach ridges;
- RE 11.3.11 – Semi-evergreen vine thicket on alluvial plains;
- RE 11.4.1 – Semi-evergreen vine thicket ± *Casuarina cristata* on Cainozoic clay plains;
- RE 11.5.15 – Semi-evergreen vine thicket on Cainozoic sand plains/remnant surfaces;
- RE 11.8.3 – Semi-evergreen vine thicket on Cainozoic igneous rocks;
- RE 11.8.6 – *Macropteranthes leichhardtii* thicket on Cainozoic igneous rocks;

- RE 11.8.13 – Semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks;
- RE 11.9.4 – Semi-evergreen vine thicket on Cainozoic fine-grained sedimentary rocks;
- RE 11.9.8 – *Macropteranthes leichhardtii* thicket on Cainozoic fine-grained sedimentary rocks; and
- RE 11.11.18 – Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism and folding (TSSC, 2001).

2.4.2.2 KNOWN DISTRIBUTION

Semi-evergreen vine thicket TEC extend from north-west of Townsville (QLD) to central northern NSW, within the Brigalow Belt North and South bioregions (refer to Plate 2-8). In Queensland, the remnant patches are scattered on rocky outcrops in the Einasleigh Uplands, as well as scattered from coastal dunes and river deltas through the northern and central parts of the Brigalow Belt Bioregion to the south-eastern parts between Jandowae and Killarney on the Queensland/NSW border (Queensland Herbarium, 2002; DCCEEW, 2023).

Throughout the TECs range, mean annual rainfall varies, with 500 – 900 mm in the northern distribution, 650 – 750 mm within the central to southern parts of its distribution (DCCEEW, 2023).

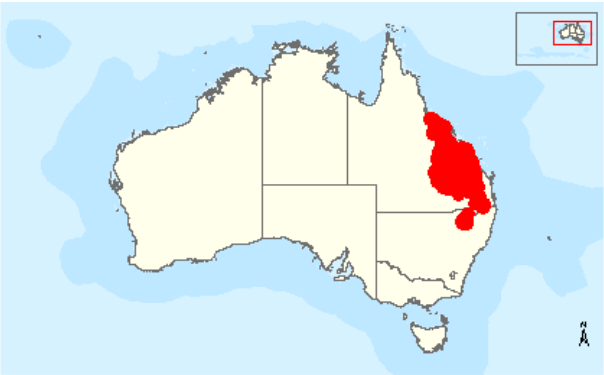

PLATE 2-8 DISTRIBUTION RANGE OF SEMI-EVERGREEN VINE THICKET TEC

Source: DoE (2024)

2.4.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

The semi-evergreen vine thicket TEC occurs within the region and a small area is known to occur just outside of the Project footprint (refer to Figure 2-4). The Project footprint has been refined to exclude areas of this TEC.

Figure 2.4 : SEVT TEC Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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2.4.3 THREATENING PROCESSES

The following have been identified as potentially threatening processes to semi-evergreen vine thicket TEC:

- Land clearing;
- Invasion of introduced weed species (i.e., buffel grass (*Cenchrus ciliaris*), green panic (*Megathyrsus maximus*) and Parthenium (*Parthenium hysterophorus*);
- Extensive trampling and grazing by livestock;
- Invasion of pest animal species (i.e., foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*) and cane toads (*Rhinella marina*));
- Human disturbance through coastal development;
- Loss of climatic habitat through anthropogenic emissions of greenhouse gasses; and
- Climate change – drought and increased temperatures affecting the ability to flower, set seed and regenerate (DCCEEW, 2023).

2.4.4 EPBC STATUTORY DOCUMENTS

The following recovery plan has been identified as being relevant for this community:

- National recovery plan for the "Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions" ecological community (McDonald, 2010).

The following threat abatement plans have been identified as being relevant for this community:

- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (DSEWPC, 2011); and
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (DoE, 2017).

2.4.5 PRIORTY RECOVERY AND THREAT ABATEMENT ACTIONS

The threats outlined in the National recovery plan for the "Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions" ecological community include:

- Broad-scale land clearing of remnant vegetation;
- Fire where SEVT is not protected by topography or substrate and where fuel characteristics have been altered by the introduction of introduced pasture grasses;
- Incursion by exotic flora including buffel grass (*Pennisetum ciliare*), green panic (*Megathyrsus maximus* var. pubiglumis), parthenium weed (*Parthenium hysterophorus*), velvet tree pear (*Opuntia tomentosa*), lantana (*Lantana camara*), rubber vine (*Cryptostegia grandiflora*) and Brazilian nightshade (*Solanum seaforthianum*). Of these, lantana and rubber vine poses the most serious threat to this TEC;
- Trampling from cattle grazing opening up the understorey of SEVT habitat facilitating the incursion of invasive flora;
- Invertebrate pest species including feral pigs, foxes, rabbits and cane toads impacting the vegetation structure and associated native fauna; and
- Coastal development where remnant vine thicket occurs on coastal beach ridges.

Threat abatement actions outlined in the National recovery plan for the "Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions" ecological community include:

- Identify and evaluate the extent, biodiversity value and condition of remnant and regrowth areas of this TEC in the Brigalow Belt (North and South) and Nandewar Bioregions;
- Complete mapping of this TEC in New South Wales and refine mapping of remnants in Queensland;
- Establish a condition assessment methodology establishing benchmark sites for each component regional ecosystem;
- Determine the extent and condition of SEVT areas that have been impacted by invasive flora, particularly weeds of national significance;
- Survey data deficient species within SEVT communities;
- Identify key ecosystem components and processes determining their response to management actions;
- Monitor selected populations of EPBC-Act listed species that occur within SEVT communities including *Cadellia pentastylis*, *Cossinia australiana*, *Denhamia parvifolia*, *Macropus dorsalis*, *Paradelma orientalis*, *Turnix melanogaster* and *Zieria verrucose*;
- Establish a comprehensive, adequate and representative system of SEVT ecological community across the Brigalow Belt (North and South) and Nandewar Bioregions, protected by either reservations or conservation agreements (including MOU's);
- Ensure best practice management to sites containing SEVT;
- Involve landholders and community members in the conservation and management of SEVT ecological communities; and
- Enhance the ability of government and non-government organisations at the national, regional and local level (including consent authorities) to recognise and incorporate SEVT ecological community conservation issues into all planning processes.

The threats outlined in the threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads include:

- Predation by cane toads;
- Larval competition with frog tadpoles or mosquitoes;
- Parasite transfer;
- Competition for terrestrial food; and
- Competition for shelter sites.

Threat abatement actions for cane toads (*Rhinella marina*) include:

- $11 million in funding from the Australian Government provided for the development of a broad-scale control method;
- $9 million in funding from the Australian Government for research and management activities;
- Identification of native species, ecological communities and off-shore islands that are known to have a high to moderate risk;
- Identify the impacts that toads have on listed native species and ecological communities;

- Where the impact is expected to be high on native species and ecological communities establish support research techniques in aiding the recovery of priority native species and ecological communities; and
- Develop a prioritisation tool to aid in the direction of resources for the protection of native species and ecological communities.

The threats outlined in the threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) include:

- Impacts on plant species composition and succession;
- Alterations to nutrient, water cycling and water quality;
- Predation of native fauna and flora including small mammals, birds, reptiles, frogs, crayfish, eggs, invertebrates, fungi and all part of plants including fruit, seeds, roots, tubers, bulbs and foliage;
- Digging and disturbance to substrate resulting in the destruction of plants threatening their survival and recruitment of new plants altering the floral composition and soil structure; and
- Disturbance caused by pigs can increase the incursion and recruitment of weeds and provide reservoirs for endemic animal diseases.

Threat abatement actions for feral pics (*Sus scrofa*) include:

- Implementation of control measures including trapping, aerial and ground shooting, poisoning and fencing;
- Using tracking dogs to detect and flush out feral pigs by commercial harvesters;
- Manipulating habitat by reducing watering points and crop waste; and
- Manage feral pigs within a policy, legislative and planning framework.

2.4.6 REFERENCES

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023). Conservation Advice for Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions. Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/24-conservation-advice.pdf. In effect under the EPBC Act from 31-Aug-2023.

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3. FLORA SPECIES

3.1 AUSTRAL CORNFLOWER (*RHAPONTICUM AUSTRALE*)

3.1.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.1.2 BIOLOGY AND ECOLOGY

3.1.2.1 CHARACTERISTIC

Austral cornflower (*Rhaponticum australe*) is an erect perennial herb that grows to 60 cm in height (refer to Plate 3-1). The branches are slightly woolly. Leaves are oblanceolate and toothed to deeply pinnatifid. The lower leaves are up to 18 cm long and 6 cm wide, reducing in size up the stem. The upper leaves are few, small and nearly sessile (DoE, 2024).

PLATE 3-1 AUSTRAL CORNFLOWER (*RHAPONTICUM AUSTRALE*)

Source: Queensland Herbarium (2007)

3.1.2.2 KNOWN DISTRIBUTION

The known distribution for Austral cornflower is currently confined to Queensland. Historically, the species was known to occur in NSW and Victoria, however is now presumed extinct in both states. The current distribution of Austral cornflower extends from Allora (north of Warwick) to Callide (north-west of Biloela) in Queensland (DoE, 2024) (refer to Figure 3-1).

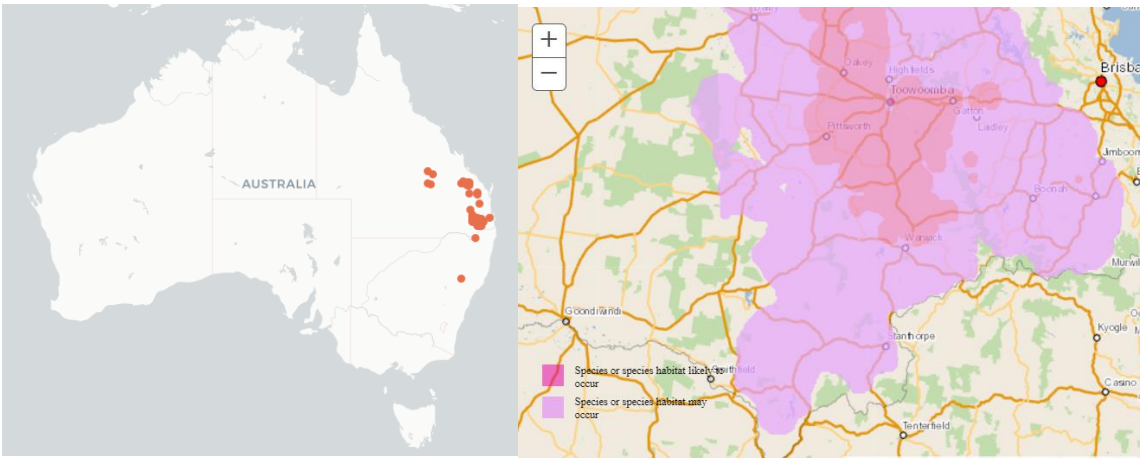

PLATE 3-2 DISTRIBUTION RANGE OF THE AUSTRAL CORNFLOWER

Source: ALA (2024); DoE (2024)

3.1.2.3 DISTRIBUTION IN RELATION TO PROJECT

Austral cornflower has been identified within the Project during field surveys including RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup 2016; Aurecon 2018). ALA database records do not reveal any specimen backed records within the Project disturbance footprint, however, there are several records within the Study Area. The most recent record within the Study Area was recorded in 2023, located in Southbrook, approximately 2 km south of the alignment section. Several records of the species exist within the alignment, notably at the Gore Highway and Tip Road junction (west of Pittsworth), recorded in 2003; north of the alignment at Draper Road (approximately 4 km west of Gowrie township), recorded in 2012. Additionally, numerous records exist within a 50 km radius of the Project, occurring as far north as Jondaryan, east to Helidon Spa, south to Allora and west to Pittsworth (refer to Plate 3-2).

The species is predicted to occur within the Study Area and has been confirmed as present within the Project footprint.

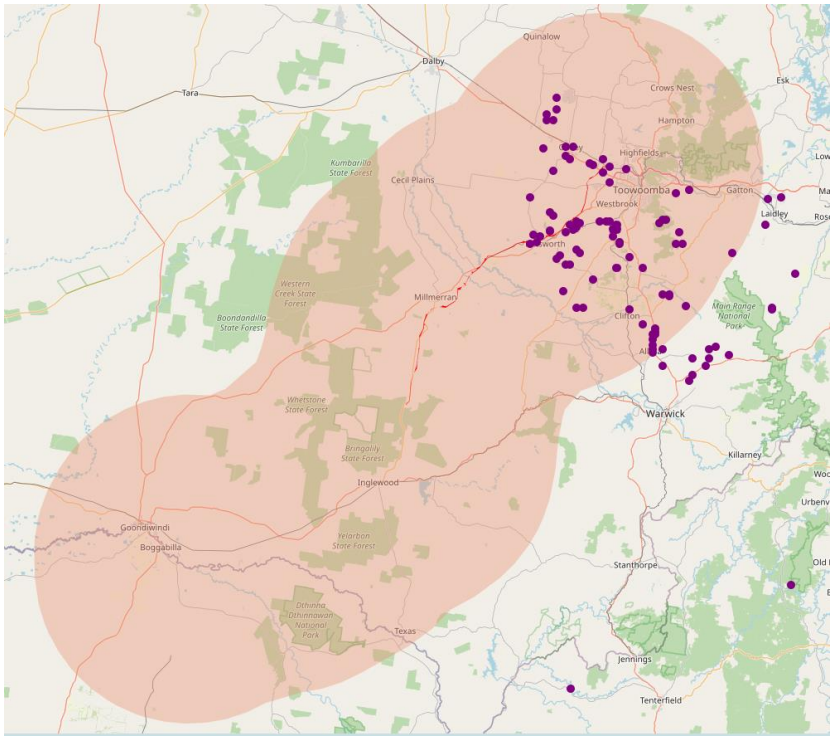

PLATE 3-3 DISTRIBUTION RANGE OF THE AUSTRAL CORNFLOWER IN RELATION TO THE PROJECT

Source: ALA (2024)

3.1.2.4 BIOLOGY AND REPRODUCTION

The species fruits and flowers from spring to autumn, however dead flowering stems can remain on the plant for several months after the seeds have dispersed (DoE, 2024).

3.1.3 HABITAT

Austral cornflower typically grows in Eucalypt open forests, with grassy understory. Typical Eucalypt woodland favourable to the Austral cornflower includes those in association with narrow-leaved ironbark (*Eucalyptus crebra*), mountain coolibah (*E. orgadophila*), poplar box (*E. populnea*), forest red gum (*E. tereticornis*), silver-leaved ironbark (*E. melanophloia*), broad-leaved apple (*Angophora subvelutina*), and rough-barked apple (*A. floribunda*). This species often occurs on roadsides and on road reserves alongside Rhodes grass (*Chloris gayana*), spear thistle (*Cirsium vulgare*), Queensland bluegrass (*Dichanthium sericeum*) and kangaroo grass (*Themeda triandra*) on black clay soil derived from basalt.

Preferred habitat for Austral cornflower includes areas where grass competition has been reduced by fire, or other forms of disturbance, as the species is considered a poor competitor. However, Austral cornflower is unlikely to benefit from disturbance that allows the development of a dense cover of exotic grasses (DoE, 2024).

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons.

For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. No Essential Habitat for this species occurs within the Project footprint. Austral cornflower has been mapped within the Project footprint, as per Figure 3-1.

Figure 3.1 : Austral Cornflower Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 3.1 : Austral Cornflower Habitat Mapping

Project Title : B2G Inland Rail

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Biddeston

Athol

189

Linthorpe

Southbrook

185

Umbiram

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Regrowth

Remnant

ARTC Records

Raponticum australe

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

1:25,000

Figure 3.1 : Austral Cornflower Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

3.1.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the Austral cornflower:

- Woodland clearing for agriculture and urban development and livestock grazing has caused the local extinction of the Austral Cornflower in Victoria and NSW; and
- The invasion of exotic grass species into Austral Cornflower habitat may also threaten extant populations. As most populations occur on highly disturbed roadsides, they must compete with introduced species including Johnson grass (*Sorghum halepense*), paspalum (*Paspalum dilatatum*), Rhodes grass (*Chloris gayana*) and other weedy forbs (DoE, 2024).

3.1.5 EPBC STATUTORY DOCUMENTS

There is no threat abatement plan or recovery plan identified as relevant for this species. A recovery plan is not required for the species. The species conservation advice is as follows:

- Approved Conservation Advice for *Stemmacantha australis* (Austral Cornflower) (DEWHA, 2008).

3.1.6 PRIORTY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice (DEWHA, 2008) lists the following recovery actions as relevant:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Identify populations of high conservation priority;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate and vegetation disturbance in areas where austral cornflower occurs do not adversely impact on known populations;
  - Control access routes to suitably constrain public access to known sites on public land.
  - Suitably control and manage access on private land;
  - Minimise adverse impacts from land use at known sites; and
  - Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.
- Invasive weeds:
  - Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on austral cornflower;
  - Identify and remove weeds in the local area, which could become a threat to austral cornflower, using appropriate methods; and
  - Manage sites to prevent introduction of invasive weeds, which could become a threat to austral cornflower, using appropriate methods.

- Trampling, browsing or grazing:
  - Develop and implement a stock management plan for roadside verges and travelling stock routes;
  - Ensure that livestock grazing uses an appropriate management regime and density that does not detrimentally affect this species; and
  - Manage total grazing pressure from stock and rabbits at important sites through exclusion fencing or other barriers.
- Conservation information:
  - Raise awareness of austral cornflower within the local community; and
  - Establish and/or maintain partnerships with private landholders and managers of land on which populations occur to ensure appropriate conservation.
- Enable recovery of additional sites and/or populations:
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

3.1.7 REFERENCES

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3.2 AUSTRAL TOADFLAX (*THESIUM AUSTRALE*)

3.2.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.2.2 BIOLOGY AND ECOLOGY

3.2.2.1 CHARACTERISTIC

Austral toadflax (*Thesium australe*) is a small, straggling perennial herb growing to 40 cm tall. The plant features pale green to yellow-green, approximately 1 – 4 cm long and 0.5 – 1.5 mm wide (refer to Plate 3-4).

Flowers are minute and white, emerging where the leaves meet the stems and appearing in spring and summer (DoE, 2013). The fruit is small and nut-like, developing in summer. This species is often hidden amongst grasses and herbs (OEH, 2017).

PLATE 3-4 AUSTRAL TOADFLAX (*THESIUM AUSTRALE*)

Source: Hunter (2018)

3.2.2.2 KNOWN DISTRIBUTION

Austral toadflax occurs in NSW, the Australian Capital Territory, Queensland and Victoria (refer to Plate 3-5) (DoE, 2013). It is also known from eastern Asia. The species current distribution is sporadic yet widespread, occurring between the Bunya Mountains in south-east Queensland to north-east Victoria and as far inland as the southern, central and northern tablelands in NSW and the Toowoomba region (QLD) (DoE, 2024).

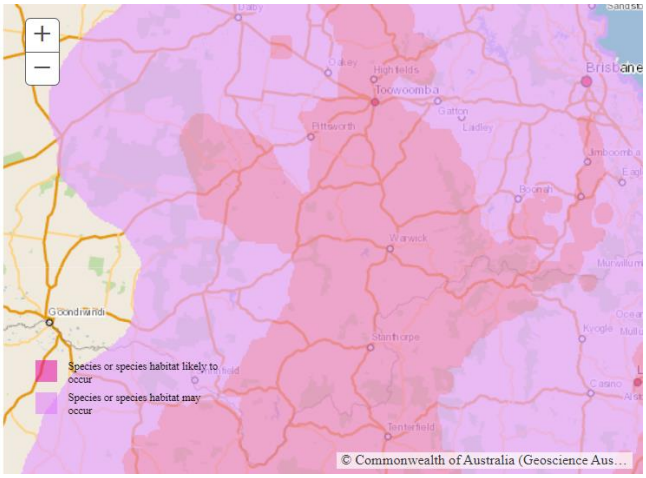

PLATE 3-5 DISTRIBUTION RANGE OF THE AUSTRAL TOADFLAX

Source: ALA (2024); DoE (2024)

3.2.2.3 DISTRIBUTION IN RELATION TO PROJECT

Austral toadflax was not identified within any Project-associated field surveys including limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup, 2016; Aurecon, 2018). ALA database records do not reveal any specimen backed records within the Project disturbance footprint or Study Area. The nearest records in relation to the Project are located in Highfields, approximately 10 km north-east of the north-eastern portion of the Project footprint and were recorded in 2022 and two in 2021. Numerous additional records are located in the Toowoomba region, within 15 km of the Project footprint (ALA, 2024).

The most recent record within 50 km of the Project was recorded in 2012, within the Tabletop Bushland Reserve, approximately 18 km east of the north-eastern portion of the Project.

Additionally, there are numerous, scattered records of the species located within 50 km of the Project, within the area of Bowenville, Grapetree (north of the Project), Gatton (east of the Project), Allora (south of the Project), and Ellangowan (west of the Project) (refer to Plate 3-6) (ALA, 2024).

A recent record of the species has been recorded in 2023, however this record is located slightly north-west of Warwick and approximately 73 km east of the Project.

Austral toadflax is predicted to occur within the Study Area, and whilst the species is not confirmed to occur within the Project footprint, suitable habitat is present. As such, the species is considered likely to occur within the Project footprint.

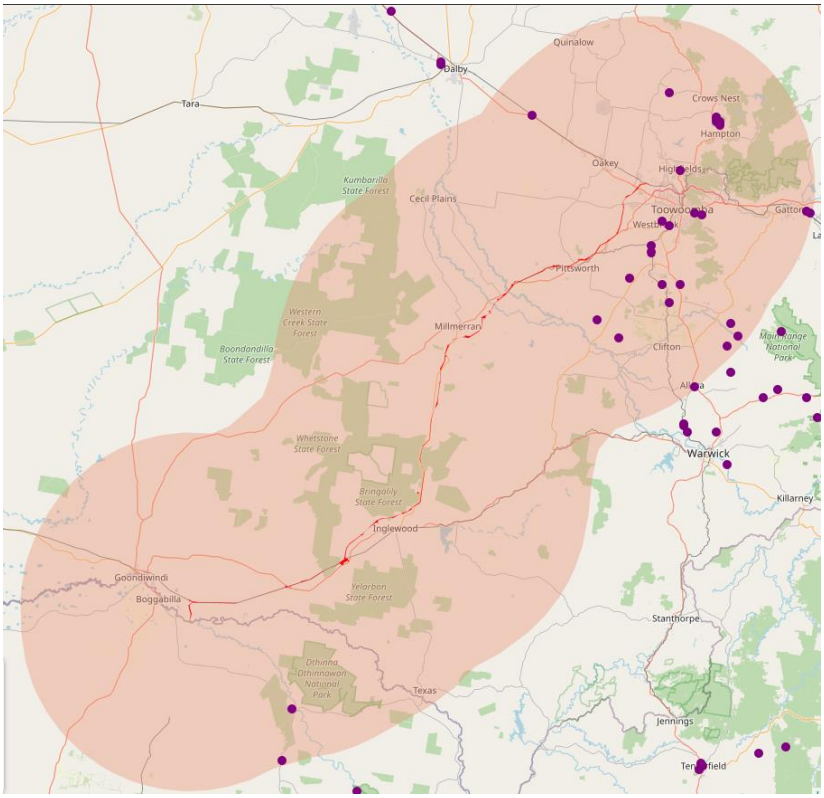

PLATE 3-6 DISTRIBUTION RANGE OF THE AUSTRAL TOADFLAX IN RELATION TO THE PROJECT

Source: ALA (2024)

3.2.2.4 BIOLOGY AND REPRODUCTION

In coastal habitats, the species persists, flowers and fruits throughout the year, living longer than two (2) years (DoE, 2024). Whereas in habitats of higher altitudes including subalpine and tableland climates, flowering and fruiting is restricted to the summer season, with the species dying back to rootstock and resprouting during spring (DoE, 2024). Austral toadflax has the ability to resprout following direct disturbance due to buds near the soil surface. The species is known to germinate well following fire, although this is not an essential requirement in species germination (DoE, 2024).

3.2.3 HABITAT

Austral toadflax occurs in subtropical, temperate, and subalpine climates over a wide range of altitudes, particularly within shrubland, grassland, woodland or damp sites (DoE, 2024). The species occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils, including black clay loams to yellow podzolics and peaty loams (DoE, 2024). The species is considered semi-parasitic on roots of other grass species, notably kangaroo grass (*Themeda triandra*).

Vegetation types include open grassy heath dominated by swamp myrtle (*Leptospermum myrtifolium*), small-fruit hakea (*Hakea microcarpa*), alpine bottlebrush (*Callistemon sieberi*), woolly grevillea (*Grevillea lanigera*), coral heath (*Epacris microphylla*) and *Poa* spp., kangaroo grass (*Themeda triandra*) grassland surrounded by Eucalypt woodland and grassland dominated by barbed-wire grass (*Cymbopogon refractus*) (DoE, 2024).

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons. For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. No Essential Habitat for this species occurs within the Project footprint. Austral toadflax has been mapped within the Project footprint, as per Figure 3-2.

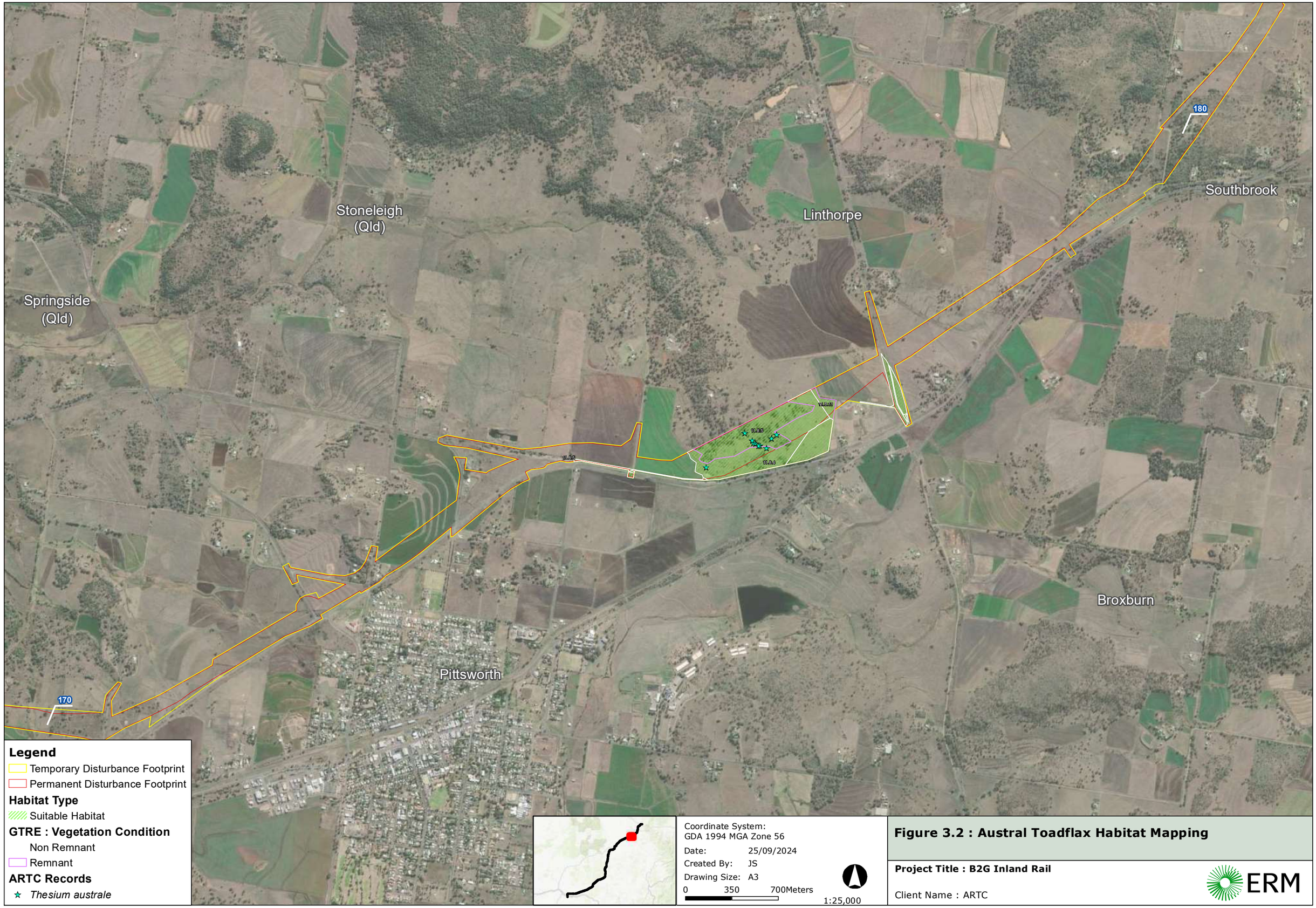

Figure 3.2 : Austral Toadflax Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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3.2.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the Austral toadflax:

- Lack of fire/disturbance;
- Existing and intensified grazing by livestock, native herbivores and feral herbivores;
- Residential, infrastructure and agricultural development;
- Weed invasion, particularly blackberry (*Rubus* spp.); and
- Infrastructure (road and rail) maintenance (DoE, 2024).

3.2.5 EPBC STATUTORY DOCUMENTS

There is no adopted or made recovery plan for Austral toadflax, and there is no recovery plan required as the approved Conservation Advice is an effective, efficient, and responsive document to guide the implementation of priority management actions. The species conservation advice is as follows:

- Approved Conservation Advice for *Thesium australe* (austral toadflax) (DoE, 2013).

The following threat abatement has been identified as being relevant for this species:

- Threat abatement plan for competition and land degradation by rabbits (DoEE, 2016).

3.2.6 PRIORTY RECOVERY AND THREAT ABATEMENT ACTIONS

Threats identified in the Threat abatement plan for competition and land degradation by rabbit relevant to Austral toadflax include:

- Preventing plant regeneration;
- Overgrazing and general damage to plant species;
- Reversing the normal processes of plant succession; and
- Altering ecological communities and changing soil structure and nutrient cycling, leading to significant erosion.

Relevant management strategies for Austral toadflax include population control. Following the threat abatement plan, control efforts should be:

- Targeted to protect sites where rabbits pose the greatest threat to biodiversity;
- Undertaken in a strategic manner to take advantage of the environmental conditions and other complementary activities; and
- Monitored to ensure that objectives are met and allow management options to be adapted to changing circumstances.

3.2.7 REFERENCES

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3.3 BELSON'S PANIC (*HOMOPHOLIS BELSONII*)

3.3.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.3.2 BIOLOGY AND ECOLOGY

3.3.2.1 CHARACTERISTIC

Belson's panic (*Homopholis belsonii*) is a perennial grass capable of growing up to 0.5 m high, with leaf ligule ranging from 0.8 to 1.5 mm and long leaf blades spanning between 2 – 4.5 mm in width (refer to Plate 3-7). The leaves are often glabrous, however, they occasionally feature ciliates at the base (DEWHA, 2008; OEH, 2017). The lowermost branch commonly features two to three laterally compressed spikelet, approximately 4.8 to 8 mm long, whilst the inflorescence and the primary branches with hairy axils both reach a length of 8 to 15 cm (DoE, 2024).

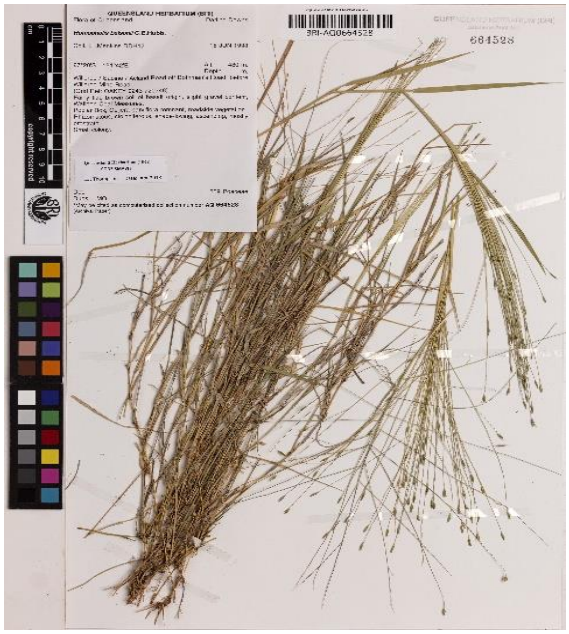

PLATE 3-7 BELSON'S PANIC (*HOMOPHOLIS BELSONII*)

Source: QLD Herb (2018)

3.3.2.2 KNOWN DISTRIBUTION

Belson's panic occurs within the southern Brigalow Belt in Queensland, and the north-western slops and plains for NSW (DEWHA, 2008). Within Queensland, the species occurs in the Darling Downs, west of Toowoomba, Oakey and Millmerran, and further west to Miles and Roma. In Queensland, Belson's panic has been identified to cover an area of over 80,000 km^2 (DoE, 2024) (refer to Plate 3-8).

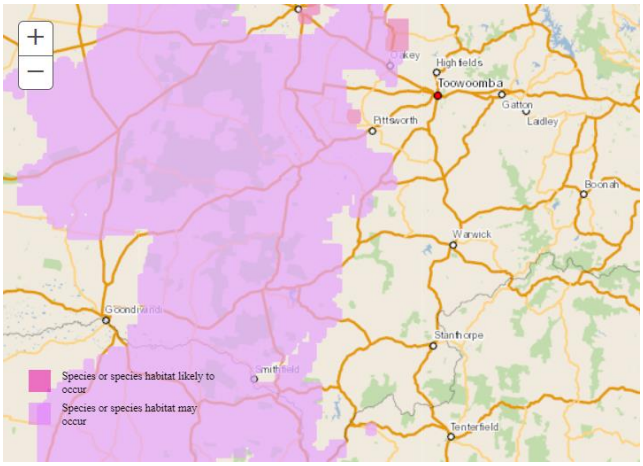

PLATE 3-8 DISTRIBUTION RANGE OF BELSON'S PANIC

Source: ALA (2024), DoE (2024)

3.3.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

The species is known to occur within the Study Area and within the Project footprint due to direct observations between Bringalily and Millmerran from the 2018 field surveys. The species was not recorded during the limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup, 2016). There are no desktop records of the species within the Project footprint, however the species does occur within Study Area. Two species records were contributed to the database following the 2018 field investigations by FFJV. Of which, one was recorded along Millmerran-Inglewood Road, between Paton and Nicol Creek Road, at which more than 100 individuals were recorded growing in large clumps; with the other record located at the junction of Owens Scrub Road and Lovell Road (south-east of Millmerran).

Additionally, ALA database records indicate two additional records within the MNES Study Area, of which, one was recorded between Lovell Road and Lindenmayer Road in 2002; with the other recorded along Yarranlea Road in 2016 (refer to Plate 3-9). Two recent records from 2021 and 2023 are present at the southern end alignment (ALA, 2023; DES, 2023).

There are numerous additional records within 50 km of the Project footprint, including in Bendidee State Forest, Millmerran, and the area surrounding Jondaryan and Acland.

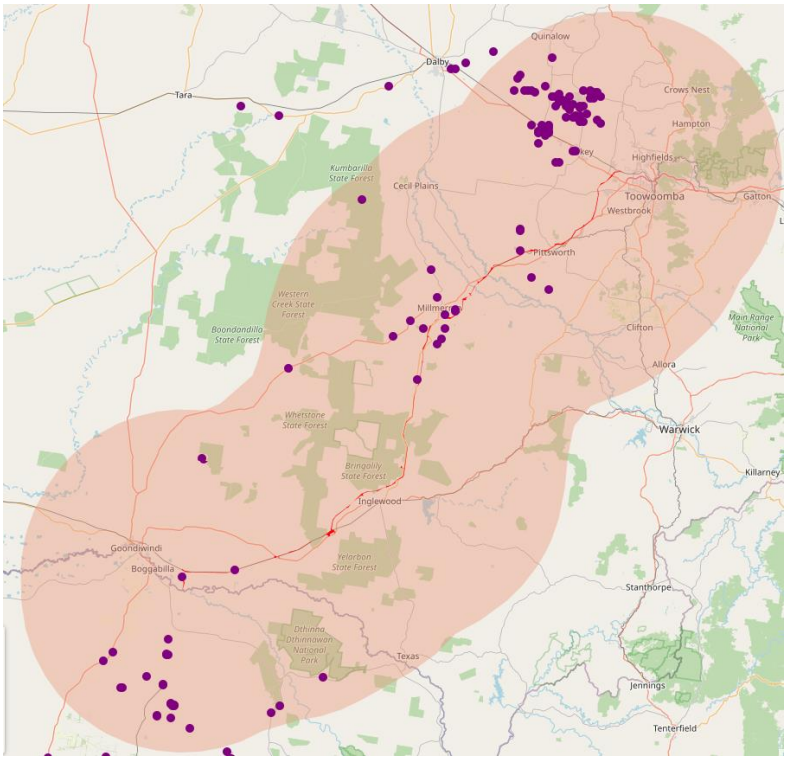

PLATE 3-9 DISTRIBUTION RANGE OF BELSON'S PANIC IN RELATION TO THE PROJECT

Source: ALA (2024)

3.3.2.4 BIOLOGY AND REPRODUCTION

Belson's panic is known to occur in isolated areas of remnant vegetation with an ability to recolonise cleared or highly disturbed environments. The species is often found in regenerating vegetation along roadsides in sufficiently large populations producing seeds, despite viability time not known (DoE, 2024).

Flowering of the species usually occurs between February to May and possibly in November to December as fruiting has been recorded in February. Belson's panic has indicated the ability to germinate readily without the need for a dormancy period and dispersal through wind occurs when panicles dry after seed formation (DoE, 2024).

3.3.3 HABITAT

Belson's panic occurs at elevations ranging from 200 – 520 m above sea level in NSW and at elevations ranging from 342 – 500 m above sea level in Queensland (DoE, 2024).

The three general habitat types supporting Belson's panic include:

- Rocky, basaltic hills featuring white box (*E. albens*) and Wilga (*Geijera parviflora*) woodlands with various shrub and grass species, where the species grows at the base of trees and shrubs, among the fallen timber; as well as among branches and leaves at ground level or along the bottom of netting fences;
- Flat to gently undulating alluvial areas supporting belah (*Casuarina cristata*) forests and occasionally brigalow (*Acacia harpophylla*), myall (*A. melvillei*), weeping myall (*A. pendula*), and mountain coolibah (*E. orgadophila*) communities; and
- Drainage lines featuring belah (*Casuarina cristata*) and sandy country dominated by cypress pine-bloodwood-ironbark-she-oak forest (DEWHA, 2008; DoE, 2024).

Belson's panic grows best in shadier environments, typically beneath or between trees, in the soils and plant communities of poplar box (*E. populnea*) woodlands. Additionally, the species has been recorded to occur on roadsides.

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons. For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. Areas mapped as Essential Habitat for this species were also included. Habitat mapping for this species within the Project footprint is presented in Figure 3-3.

Figure 3.3 : Belson's Panic Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 3.3 : Belson's Panic Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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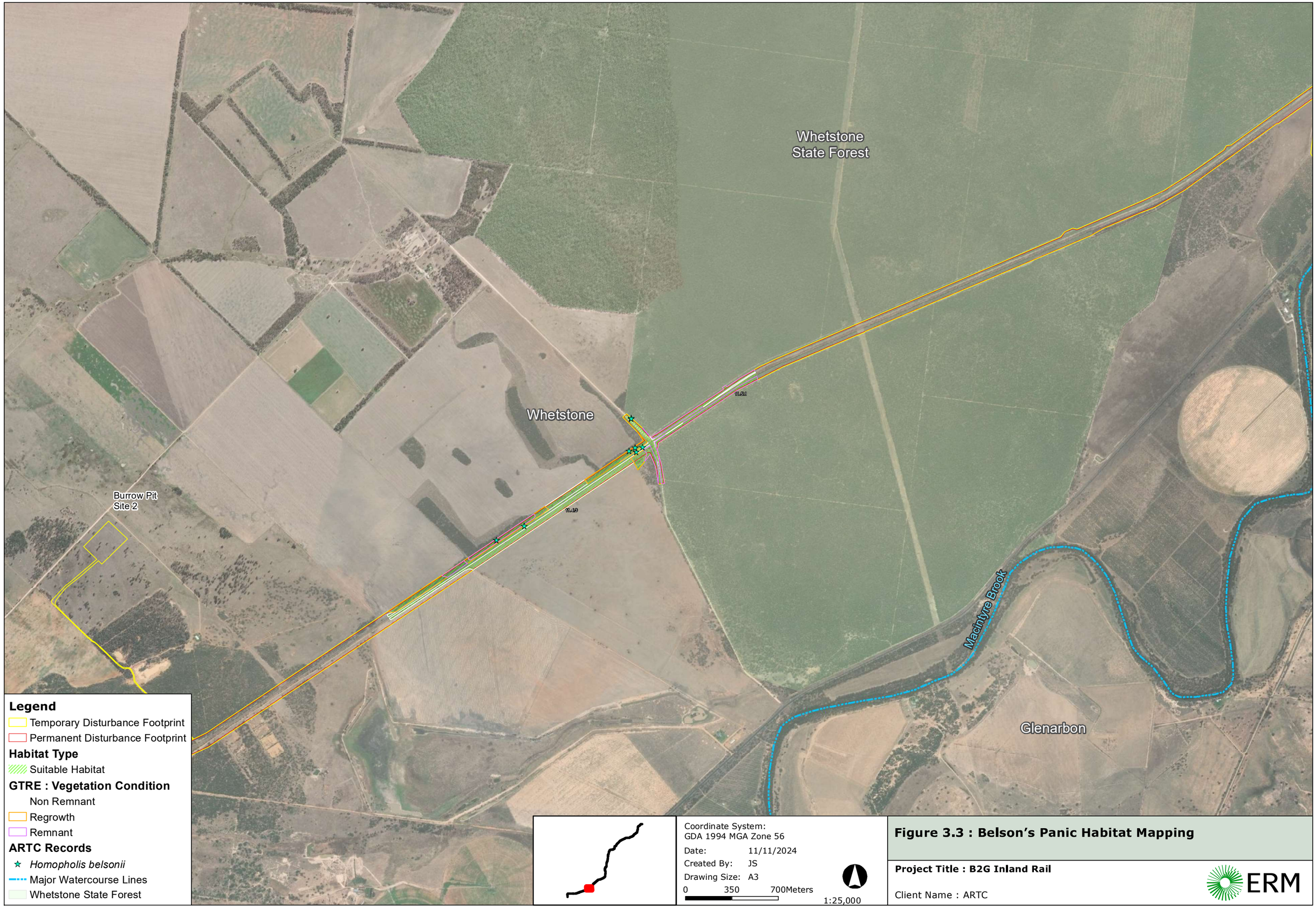

Figure 3.3 : Belson's Panic Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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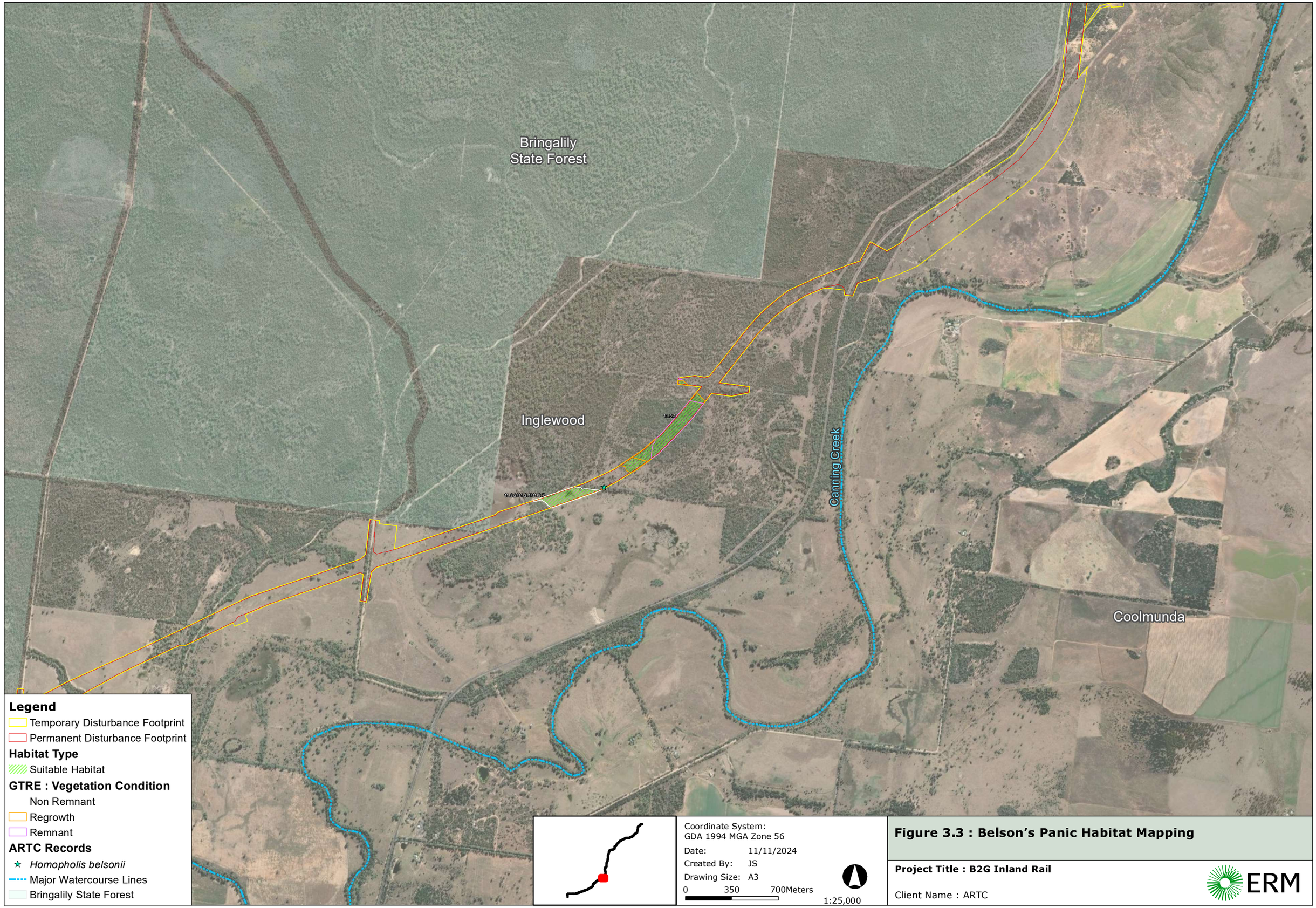

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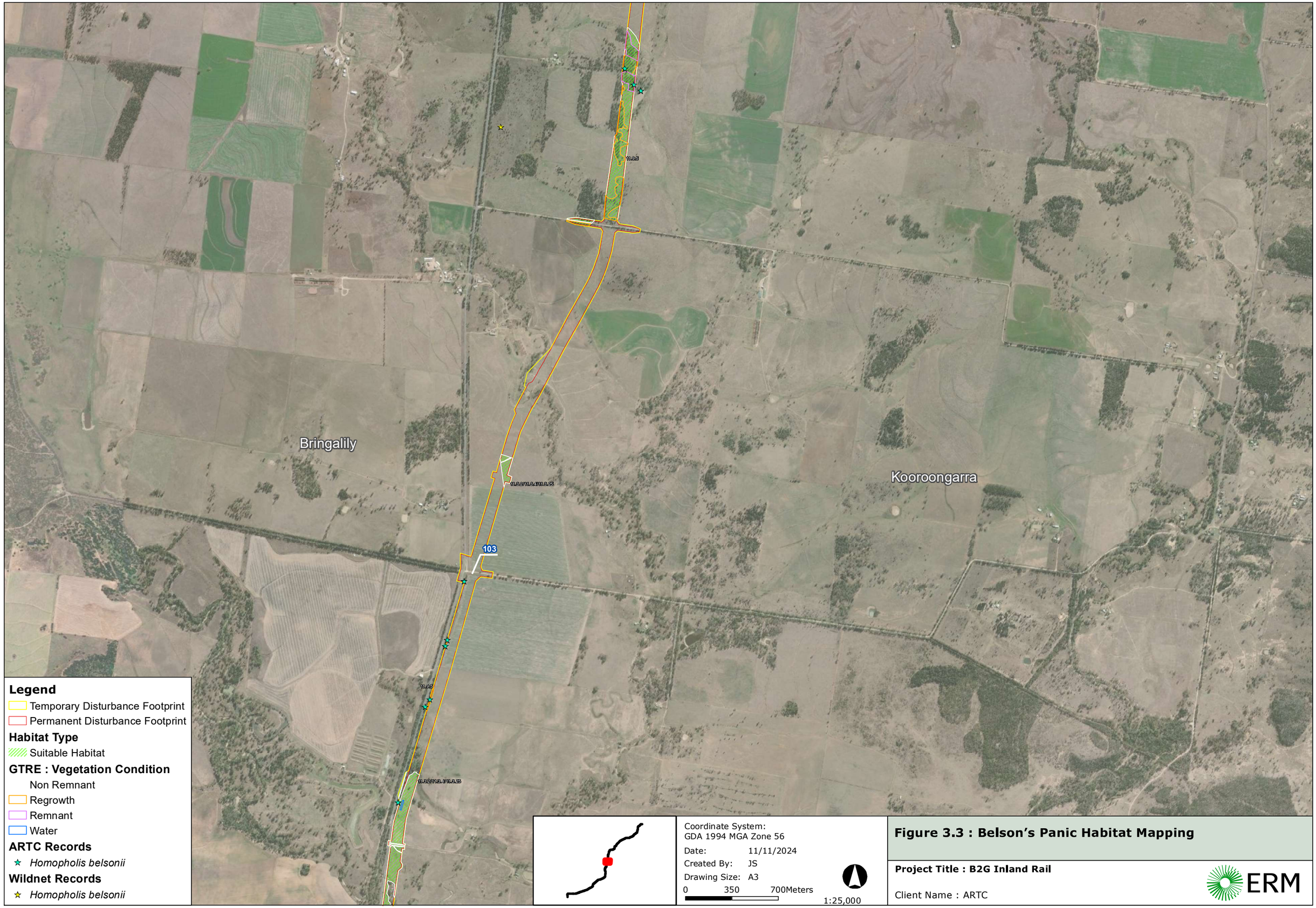

Figure 3.3 : Belson's Panic Habitat Mapping

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Figure 3.3 : Belson's Panic Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Captains Mountain

Domville

Grays Gate

Borrow Pit Site 6A

Clontarf (Toowoomba - Qld)

Borrow Pit Site 6B

Millwood

Lavelle

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Regrowth

Remnant

ARTC Records

Homopholis belsonii

Wildnet Records

Homopholis belsonii

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024

Created By: JS

Drawing Size: A3

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Figure 3.3 : Belson's Panic Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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ERM_ANZ_2023_A3_Landscape_MNES.mxd

Millmerran

Domville

Clontarf (Toowoomba - Qld)

Grays Gate

123

122

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Regrowth

Remnant

ARTC Records

Homopholis belsonii

Wildnet Records

Homopholis belsonii

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 3.3 : Belson's Panic Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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St Helens (Toowoomba - Qld)

Springside (Qld)

Brookstead

Yarranlea

Pittsworth

Scrubby Mountain

166

167

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Remnant

Wildnet Records

Homopholis belsonii

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

1:25,000

Figure 3.3 : Belson's Panic Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

3.3.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to Belson's panic:

- Habitat clearing for agriculture, mining development and/or pasture improvement;
- Overgrazing by domestic stock;
- Invasion of habitat by introduced species, including green panic grass (*Panicum maximum var. trichoglume*). Weed invasion may be driven by grazing and soil compaction from cattle production (including dairy);
- Herbicide application may poison Belson's panic;
- Development including roadworks;
- Rubbish dumping and collection of firewood; and
- Encroachment of native vegetation impacting survival and reproduction in locations (OEH, 2017; DoE, 2024).

3.3.5 EPBC STATUTORY DOCUMENTS

There is no adopted or made recovery plan for Belson's Panic and there is no recovery plan required. The species conservation advice is as follows:

- Approved Conservation Advice for *Homopholis belsonii* (DEWHA, 2008).

3.3.6 PRIORTY RECOVERY AND THREAT ABATEMENT ACTIONS

The conservation advice for Belson's panic identifies two priority management sites in NSW:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Identify populations of high conservation priority;
  - Manage any other known, potential or emerging threats;
  - Ensure fertilisers used in agriculture, and chemicals or other mechanisms used to eradicate weeds, do not have a significant adverse impact on *Homopholis belsonii*; and
  - Ensure road widening and maintenance and mining activities (or other infrastructure or development activities) involving substrate or vegetation disturbance in areas where *H. belsonii* occurs do not adversely impact on known populations.
- Invasive weeds:
  - Develop and implement a management plan for the control of invasive weeds such as green panic grass (*Panicum maximum var. trichoglume*), Coolatai grass (*Hyparrhenia hirta*) and tiger pear (*Opuntia aurantiaca*) in the local region.
- Trampling, browsing or grazing:
  - Develop and implement a stock management plan for roadside verges and travelling stock routes.
- Conservation information:
  - Raise awareness of *H. belsonii* within the local community.

- Enable recovery of additional sites and/or populations:
  - Undertake appropriate seed collection and storage; and
- Investigate options for linking, enhancing or establishing additional populations.

3.3.7 REFERENCES

Atlas of Living Australia (2024). *Homopholis belsonii*. Available from: https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2912755#overview [Accessed 17 January 2024].

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3.4 BLUEGRASS (*DICHANTHIUM SETOSUM*)

3.4.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.4.2 BIOLOGY AND ECOLOGY

3.4.2.1 CHARACTERISTIC

Bluegrass (*Dichanthium setosum*) is an erect perennial grass growing to 1 m tall, with hairless leaves approximately 2 – 3 mm in width. The plant produces cylindrical, densely hairy, clustered flowers which grow in pairs at the end of an 8 cm stem (refer to Plate 3-10; DEWHA, 2008). Flowers generally appear during summer (DoE, 2024). The species typically forms pure swards, however may occur as scattered clumps (DoE, 2024).

PLATE 3-10 BLUEGRASS (*DICHANTHIUM SETOSUM*)

Source: Rose (2013)

3.4.2.2 KNOWN DISTRIBUTION

Bluegrass is restricted to inland Queensland and New South Wales, however, unconfirmed reports suggest the species may occur in Western Australia and Tasmania (DoE, 2024). In Queensland, bluegrass occurs within the Leichhardt, Morton, North Kennedy and Port Curtis regions (refer to Plate 3-11; DEWHA, 2008). Additionally, bluegrass occurs in the Mistake Range, in Main Range National Park, and possibly in Glen Rock Regional Park, adjacent to the Main Range National Park in Queensland (DoE, 2024).

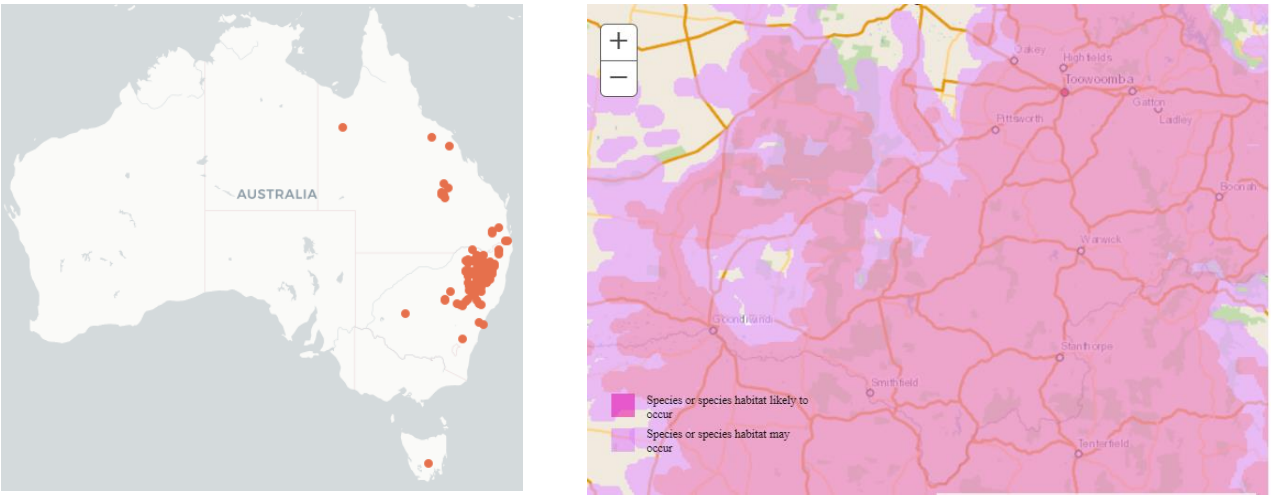

PLATE 3-11 DISTRIBUTION RANGE OF BLUEGRASS

Source: ALA (2024), DoE (2024)

3.4.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Bluegrass was not identified within any Project-associated field surveys including limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup, 2016). There are no desktop records of the species within the Project disturbance footprint or the MNES Study Area. The nearest record in relation to the Project is located along an existing rail corridor between North Star Road and the Bruxner Way in NSW, approximately 10 km south of the Project footprint, and was recorded in 2018.

There are an additional three records of the species within 50 km of the Project, in Highfields (1996), west of Hodgson Vale (2004) and within the Picnic Point Parklands in Toowoomba (2009) (refer to Plate 3-12; ALA, 2024).

Bluegrass specimen-backed records outside the 50 km buffer occur as far north as Gamboola in north Queensland, inland to Mount Isa and south to Willandra National Park in New South Wales, with most records occurring west of the Great Dividing Range (ALA, 2024).

The species has the potential to occur within the Project footprint.

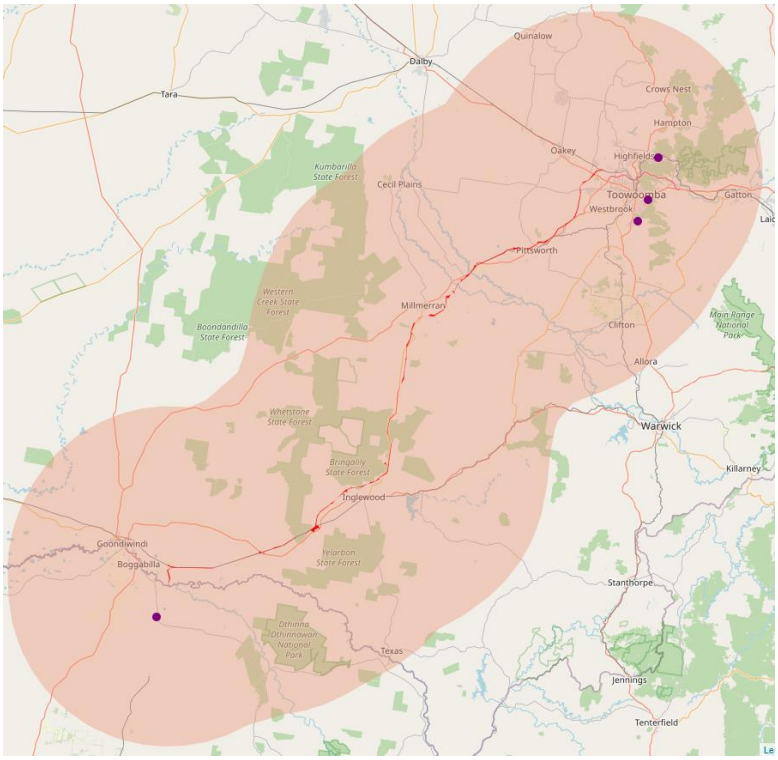

PLATE 3-12 DISTRIBUTION RANGE OF BLUEGRASS IN RELATION TO THE PROJECT

Source: ALA (2024)

3.4.2.4 BIOLOGY AND REPRODUCTION

Bluegrass is a seasonal perennial grass, growing during spring, flowering in summer and becoming dormant in late autumn (DEWHA, 2008). The species is known to thrive with a fire frequency of greater than 5 years (DoE, 2024).

3.4.3 HABITAT DESCRIPTION AND DEFINITION

Dichanthium setosum occurs in soils generally described as heavy soils (predominantly cracking clays or alluvium, often in gilgai), and including more specific soils including heavy basaltic black soil, stony red-brown hard-setting loam with a clay subsoil (Booth, 2012; DEH, 2022). Vegetation communities forming habitat for the species are described in the literature as woodland or open woodland usually dominated by brigalow (*Acacia harpophylla*) and/or *Eucalyptus* spp. (Booth, 2012). It is also described as often being found in moderately disturbed areas such as cleared woodland, disturbed open grassy woodlands, grassy roadside remnants, and highly disturbed pasture.

The entire alignment is within the mapped distribution where the species or species habitat is likely to and may occur, largely within the likely to occur distribution.

Suitable vegetation communities described in the literature and detected within the Project footprint, include woodland, open woodland, brigalow (*Acacia harpophylla*) woodland, cleared woodland, disturbed open grassy woodlands, grassy roadside remnants, and highly disturbed pasture (refer to Table 3-1 and Figure 3-4).

TABLE 3-1 HABITAT CRITERIA FOR BLUEGRASS WITHIN THE STUDY AREA

Habitat function	Habitat description	REs	Habitat mapping rules
Suitable habitat	Eucalyptus woodland, open woodland, brigalow (*Acacia harpophylla*) woodland, cleared woodland, disturbed open grassy woodlands, grassy roadside remnants, and pasture on clay and alluvium.	11.3.1, 11.3.2, 11.3.14, 11.3.17, 11.3.18, 13.3.21, 13.3.24, 13.3.25, 12.3.4, 11.4.3, 11.4.10, 11.8.11, 11.9.5	Areas of woodland, open woodland, brigalow (*Acacia harpophylla*), grasslands and pasture on cracking clays and alluvium.

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Burrow Pit
Site 2

Whetstone

Yelarbon

Macintyre Brook

Glenarbon

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Regrowth

Remnant

Major Watercourse Lines

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Whetstone
State Forest

Whetstone

Whetstone
Material
Distribution Centre

Glenarbon

Macintyre Brook

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Regrowth

Remnant

Major Watercourse Lines

Whetstone State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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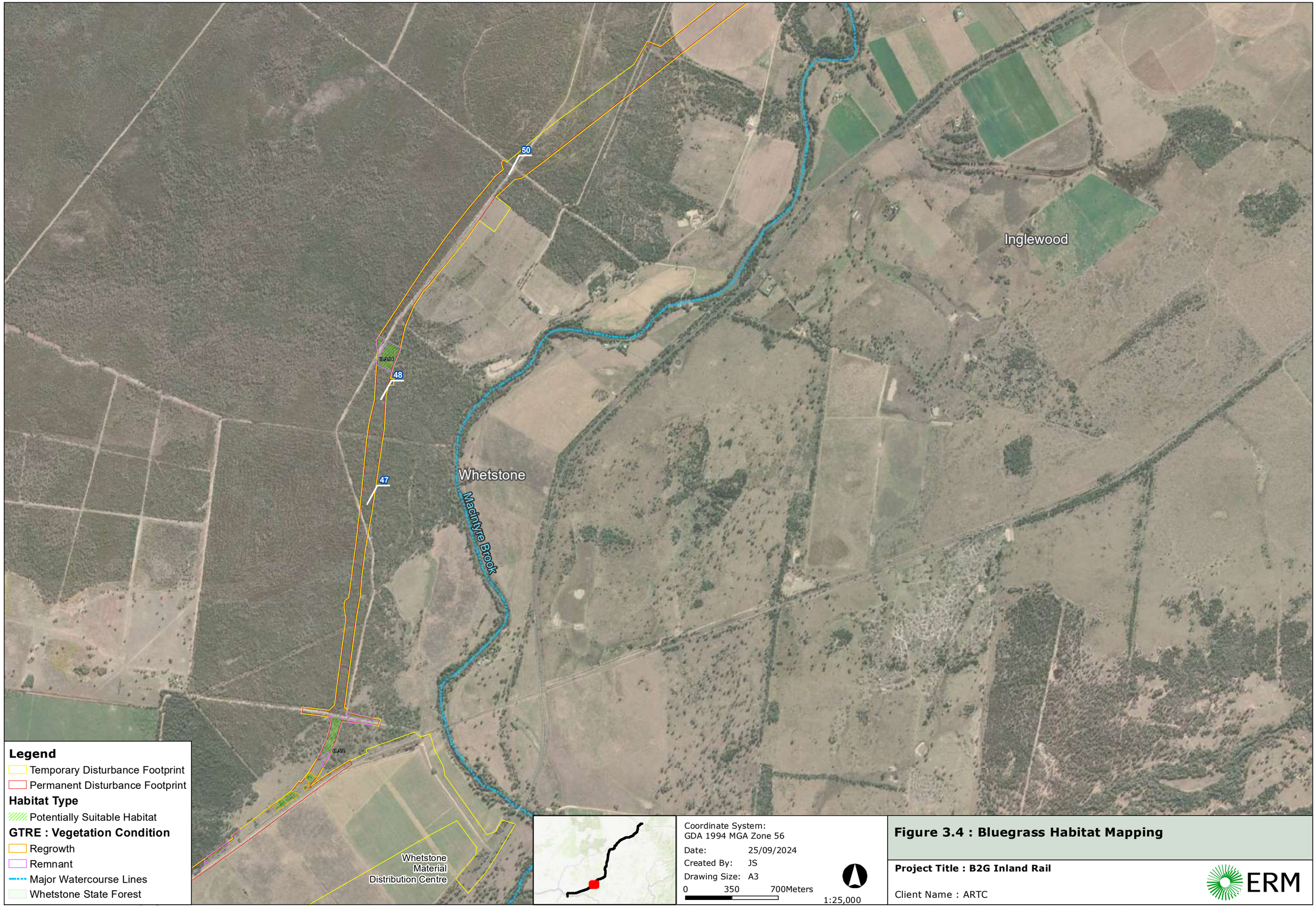

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Bringalily
State Forest

Inglewood

Canning Creek

Macintyre Brook

Legend

- Temporary Disturbance Footprint
- Permanent Disturbance Footprint

Habitat Type

- Potentially Suitable Habitat

GTRE : Vegetation Condition

- Regrowth
- Remnant
- Major Watercourse Lines
- Bringalily State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Canning Creek

Inglewood Non-Resident Workforce Accommodation

Mosquito Creek

Bringalily State Forest

Inglewood

Borrow Pit Site 4

Canning Creek

Borrow Pit Site 3

Coolmunda

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Remnant

Major Watercourse Lines

Bringalily State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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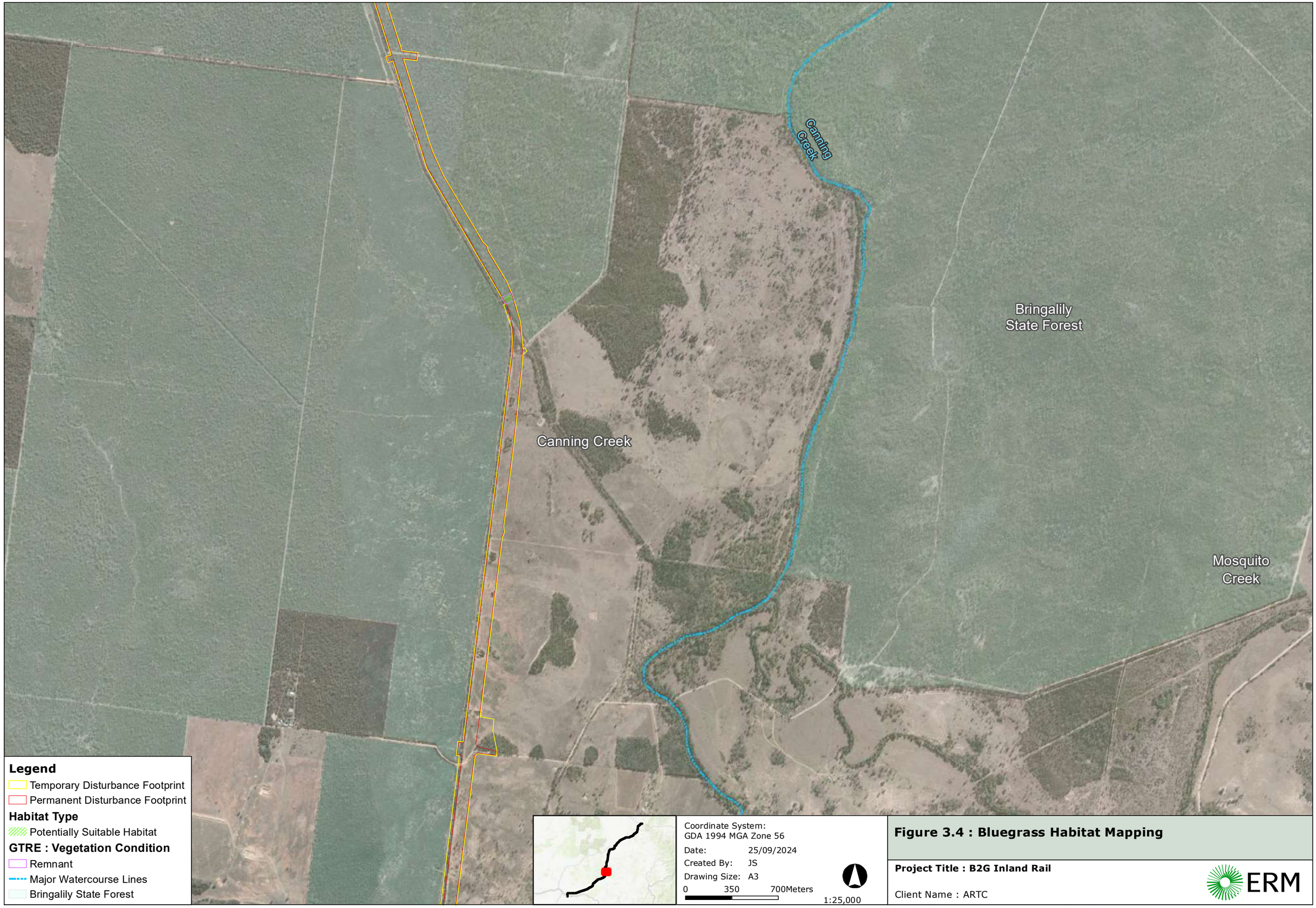

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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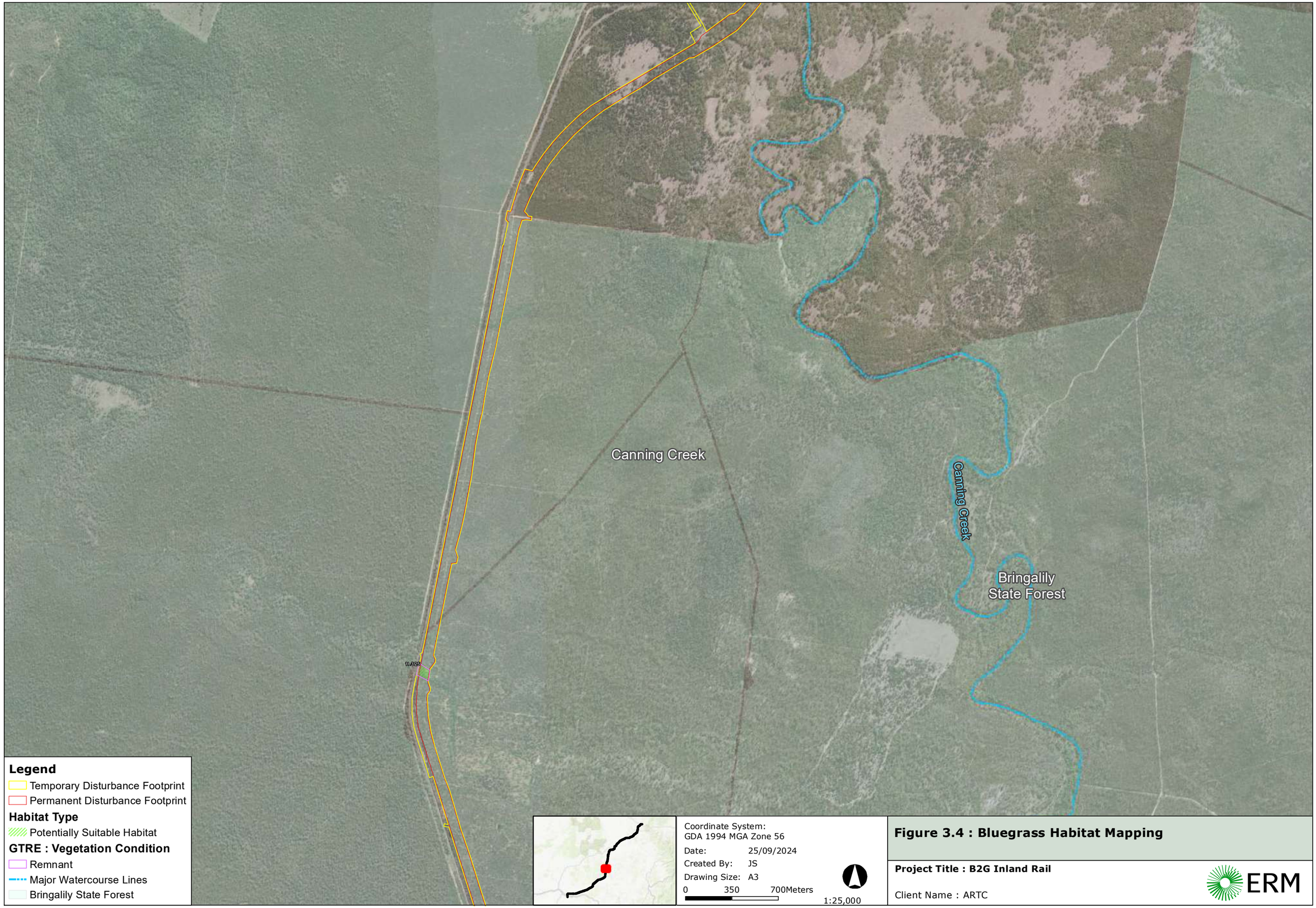

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Bringalily

Kooroongarra

Canning Creek

Borrow Pit
Site 5

Canning Creek

Stonehenge

Legend

- Temporary Disturbance Footprint
- Permanent Disturbance Footprint

Habitat Type

- Potentially Suitable Habitat

GTRE : Vegetation Condition

- Non Remnant
- Regrowth
- Remnant
- Major Watercourse Lines
- Bringalily State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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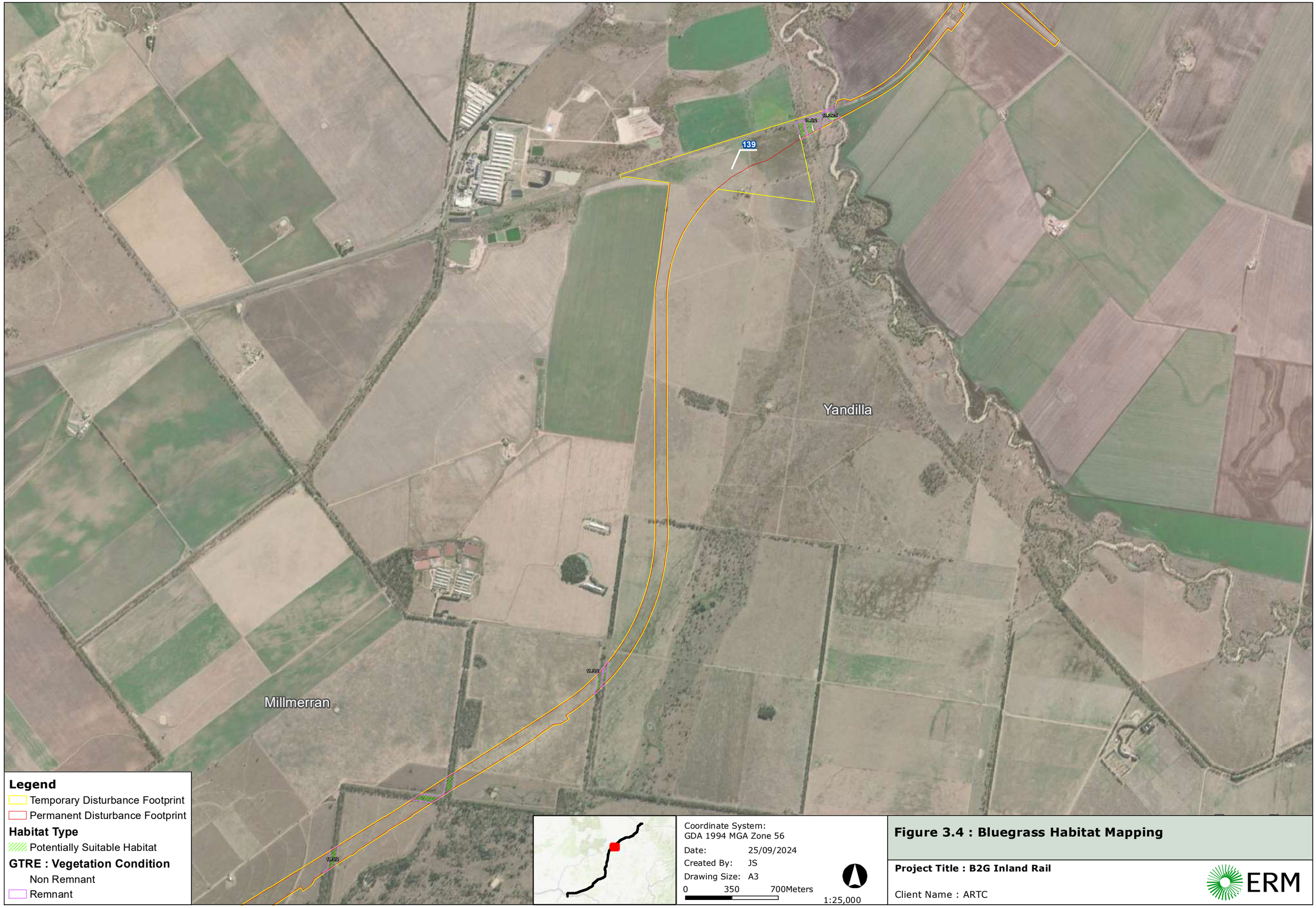

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Legend

- Temporary Disturbance Footprint
- Permanent Disturbance Footprint

Habitat Type

- Potentially Suitable Habitat

GTRE : Vegetation Condition

- Remnant
- Major Watercourse Lines

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3

0 350 700Meters

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Springside (Qld)

166

167

Yarranlea

Pittsworth

Scrubby Mountain

Kincora

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Regrowth

Remnant

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Stoneleigh (Qld)

Linthorpe

Southbrook

Springside (Qld)

Pittsworth

Broxburn

180

176

170

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Remnant

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

1:25,000

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Oakey

Gowrie Junction

Kingsthorpe

Gowrie Mountain

Charlton (Qld)

Biddeston

Wellcamp

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Remnant

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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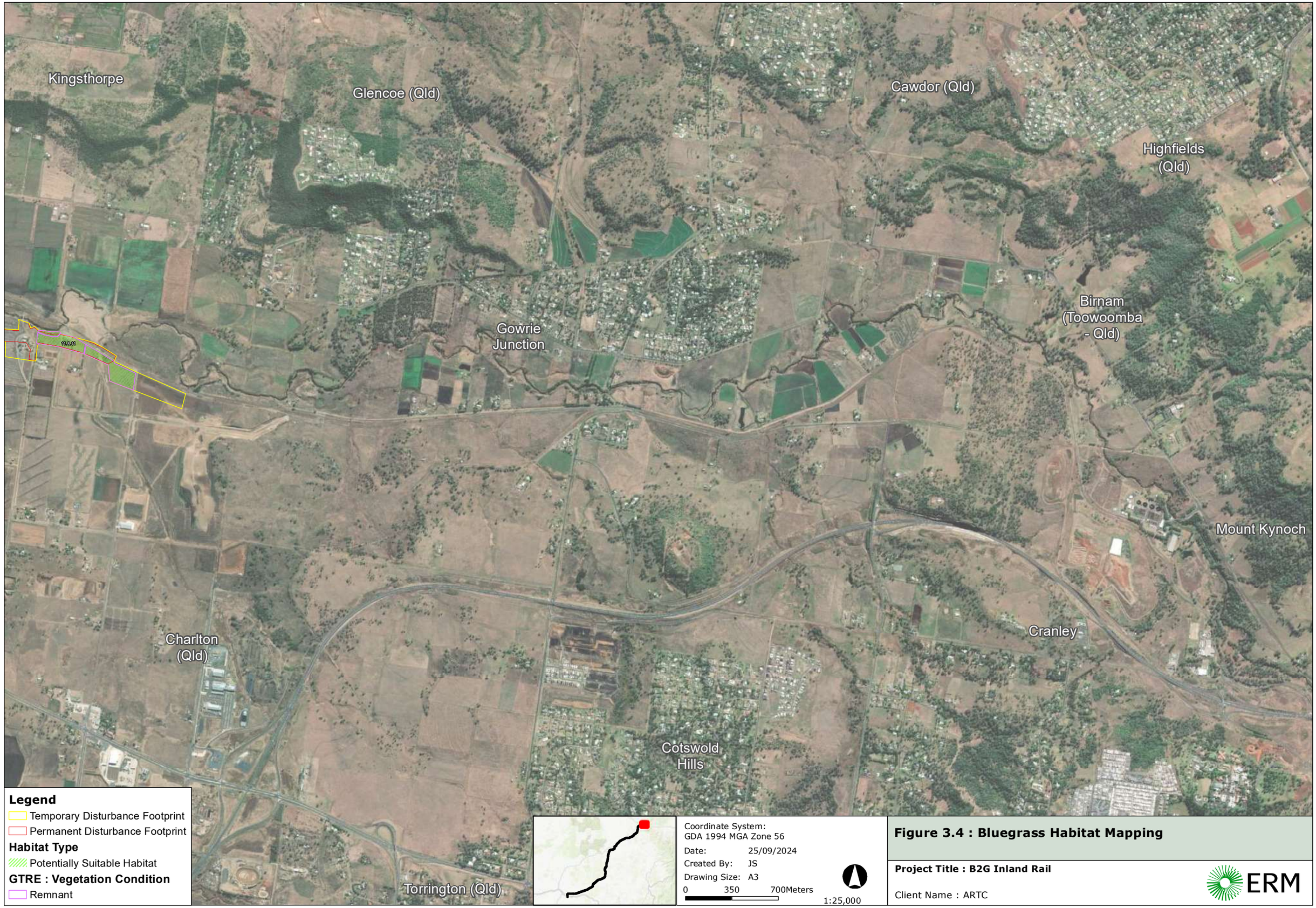

Figure 3.4 : Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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3.4.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to Bluegrass:

- Heavy grazing by domestic livestock;
- Clearing of habitat for pasture improvement and cropping;
- Frequent irregular fires for agricultural purposes;
- Road widening; and
- Invasion by introduced grasses including coolatai grass (*Hyparrhenia hirta*), lippia (*Phyla canescens*) and African lovegrass (*Eragrostis curvula*) (DoE, 2024).

3.4.5 EPBC STATUTORY DOCUMENTS

There is no adopted or made recovery plan for bluegrass, and a recovery plan is not required. The species conservation advice is as follows:

- Approved Conservation Advice for *Dichanthium setosum* (DEWHA, 2008).

The species listing advice is as follows:

- Commonwealth Listing Advice on *Dichanthium setosum* (bluegrass) (TSSC, 2012).

The following threat abatement plan is relevant to the species:

- Threat abatement plan for competition and land degradation by rabbits (DoEE, 2016).

3.4.6 PRIORTY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice outlines the following priority recovery actions as relevant:

- Habitat loss, disturbance and modification:
  - Identify populations of high conservation priority;
  - Manage threats to areas of vegetation that contain populations / occurrences / remnants of *D. setosum*;
  - Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on *D. setosum*;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities as appropriate) in areas where *D. setosum* occurs do not adversely impact on known populations; and
  - Investigate formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure.
- Invasive weeds:
  - Develop and implement a management plan for the control of introduced grasses, such as coolatai, African lovegrass and lippia, in the local region.
- Trampling, browsing or grazing:
  - Develop and implement a stock management plan for roadside verges and travelling stock routes.
- Fire
  - Develop and implement a suitable fire management strategy for *D. setosum*;
  - Identify appropriate intensity and interval of fire to promote seed germination; and

  - Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigative measures in bush fire risk management plans, risk register and/or operation maps.
- Conservation information:
  - Raise awareness of *D. setosum* within the local community, particularly among land-holders with the species on their properties.
- Enable recovery of additional sites and/or populations:
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

The threat abatement plan for the competition and land degradation by rabbits (DoEE, 2016) outlines the following threats for bluegrass:

- Preventing plant regeneration;
- Overgrazing and general damage to plant species;
- Reversing the normal processes of plant succession; and
- Altering ecological communities and changing soil structure and nutrient cycling, leading to significant erosion.

The threat abatement plan for the competition and land degradation by rabbits (DoEE, 2016) further suggest the primary management measure is population control, with control efforts to include:

- Targeting to protect sites where rabbits pose the greatest threat to biodiversity;
- Undertaking control measures a strategic manner to take advantage of the environmental conditions and other complementary activities; and
- Monitoring control measures to ensure that objectives are met and allow management options to be adapted to changing circumstances.

3.4.7 REFERENCES

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3.5 HAIRY-JOINT GRASS (*ARTHRAXON HISPIDUS*)

3.5.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.5.2 BIOLOGY AND ECOLOGY

3.5.2.1 CHARACTERISTIC

Hairy-joint grass (*Arthraxon hispidus*) is a slender tufted creeping grass that roots at the nodes, with erect to semi-erect stems (DEWHA, 2008). The plant's leaves are reddish to purplish in colouration, with long, white hairs. The leaves are broad at the base before tapering to a sharp point (refer to Plate 3-13; DEWHA, 2008). The plant produces simple, dry seeded fruits with seed fused to the wall of the fruit and remaining closed at maturity (also known as 'caryopsis'), and seed-heads are held above the plant on a long fine stalk (DEWHA, 2008). The species was once considered an annual species; however it has since been suggested the species is perennial, dying down in winter (DEWHA, 2008).

PLATE 3-13 HAIRY-JOINT GRASS (*ARTHRAXON HISPIDUS*)

Source: Dalgial (2015)

3.5.2.2 KNOWN DISTRIBUTION

Hairy-joint grass occurs in Australia and has a wide distribution from tropical Africa to Asia. In Australia, the species occurs throughout Queensland and the northern tablelands and north coast of NSW, all in scattered populations (DEWHA, 2008). In Queensland, hairy-joint grass predominantly occurs south of Noosa, however the species distribution includes areas north to Port Douglas, and west to fragmented populations in Carnarvon National Park (refer to Plate 3-14; DEWHA, 2008).

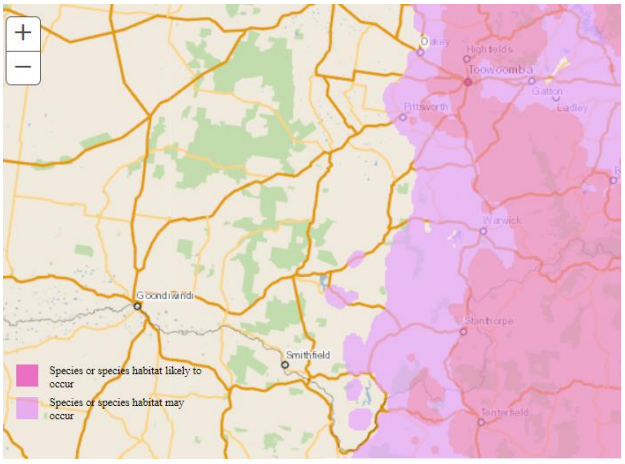

PLATE 3-14 DISTRIBUTION RANGE OF HAIRY-JOINT GRASS

Source: ALA (2024), DoE (2024)

3.5.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Hairy-joint grass is assessed as having the potential to occur within the Project footprint, however, the species was not recorded during any Project-associated field surveys including limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup 2016; Aurecon 2018). ALA database records do not reveal any specimen backed records within the Project disturbance footprint or within the MNES Study Area. The nearest record of the species is located in Toowoomba, approximately 15 km east of the alignment and was recorded in 1875. This area is now part of an industrial area of Toowoomba. There is a small cluster of records in the Rangeville township, approximately 19 km east of the alignment, with recorded from 2011, 2012, 2014, 2017, 2019 and 2022 (ALA, 2024). An additional five (5) records exist in close Toowoomba central and east Toowoomba, approximately 11 km east of the northern-most portion of the alignment and were recorded in 2005 (refer to Plate 3-15; ALA, 2024).

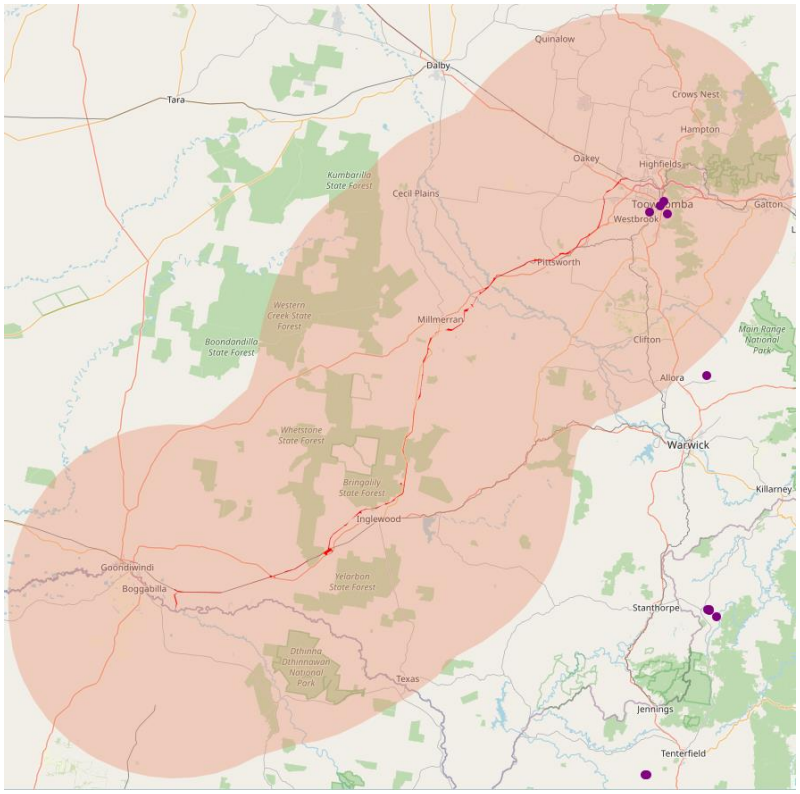

PLATE 3-15 DISTRIBUTION RANGE OF HAIRY-JOINT GRASS IN RELATION TO THE PROJECT

Source: ALA (2024)

3.5.2.4 BIOLOGY AND REPRODUCTION

Hairy-joint grass flowers from March to July and summer to autumn (DEWHA, 2008).

3.5.3 HABITAT DESCRIPTION AND DEFINITION

Hairy-joint grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps. In south-east Queensland, hairy-joint grass has also been recorded growing in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests.

The railway alignment partly overlaps areas where modelled habitat distribution may occur around Toowoomba, Oakey and Pittsworth. The species or species habitat likely to occur distribution is mapped to the north and east of the Project footprint between Kingsthorpe and Gowrie and around Southbrook (north-east of Pittsworth) where it is closest to the Project. Habitat mapping for the species within the study area has been undertaken using the habitat criteria in Table 3-2 and is presented in Figure 3-5.

TABLE 3-2 HABITAT CRITERIA FOR HAIRY-JOINT GRASS WITHIN THE STUDY AREA

Habitat function	Habitat description	REs	Habitat mapping rules
Suitable habitat	Rainforest, wet eucalypt forest, fringes of creeks or swamps, creek banks and sandy alluvium.	11.3.2, 11.3.4, 11.3.14, 11.3.18, 11.3.25, 11.3.27b	Rainforest/wet eucalypt forest on alluvial soils associated with landzone 3 within Toowoomba, Oakey and Pittsworth regions.

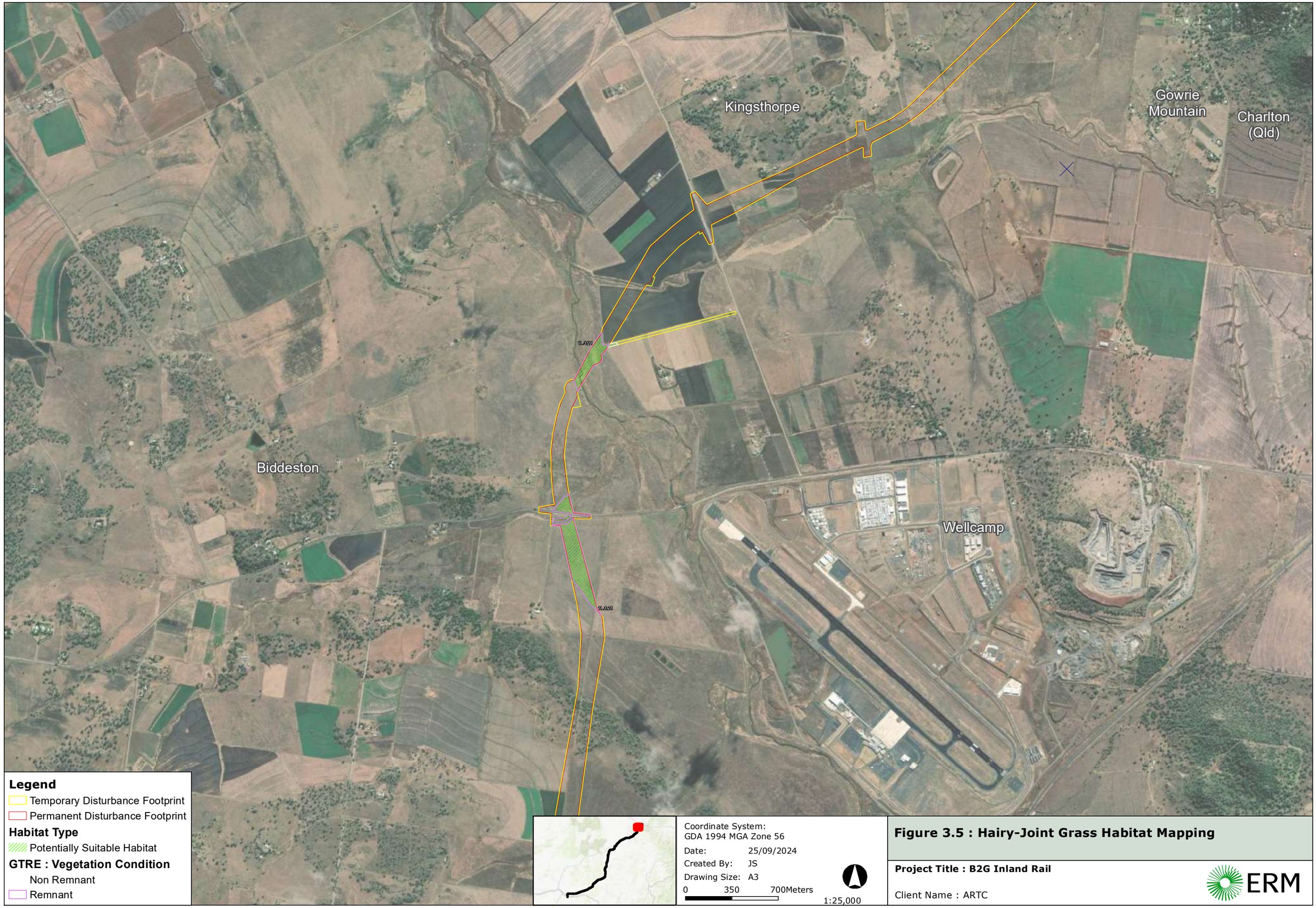

Figure 3.5 : Hairy-Joint Grass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024
Created By: JS
Drawing Size: A3

0 400 800Meters

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Figure 3-6 : Hairy-Joint Grass Habitat Mapping Within 5 Km Buffer

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

3.5.4 THREATENING PROCESSES

The following have been by identified by DEWHA as potentially threatening processes to the Hairy-joint grass:

- Trampling and over grazing by stock;
- Clearing for agriculture and development;
- Slashing or mowing of habitat;
- Inappropriate fire regimes; and
- Competition from introduced grasses including paspalum (*Paspalum dilatatum*) and kikuyu (*Pennisetum clandestinum*) (DEWHA, 2008).

3.5.5 EPBC STATUTORY DOCUMENTS

There is no adopted or made recovery plan or threat abatement plan relevant for hairy-joint grass (DoE, 2024). There is no recovery plan required. The conservation advice for the species is as follows:

- Approved Conservation Advice for *Arthraxon hispidus* (Hairy-joint Grass) (DEWHA, 2008).

3.5.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The conservation advice lists the following a priority actions:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Identify populations of high conservation priority; and
  - Investigate further formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.
- Conservation information:
  - Raise awareness of Hairy-joint Grass within the local community.
- Enable recovery of additional sites and/or populations:
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

3.5.7 REFERENCES

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3.6 HAWKWEED (*PICRIS EVAE*)

3.6.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.6.2 BIOLOGY AND ECOLOGY

3.6.2.1 CHARACTERISTIC

Hawkweed (*Picris evae*) is an erect annual herb which grows approximately 1.3 – 1.7 m in height. The plant procures toothed, pointed leaves approximately 2.5 – 15 cm long and 4 – 30 mm wide. The leaves are sparsely hairy with split-end hairs (DEWHA, 2008). Hawkweed produces small, yellow flowers, approximately 8 – 10 mm wide at the ends of the stems and fruits 5 – 8 mm long (refer to Plate 3-16; DEWHA, 2008).

PLATE 3-16 HAWKWEED (*PICRIS EVAE*)

Source: Bennett (2019)

3.6.2.2 KNOWN DISTRIBUTION

Hawkweed has a limited distribution, restricted to south-east Queensland and northern New South Wales. In Queensland, the species is known to occur in 30 sites in the Darling Downs and Moreton pastoral districts (refer to Plate 3-17; DEWHA, 2008).

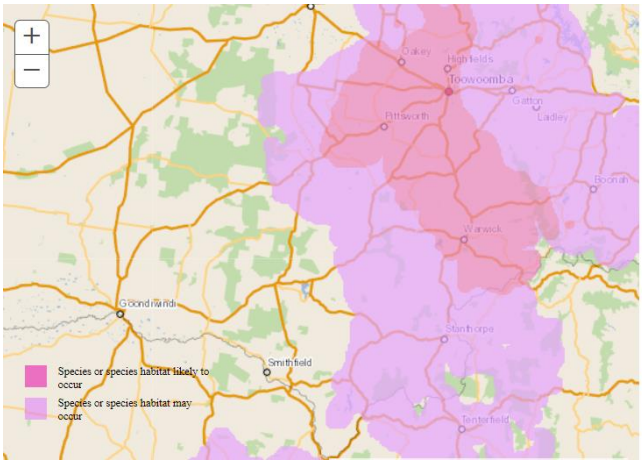

PLATE 3-17 DISTRIBUTION RANGE OF THE HAWKWEED

Source: ALA (2024), DoE (2024)

3.6.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Hawkweed is known to occur within the Project footprint due to direct sightings during the 2018 field investigations. The species was recorded in a road reserve along the Gore Highway, between Tip Road and Oakey-Pittsworth Road, north of Pittsworth. The species was not detected during limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup, 2016). The ALA database suggests records of hawkweed within close proximity to the Project are restricted to north of Pampas. There is one record at the junction of the Gore Highway and Elsden Road in *Dicanthium sericeum* grassland, adjacent to cultivated land growing on black clay soil, recorded in 2002. Additionally, there are a number of records within the MNES Study Area, particularly between Pittsworth and Southbrook, with the most recent recorded in 2021.

As per the ALA database, there are several records of hawkweed within 50 km of the Project, with species sightings from Muldu to Allora along the eastern Darling Downs (refer to Plate 3-18).

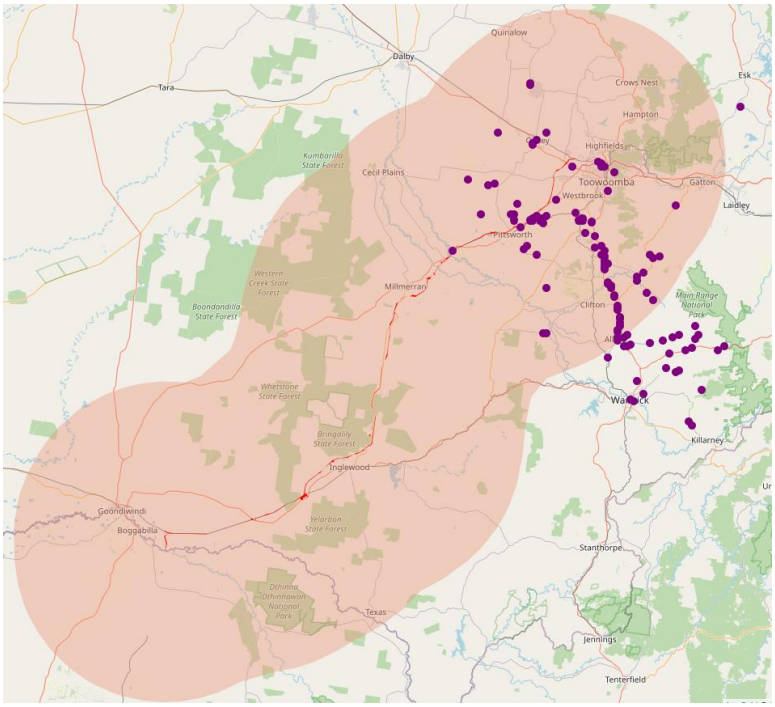

PLATE 3-18 DISTRIBUTION RANGE OF THE HAWKWEED IN RELATION TO THE PROJECT

Source: ALA (2024)

3.6.2.4 BIOLOGY AND REPRODUCTION

Hawkweed produces flowers during summer and early autumn, typically from December to March.

3.6.3 HABITAT

Hawkweed grows in Eucalyptus open woodlands, with a grassy understorey associated with *Dichanthium* spp. Typical habitat for hawkweed includes upper stratum species including *Eucalyptus melliodora, E. crebra, E. populnea, E. albens, Angophora subvelutina, Allocasuarina torulosa*, and *Casuarina cunninghamiana*. Hawkweed is also known to occur along roadsides and in cultivated areas (i.e., paddocks), on black, dark grey or red-brown soils, reddish clay-loam or medium clay soils (DEWHA, 2008).

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons. For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. Areas mapped as Essential Habitat for this species were also included. Habitat mapping for this species within the Project footprint is presented in Figure 3-7.

Figure 3.7 : Hawkweed Habitat Mapping

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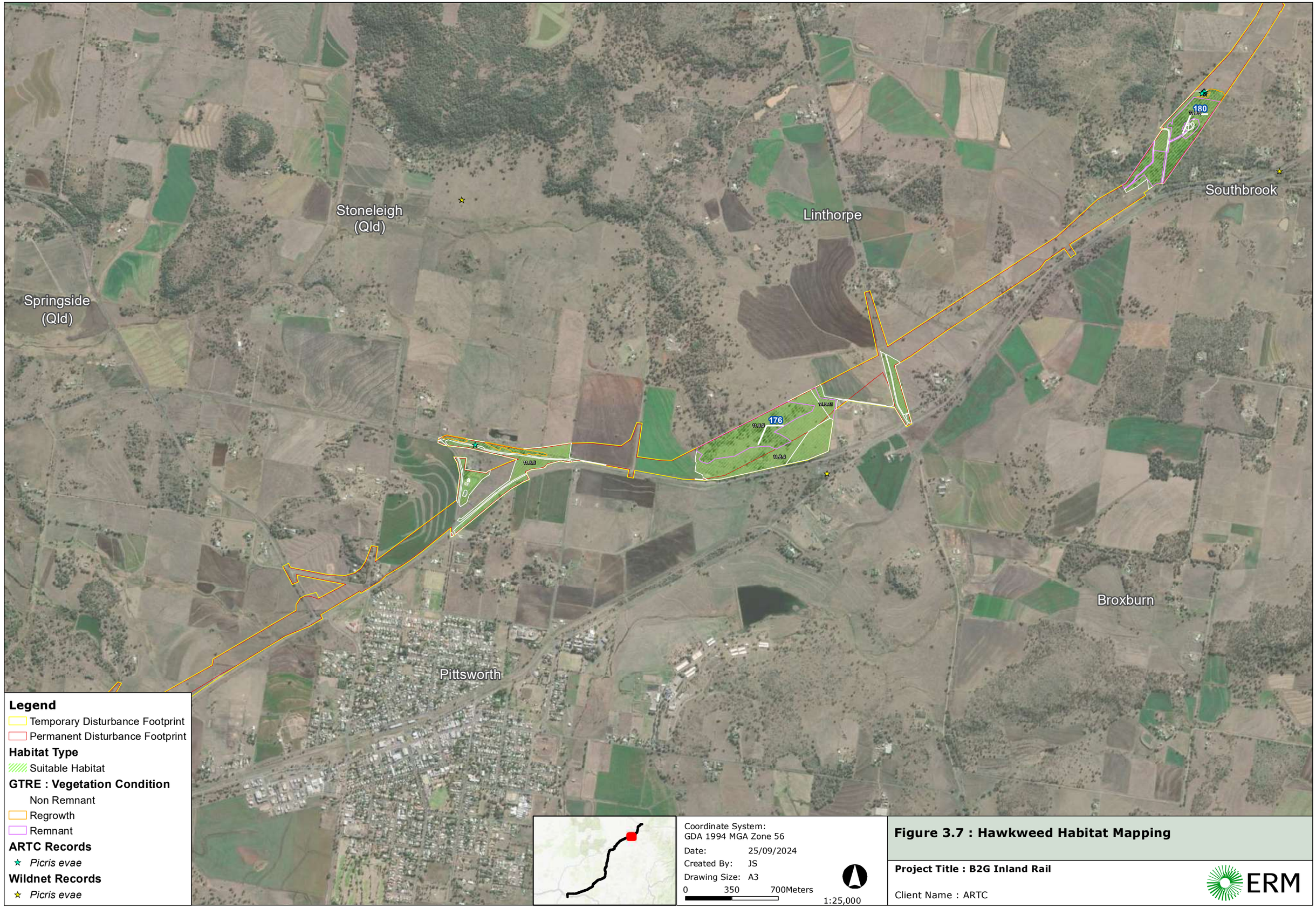

Figure 3.7 : Hawkweed Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 3.7 : Hawkweed Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3
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Figure 3.7 : Hawkweed Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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3.6.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to Hawkweed:

- Introduction of invasive flora;
- Inappropriate fire regimes;
- Habitat fragmentation; and
- Clearing of vegetation for cropping and grazing (DEWHA, 2008).

3.6.5 EPBC STATUTORY DOCUMENTS

There are no adopted or made recovery plans or threat abatement plans relevant for hawkweed. A recovery plan is not required. The species conservation advice is as follows:

- Approved Conservation Advice for *Picris evae* (Hawkweed) (DEWHA, 2008).

3.6.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice lists the following priority actions as relevant:

- Habitat loss, disturbance and modification:
  - Identify significant vulnerable populations of high conservation priority; focus recovery actions and adaptive management at these sites;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate or vegetation disturbance in areas where Hawkweed occurs do not adversely impact on known populations; and
  - Investigate further formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.
- Fire:
  - Develop and implement a suitable fire management strategy for hawkweed; and
  - Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigative measures in bush fire risk management plan(s), risk register and/or operation maps.
- Conservation Information:
  - Raise awareness of hawkweed within the local community; and
  - Negotiate with landholders to prepare and implement site management plans that address threats.
- Enable recovery of additional sites and/or populations:
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

3.6.7 REFERENCES

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3.7 KING BLUEGRASS (*DICHANTHIUM QUEENSLANDICUM*)

3.7.1 STATUS

EPBC Act – Endangered, effective 26 February 2013

3.7.2 BIOLOGY AND ECOLOGY

3.7.2.1 CHARACTERISTIC

King bluegrass (*Dichanthium queenslandicum*) is a perennial grass growing to 80 cm in height. The plant features solitary or rarely branched, erect, glabrous, smooth culms which are 4 – 5 noded with nodes prominently hairy (refer to Plate 3-19; DSEWPC, 2013). Leaf sheaths are hirsute with hairs arising from wart-like projections. Inflorescences are single racemes of paired spikelets approximately 10 cm in length. Sessile spikelets are bisexual, dorsally compressed, and straw-coloured to pale mauve. Pedicelled spikelets are male and straw-coloured to pale mauve (DSEWPC, 2013).

PLATE 3-19 KING BLUEGRASS (*DICHANTHIUM QUEENSLANDICUM*)

Source: Ausgrass2 (2018)

3.7.2.2 KNOWN DISTRIBUTION

King bluegrass is endemic to central and southern Queensland, occurring in three disjunct populations, including:

- The Hughenden district;
- From Nebo to Monto and west to Clermont and Rolleston; and
- The Dalby district, Darling Downs (refer to Plate 3-20; DSEWPC, 2013).

The species is thought to be restricted to these locations, with the extent of occurrence reduced from 1,100 km^2 to 245 km^2; however, the area of occupancy is unknown (DSEWPC, 2013).

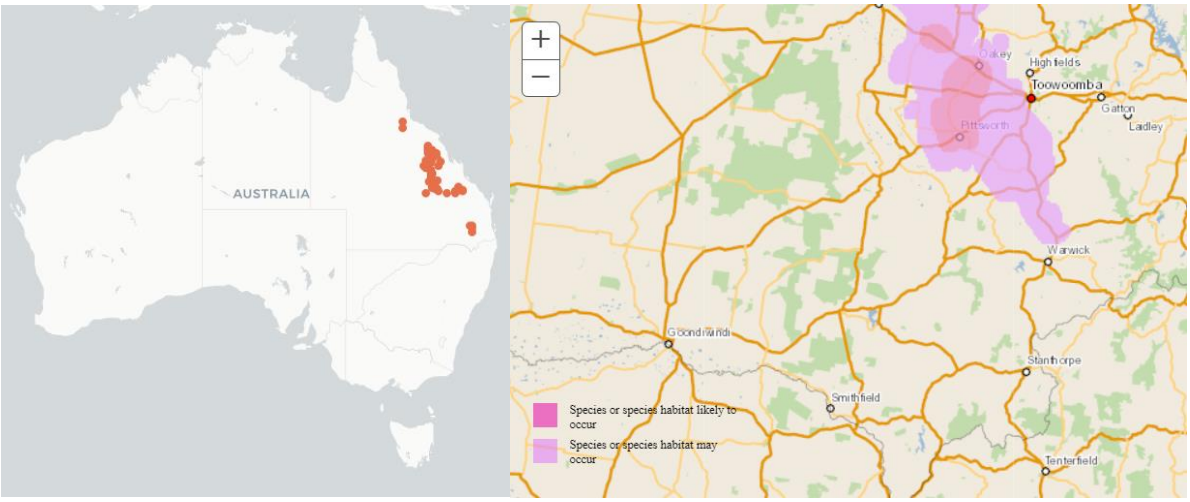

PLATE 3-20 DISTRIBUTION RANGE OF KING BLUEGRASS

Source: ALA (2024), DoE (2024)

3.7.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

King bluegrass is known to occur within the Project footprint, with the species recorded in open woodland on low hills near Pittsworth during field surveys. As per the ALA database, there are five (5) records less than 1 km from the Project footprint, recorded in 2014, 2015, 2016 and 2021, of which, three were recorded at the Gore Highway / Toowoomba Road junction and two along Toowoomba Road (ALA, 2024). There are an additional six (6) records of the species within 50 km of the Project, all of which were recorded along the Warrego Highway north of McCaffery Field Airport (between Oakey and Dalby), recorded in 2001, 2004, 2011, 2012 and 2020 (refer to Plate 3-21;ALA, 2024). These records are the southern-most records for the species, with majority of species records occurring between Taroom and Collinsville

The species is predicted to occur within the Study Area and has been assessed as known to occur within the Project footprint.

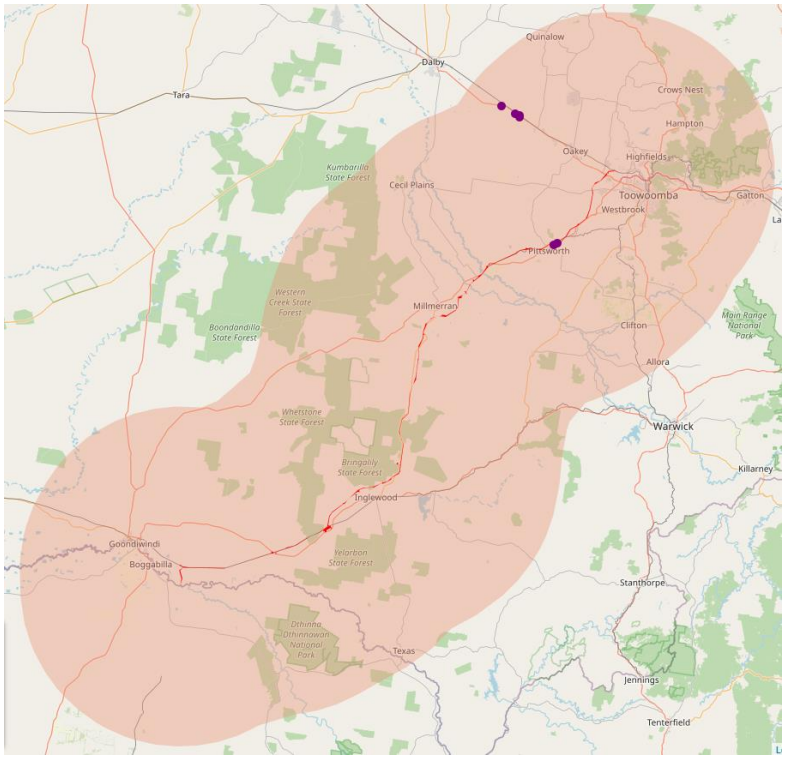

PLATE 3-21 DISTRIBUTION RANGE OF KING BLUEGRASS IN RELATION TO THE PROJECT

Source: ALA (2024)

3.7.2.4 BIOLOGY AND REPRODUCTION

King bluegrass flowers throughout the year, however, flowers are more prevalent from March onwards.

3.7.3 HABITAT

King bluegrass grows on black cracking clay in tussock grasslands typically dominated by blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.). The species is generally confined to the natural bluegrass grasslands in central and southern Queensland (DSEWPC, 2013). King bluegrass is typically found in the following TECs:

- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin; and
- Natural Grasslands on Basalt and Fine-textured Alluvial Plains of northern NSW and southern Queensland (DSEWPC, 2013).

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons. For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. Areas mapped as Essential Habitat for this species were also included. Habitat mapping for the species within the Project footprint is presented in Figure 3-8.

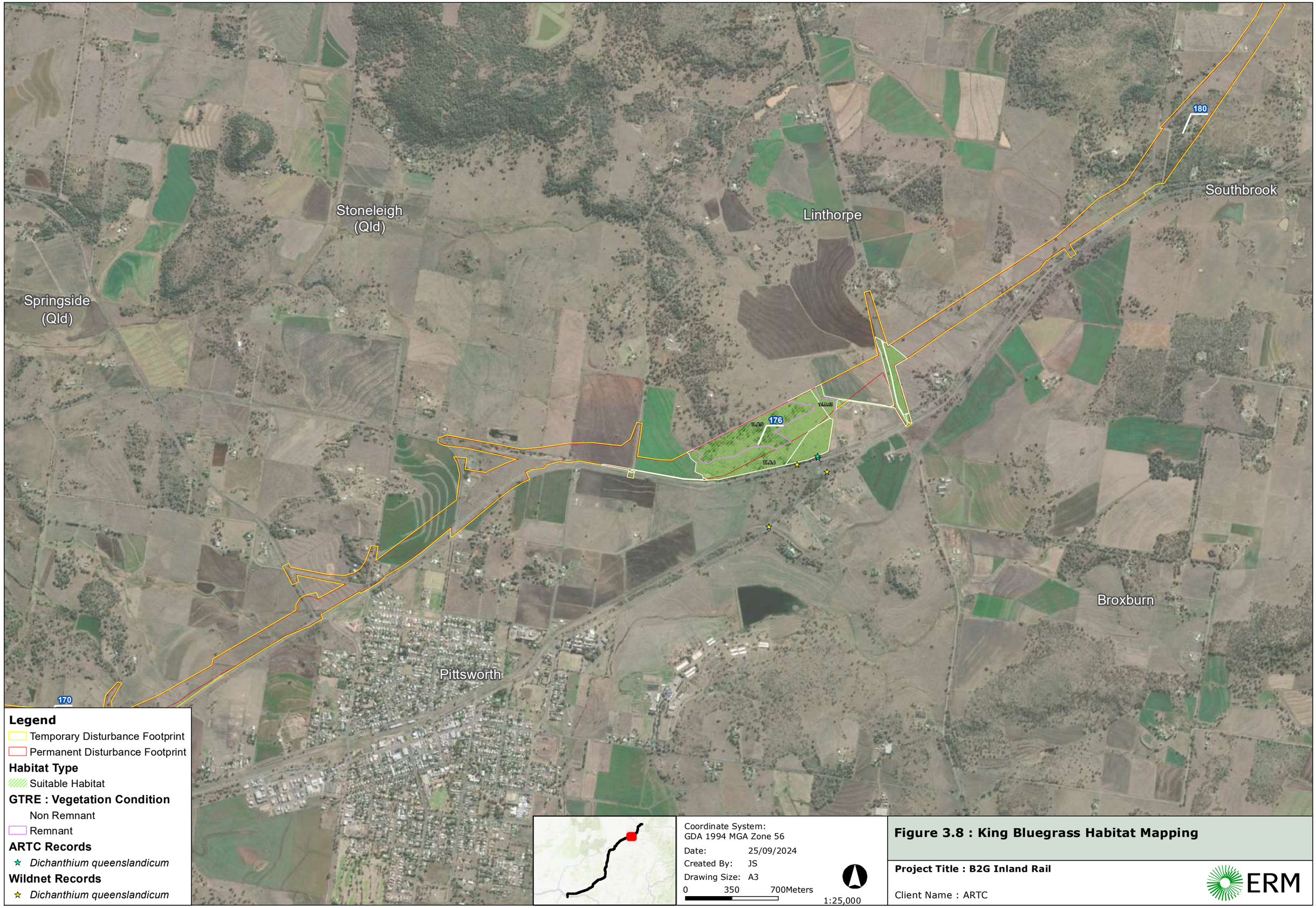

Figure 3.8 : King Bluegrass Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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3.7.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the King bluegrass:

- Loss of habit through agricultural and mining activities, road construction and other infrastructure developments;
- Cultivation and crop production;
- Grazing by domestic livestock;
- Expansion of mining activities, particularly exploration and long wall mining; and
- Introduction of invasive weeds including parthenium (*Parthenium hysterophorus*) and parkinsonia (*Parkinsonia aculeata*) (DSEWPC, 2013).

3.7.5 EPBC STATUTORY DOCUMENTS

There are no adopted or made recovery plans or threat abatement plans relevant for king-blue grass (DoE, 2024). A recovery plan is not required as approved Conservation Advice is an effective, efficient, and responsive document to guide the implementation of priority management actions, mitigate key threats, and support the recovery of this EPBC Act listed Endangered species. The species conservation advice is as follows:

- Approved Conservation Advice for *Dichanthium queenslandicum* (king bluegrass) (DSEWPC, 2013).

3.7.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The conservation advice lists the following priority actions for the species:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Identify populations of high conservation priority;
  - Ensure there is no disturbance in areas where king bluegrass occurs, excluding necessary actions to manage the conservation of the species/ecological community;
  - Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate and/or secure inclusion in reserve tenure if possible; and
  - Manage any other known, potential or emerging threats, including mining practices, grazing, weed invasion and climate change.
- Invasive weeds:
  - Develop and implement a management plan for king bluegrass for the control of parthenium (*Parthenium hysterophorus*) and parkinsonia (*Parkinsonia aculeata*) in the region; and
  - Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on king bluegrass.

- Trampling, browsing or grazing:
  - Develop and implement a stock management plan for roadside verges and travelling stock routes;
  - Raise awareness of king bluegrass within the local community, for example distribute fact sheets/information brochures or conduct field days in conjunction with known industry or community interest groups;
  - Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions;
  - Enable recovery of additional sites and/or populations;
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

3.7.7 REFERENCES

Atlas of Living Australia (2024), *Dichanthium queenslandicum*. Australia's species Database. Available at: https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2901362. [Accessed 23 January 2024]

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3.8 SMALL-FLOWERED WESTRINGIA (*WESTRINGIA PARVIFOLIA*)

3.8.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.8.2 BIOLOGY AND ECOLOGY

3.8.2.1 CHARACTERISTIC

Small-flowered westringia (*Westringia parvifolia*) is a small shrub growing approximately 1 m in height, with oval shaped leaves approximately 1.5 – 3 mm long and recurved margins (DoE, 2024). The plant's leaves are arranged along the steam in clusters of three leaves, which form a whorl at each node (refer to Plate 3-22). The young shoots and flowers are covered with small, white hairs pressed closely to the surface and the branchlets are often hexagonal. The plant produces flowers which are pale purple to white with reddish spots in colouration, and occur in the upper leaf axils, forming a terminal leafy head of 3 to 7 flowers (DoE, 2024).

PLATE 3-22 SMALL-FLOWERED WESTRINGIA (*WESTRINGIA PARVIFOLIA*)

Source: Johnson (1974)

3.8.2.2 BIOLOGY AND REPRODUCTION

The species has been recorded to flower in September and November (DoE, 2024).

3.8.2.3 KNOWN DISTRIBUTION

Small-flowered westringia is known from four collections near Yelarbon, Inglewood and Goondiwindi in south-east Queensland, and from Yetman in northern New South Wales (refer to Plate 3-23; DoE, 2024).

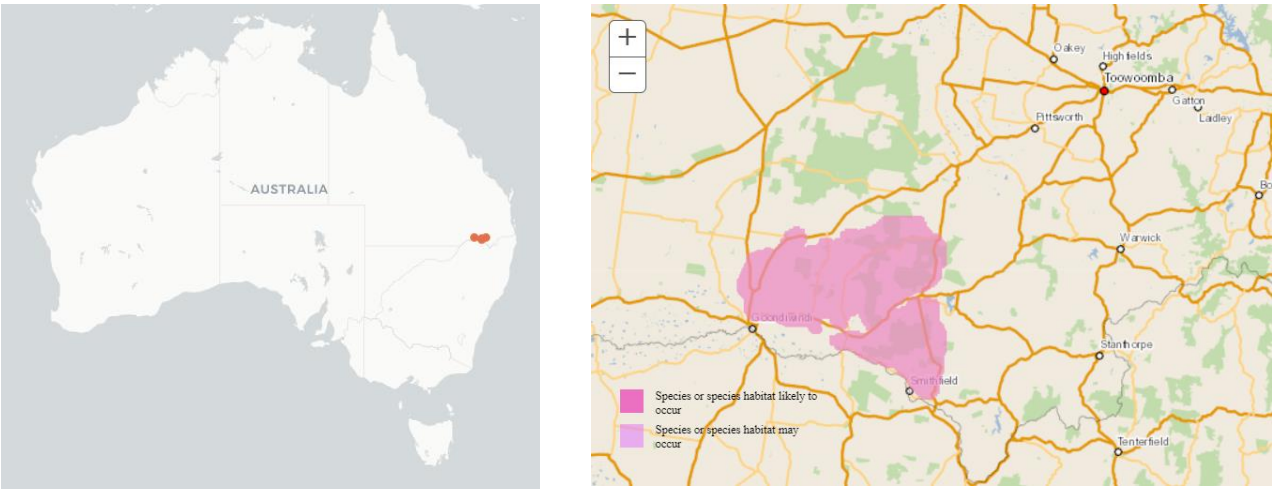

PLATE 3-23 DISTRIBUTION RANGE OF SMALL-FLOWERED WESTRINGIA

Source: ALA (2024), DoE (2024)

3.8.2.4 DISTRIBUTION IN RELATION TO THE PROJECT

Small-flowered westringia is assessed as having the potential to occur within the Study Area and has been recorded to occur within the Project footprint. Multiple individuals of the species were identified within the Project footprint, north-east of Yelarbon.

There is one desktop record (ALA) of the species within the Project footprint, recorded in 2020 along East Sawmill Road, approximately 3 km north-east of Yelarbon (ALA, 2024). There are an additional three (3) records within 1 km of the Project footprint, recorded in 1919 and 1948, along Merton Road and Yelarbon-Keetah Road, respectively. Additionally, there are a further three (3) records within 50 km of the Project footprint, of which, one recorded along Inglewood Texas Road (1974); one recorded in Yelarbon State Forest (1910); and one recorded along the Leichardt Highway (1977) (refer to Plate 3-24; ALA, 2024).

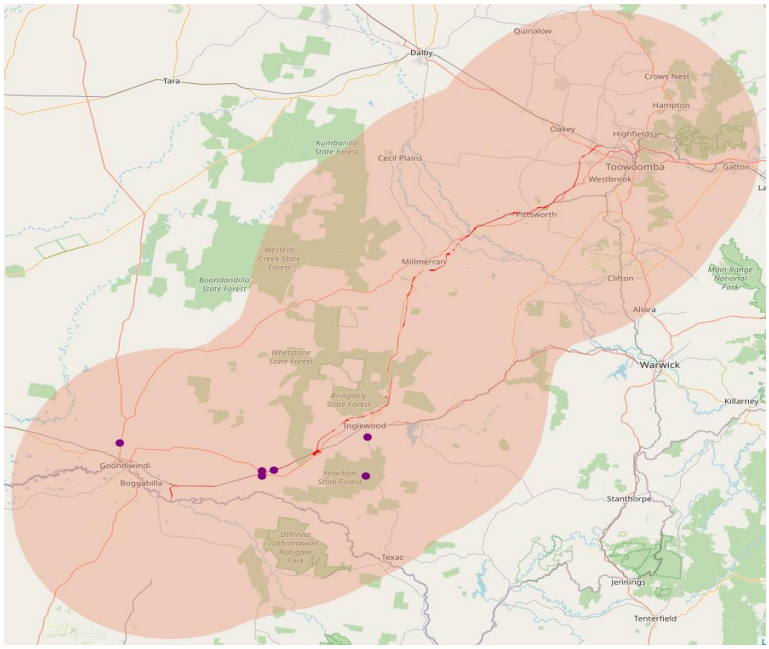

PLATE 3-24 DISTRIBUTION RANGE OF SMALL-FLOWERED WESTRINGIA IN RELATION TO THE PROJECT

Source: ALA (2024)

3.8.3 HABITAT

Small-flowered westringia grows on sandy and stony soils in association with Baker's malee (*Eucalyptus bakeri*), green mallee (*E. viridis*) and between clumps of spinifex (*Triodia* spp.) (DoE, 2024).

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons. For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. Areas mapped as Essential Habitat for this species were also included. Habitat mapping for the species within the Project footprint is presented in Figure 3-9. Habitat mapping within a 5 km buffer of the Project was used for the flooding assessment and is presented in Figure 3-10 (see Section 5.2.13 of the MNES technical report).

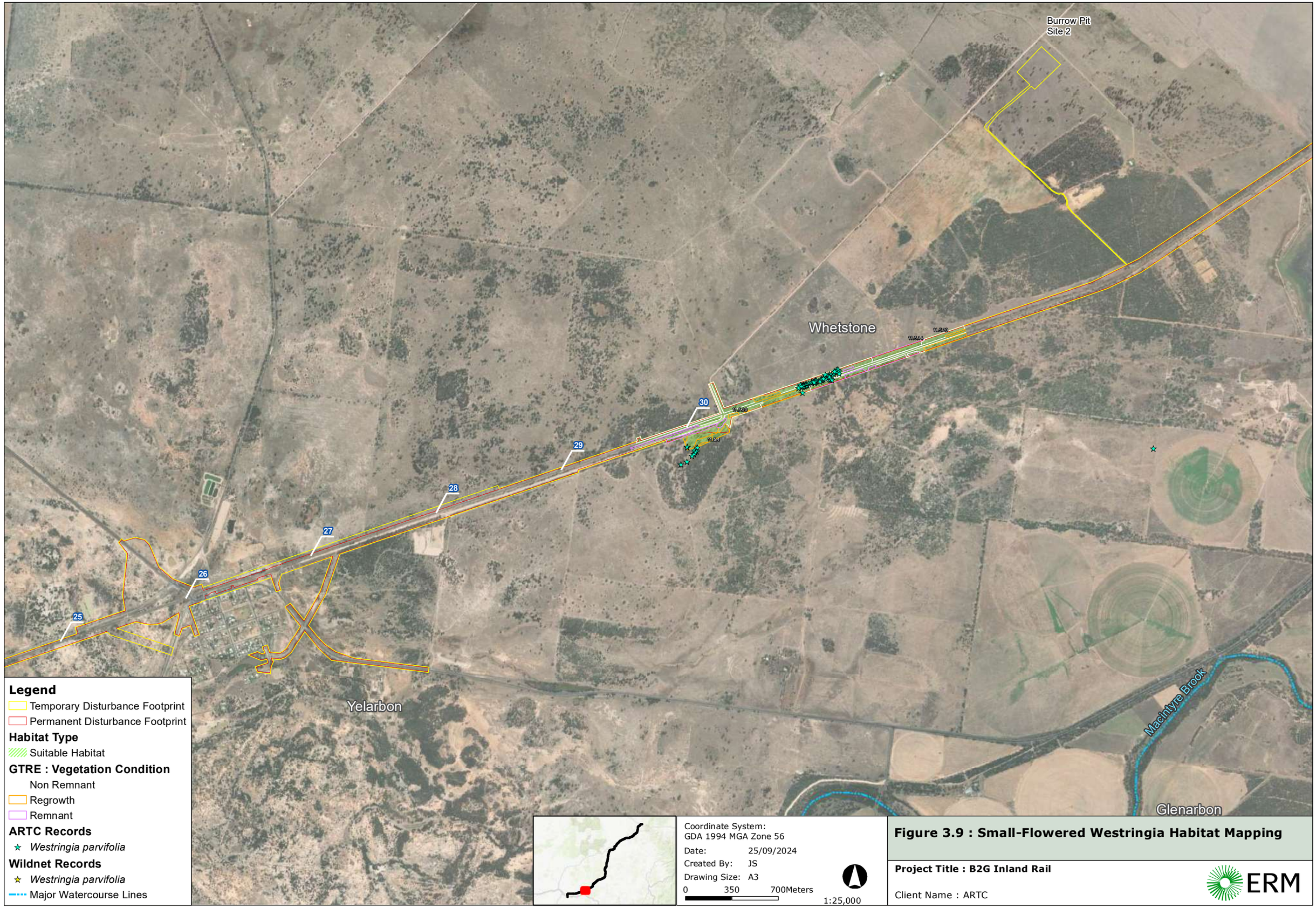

Figure 3.9 : Small-Flowered Westringia Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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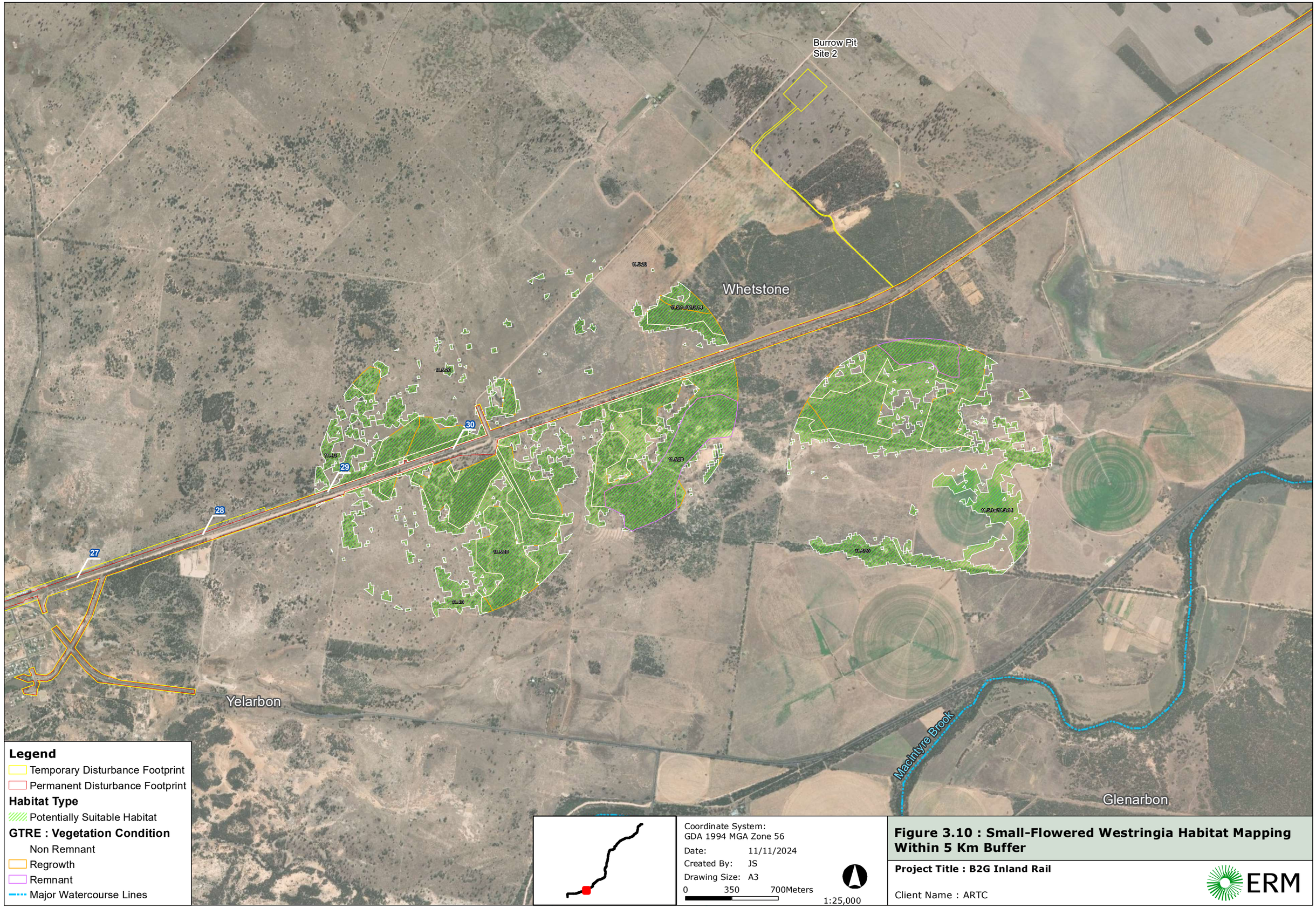

Figure 3.10 : Small-Flowered Westringia Habitat Mapping Within 5 Km Buffer

Project Title : B2G Inland Rail

Client Name : ARTC

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3.8.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to *Westringia parvifolia*:

- Broad-scale vegetation clearing;
- Increasing fragmentation and loss of remnants;
- Hydrological change; and
- Pollution (DoE, 2024).

3.8.5 EPBC STATUTORY DOCUMENTS

There is no adopted or made recovery plan or threat abatement plan relevant for *Westringia parvifolia*. There is no recovery plan required. The species conservation advice is as follows:

- Approved Conservation Advice for *Westringia parvifolia* (DEWHA, 2008).

3.8.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice lists the following priority actions:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Identify populations of high conservation priority;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate or vegetation disturbance in areas where *W. parvifolia* occurs do not adversely impact on known populations;
  - Manage any changes to hydrology that may result in changes to water table levels and/or increased run-off, salinity, sedimentation or pollution;
  - Manage any disruptions to water flows;
  - Control access routes to suitably constrain public access to known sites on public land;
  - Minimise adverse impacts from land use at known sites; and
  - Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.
- Conservation Information
  - Raise awareness of *W. parvifolia* within the local community.
- Enable recovery of additional sites and/or populations:
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

3.8.7 REFERENCES

Atlas of Living Australia (2024). *Westringia parvifolia*. Available from: https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2920137#overview [Accessed 24 January 2024].

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3.9 STREAM CLEMATIS (*CLEMATIS FAWCETTII*)

3.9.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.9.2 BIOLOGY AND ECOLOGY

3.9.2.1 CHARACTERISTIC

Stream clematis (*Clematis fawcettii*) is a climbing vine which can grow high in the rainforest canopy, although it is typically identified as a weak climber in the understorey. The species grows stems approximately 1 – 2 m in length, with 0.6 – 4 cm long and 0.5 – 3 cm wide leaflets (refer to Plate 3-25; DoE, 2024). The paired leaves are divided once (biternate) or twice (triternate) into three toothed leaflets. Stream clematis produces white to pink-purple flowers, typically solitary or in small panicles; and one-seeded fruits with long feathered tails (2 to 2.5 cm long) assisting wind dispersal of seeds (DoE, 2024).

PLATE 3-25 STREAM CLEMATIS (*CLEMATIS FAWCETTII*)

Source: QLD Herb (2018), ALA (2024)

3.9.2.2 KNOWN DISTRIBUTION

Stream clematis is restricted to north-eastern New South Wales and south-east Queensland, occurring from Lismore (NSW) north to the Bunya Mountains (QLD) (refer to Plate 3-26). The species occurs at approximately 39 confirmed locations throughout its range, including Richmond Range National Park, Toonumbar National Park, Lamington National Park, Main Range National Park and Mt Barney National Park (DoE, 2024; DEWHA, 2008). The overall extent of the species occurrence is approximately 65,000 km^2.

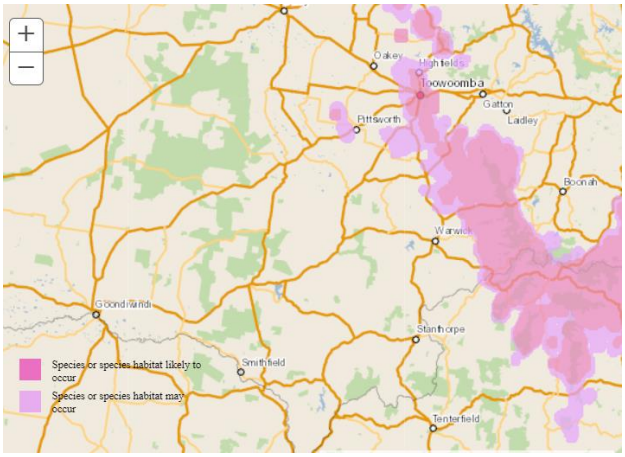

PLATE 3-26 DISTRIBUTION RANGE OF STREAM CLEMATIS

Source: ALA (2024), DoE (2024)

3.9.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Stream clematis is assessed as having the potential to occur within the Project, however it has not been directly recorded during Project-associated field surveys including limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup, 2016). There are no desktop records of the species within the Project disturbance footprint or the MNES Study Area. The nearest record of the species is located approximately 1.2 km north of the northern-most portion of the Project, in close proximity to the township of Kingsthorpe, and was recorded in 2023 (ALA, 2024). There are an additional four (4) records of the species within 5 km of the Project (north of the northern-most portion of the Project), recorded in 2020 and 2021. In addition to the above records, there are five (5) records within 50 km of the Project, recorded in 1987, 1990 and 2011 (refer to Plate 3-27).

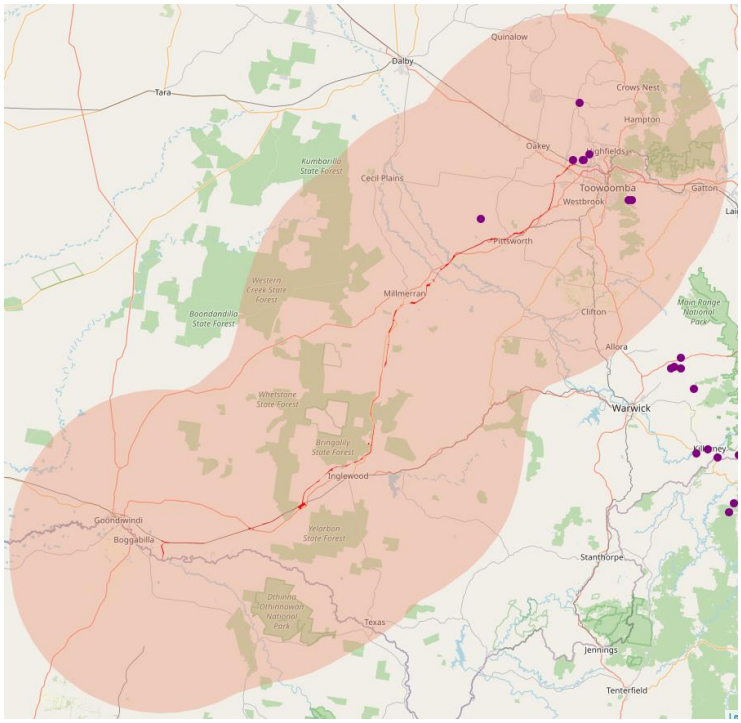

PLATE 3-27 DISTRIBUTION RANGE OF STREAM CLEMATIS IN RELATION TO THE PROJECT

Source: ALA (2024)

3.9.2.4 BIOLOGY AND REPRODUCTION

Stream clematis generally only flowers and fruits in high light conditions, with flowering occurring from October to December, and fruiting in January, June and December (DoE, 2024).

3.9.3 HABITAT DESCRIPTION AND DEFINITION

Stream clematis prefers canopy gaps and is often found near streams. This species is generally found in the following community types: semi-evergreen vine thicket, araucarian microphyll vine forest, complex notophyll vine forest, and eucalypt open forest with scattered vine forest species on loam soils derived from basalt, volcanic rock and fertile clays (DEWHA, 2008)

Two small areas within the railway alignment around Gowrie and Pittsworth are located within the mapped distribution where the species or species habitat may occur. Habitat mapping for the species within the study area has been undertaken using the habitat criteria in Table 3-3 and is presented in Figure 3-11.

TABLE 3-3 HABITAT CRITERIA FOR STREAM CLEMATIS WITHIN THE STUDY AREA

Habitat function	Habitat description	REs	Habitat mapping rules
Suitable habitat	Semi-evergreen vine thicket, araucarian microphyll vine forest, complex notophyll vine forest, and eucalypt open forest associated with streams on loamy soils and fertile clays.	11.8.3, 11.3.25	Loamy soils and clays occurring in streams and vine thickets/forests, between Gowrie and Pampas.

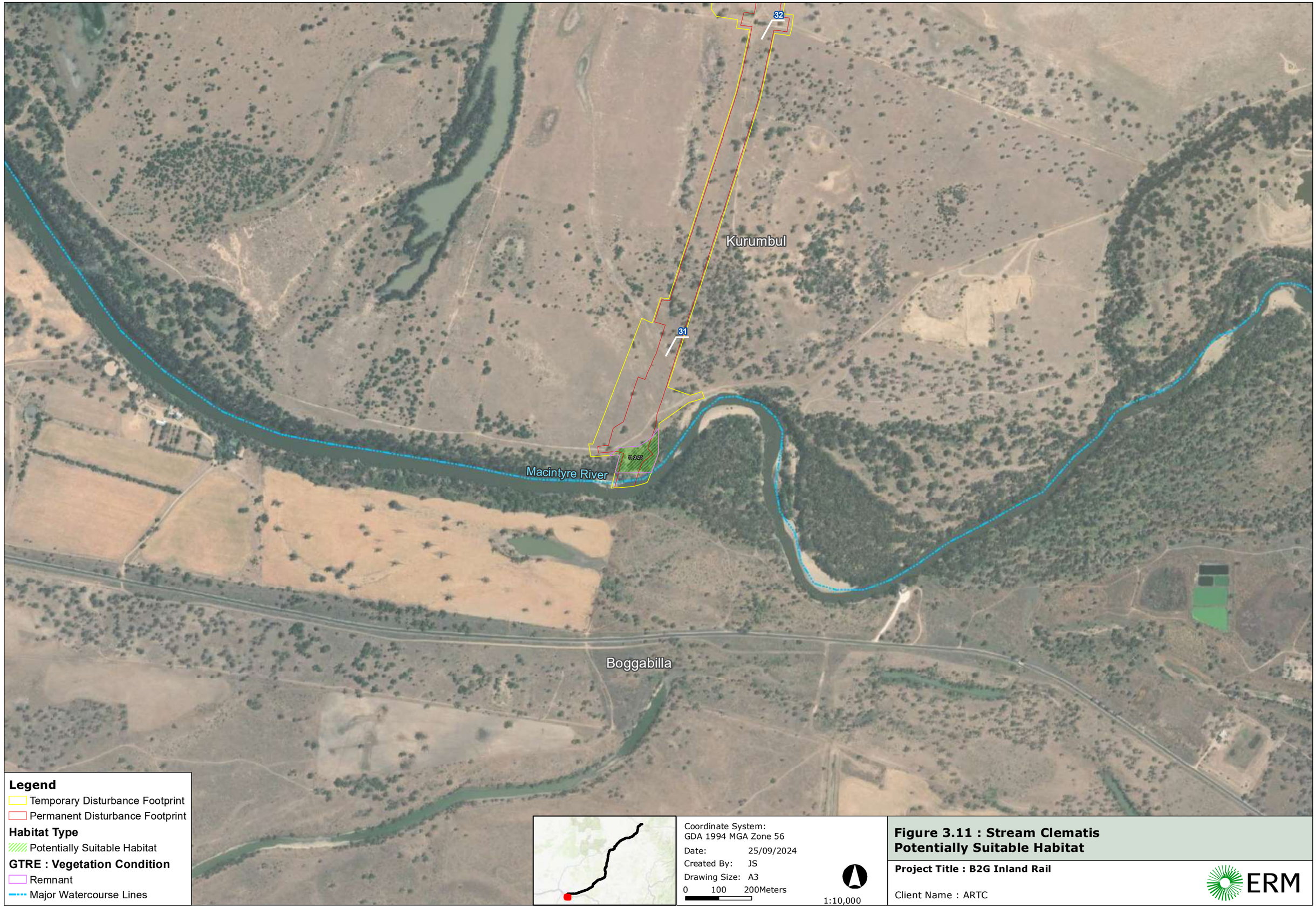

Figure 3.11 : Stream Clematis Potentially Suitable Habitat

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Legend

- Temporary Disturbance Footprint
- Permanent Disturbance Footprint

Habitat Type

- Potentially Suitable Habitat

GTRE : Vegetation Condition

- Regrowth
- Major Watercourse Lines

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3
0 100 200Meters

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Figure 3.11 : Stream Clematis Potentially Suitable Habitat

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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3.9.4 EPBC STATUTORY DOCUMENTS

There are no adopted or made recovery plan or threat abatement plans relevant for stream clematis (DoE, 2024). There is no recovery plan required for this species. The species conservation advice and listing are as follows:

- Approved Conservation Advice for *Clematis fawcettii* (Stream Clematis) (DEWHA, 2008); and
- Commonwealth Listing Advice on *Clematis fawcettii* (Stream Clematis) (TSSC, 2012).

3.9.5 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice lists the following priority actions:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Develop and implement a management plan for the control of Forest Eucalypt Dieback;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate or vegetation disturbance in areas where stream clematis occurs do not adversely impact on known populations; and
  - Investigate further formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure to protect remaining habitat from further clearing.
- Invasive weeds:
  - Develop and implement a management plan for the control of major weeds such as Lantana in the region; and
  - Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on stream clematis.
- Fire:
  - Develop and implement a suitable fire management strategy for stream clematis, including protecting dry rainforest from fire;
  - Identify appropriate intensity and interval of fire to promote seed germination; and
  - Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigative measures in bush fire risk management plans, risk register and/or operation maps.
- Conservation information:
  - Identify information and resource needs required to ensure land managers and stakeholders are aware of populations of stream clematis and habitat; and
  - Raise awareness of the stream clematis within the local community to assist in detecting new locations and habitat rehabilitation projects.

3.9.6 REFERENCES

Atlas of Living Australia (2024), *Clematis fawcettii* - Stream clematis. Available at: https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2889478#gallery . [Accessed 23 January 2024]

Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Clematis fawcettii* (Stream Clematis). Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/4311-conservation-advice.pdf. In effect under the EPBC Act from 01 October 2008.

Department of the Environment (2024). *Clematis fawcettii* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. [Accessed 23 January 2024]

Queensland Government (2020), Species profile— Cadellia Clematis Wang J (1997). *Clematis fawcettii.*

Queensland Herbarium. (2018). Stream clematis (*Clematis fawcettii*). [Image] [Online] Available from https://images.ala.org.au/image/details?imageId=e8911df9-98c1-42b3-b349-1ddbe1365fed. [19 September 2019].

Threatened Species Scientific Committee (TSSC) (2012). Commonwealth Listing Advice on *Clematis fawcettii* (Stream Clematis). Department of Sustainability, Environment, Water, Population and Communities. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/4311-listing-advice.pdf

3.10 TARA WATTLE (*ACACIA LAUTA*)

3.10.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

3.10.2 BIOLOGY AND ECOLOGY

3.10.2.1 CHARACTERISTIC

Tara wattle (*Acacia lauta*) is a sprawling shrub growing approximately 2 m in height. The plant features yellowish, angular branchlets, and straight to incurved phyllodes approximately 2 – 4 cm long and 1.5 – 2.5 mm wide. The phyllodes are flat and narrowed at the base before abruptly contracting at the apex with a sharp terminal point, a slightly raised midrib with one or two obscure longitudinal veins (DAWE, 2008). The plant produces a cluster of 25 – 30 flower heads on stalks approximately 5 – 7 mm long, between the phyllodes and stems. The seeds produced are typically 4.5 – 5 mm long, and pods are linear, 6 cm in length (refer to Plate 3-28; DAWE, 2008).

PLATE 3-28 TARA WATTLE (*ACACIA LAUTA*)

Source: Fagg (n.d.), ALA (2024)

3.10.2.2 KNOWN DISTRIBUTION

Tara wattle is restricted to the Darling Downs region within south-east Queensland, with populations occurring between Inglewood and Tara (refer to Plate 3-29; DAWE, 2008). Specimens of the species have been collected from Spinifex Corner (15 km north of Tara), Goranba Lane (16 km east of Tara) and at Marron Glen (15 km south-east of Inglewood (DAWE, 2008).

Research suggests the species population is estimated to be 2000 plants, with majority of the population occurring at Marron Glen (on freehold land), followed by Spinifex Corner (on a road reserve and freehold land) and Goranba Lane (on a roadside verge) (DAWE, 2008).

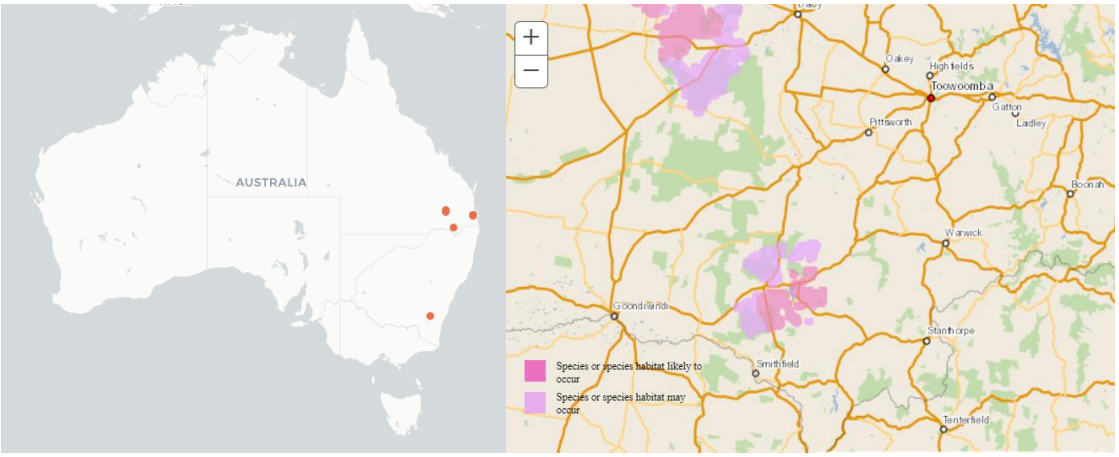

PLATE 3-29 DISTRIBUTION RANGE OF THE TARA WATTLE

Source: ALA (2024); DoE (2024)

3.10.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Tara wattle is assessed as having the potential to occur within the Project footprint, however the species has not been directly recorded during Project-associated field surveys including limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution (Arup, 2016). There are no desktop records of the species within the Project disturbance footprint or the MNES Study Area. The nearest record of the species is located approximately 16.5 km east of the Project (east of Inglewood) and was recorded in 1989 (refer to Plate 3-30; ALA, 2024). There are no additional records of the species within 50 km of the Project footprint. Other records of the species occur in Yeerongpilly and St Lucia, approximately 113 km east of the Project footprint, as well as three (3) records along Surat Development Road near Tara, 115 km west of the Project footprint (refer to Plate 3-30).

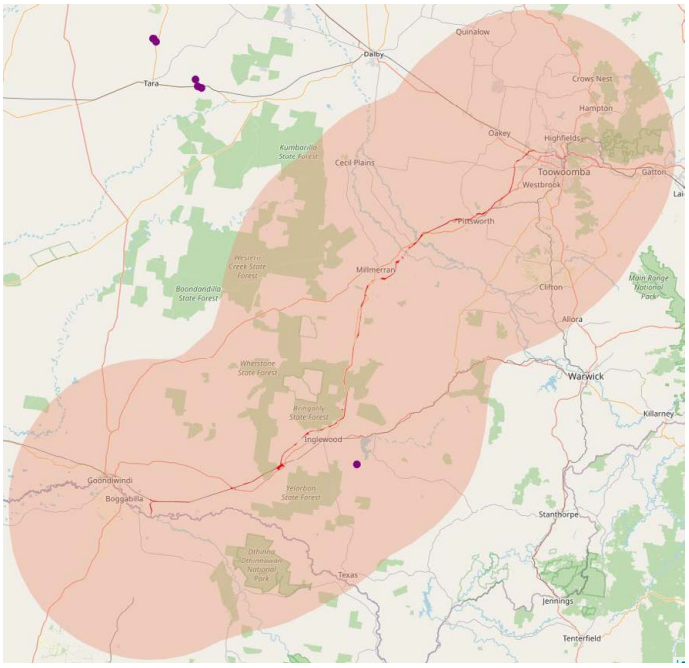

PLATE 3-30 DISTRIBUTION RANGE OF THE TARA WATTLE IN RELATION TO THE PROJECT

Source: ALA (2024)

3.10.2.4 BIOLOGY AND REPRODUCTION

Tara wattle produces flowers from mid-August to mid-September, and fruits from October to November (DoE, 2024). Regeneration of the plant typically occurs through falling seeds; however, the seeds are secondarily dispersed by ants (DoE, 2024).

3.10.3 HABITAT DESCRIPTION AND DEFINITION

Tara wattle occurs within south-east Queensland, in a small region of the Darling Downs between Inglewood and Tara. Generally, the species is found on gently undulating to flat landforms with sandy soils in open forest to low woodland with a moderately dense shrub layer (Maslin, 2005). The species grows in moderately deep and hard setting soil with a weakly acidic to neutral sandy loam surface, grading into alkaline sandy clay subsoil (Halford, 1995b).

Habitat for the species occurs within the Project footprint near Inglewood and was recently recorded during affiliated surveys by USC approximately 11 km from the alignment near Coolmunda Dam. Habitat mapping for the species within the Project footprint has been undertaken using the habitat criteria in Table 3-4 and is presented in Figure 3-12.

Associated species consisting of *Callitris glaucophylla* and *Allocasuarina luehmannii* are abundant throughout the alignment.

TABLE 3-4 HABITAT CRITERIA FOR TARA WATTLE WITHIN THE STUDY AREA

Habitat function	Habitat description	REs	Habitat mapping rules
Suitable habitat	Open forest to low woodland on sandy soil substrates throughout the alignment from Goondiwindi to Millmerran, associated with *Callitris glaucophylla* and *Allocasuarina luehmannii.*	11.5.1, 11.5.4, 11.3.18, 11.3.7	Open forest to low woodland on sandy soils featuring *Callitris glaucophylla* and *Allocasuarina luehmannii* located between Goodiwindi and Millmerran.

Burrow Pit
Site 2

Whetstone

Yelarbon

Glenarbon

Macintyre Brook

25
26
27
28
29
30

Legend

Temporary Disturbance Footprint
Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Regrowth
Remnant
Major Watercourse Lines

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3

0 350 700Meters

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Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Whetstone State Forest

Whetstone

Whetstone Material Distribution Centre

Glenarbon

Macintyre Brook

Legend

- Temporary Disturbance Footprint
- Permanent Disturbance Footprint

Habitat Type

- Potentially Suitable Habitat

GTRE : Vegetation Condition

- Non Remnant
- Regrowth
- Remnant
- Major Watercourse Lines
- Whetstone State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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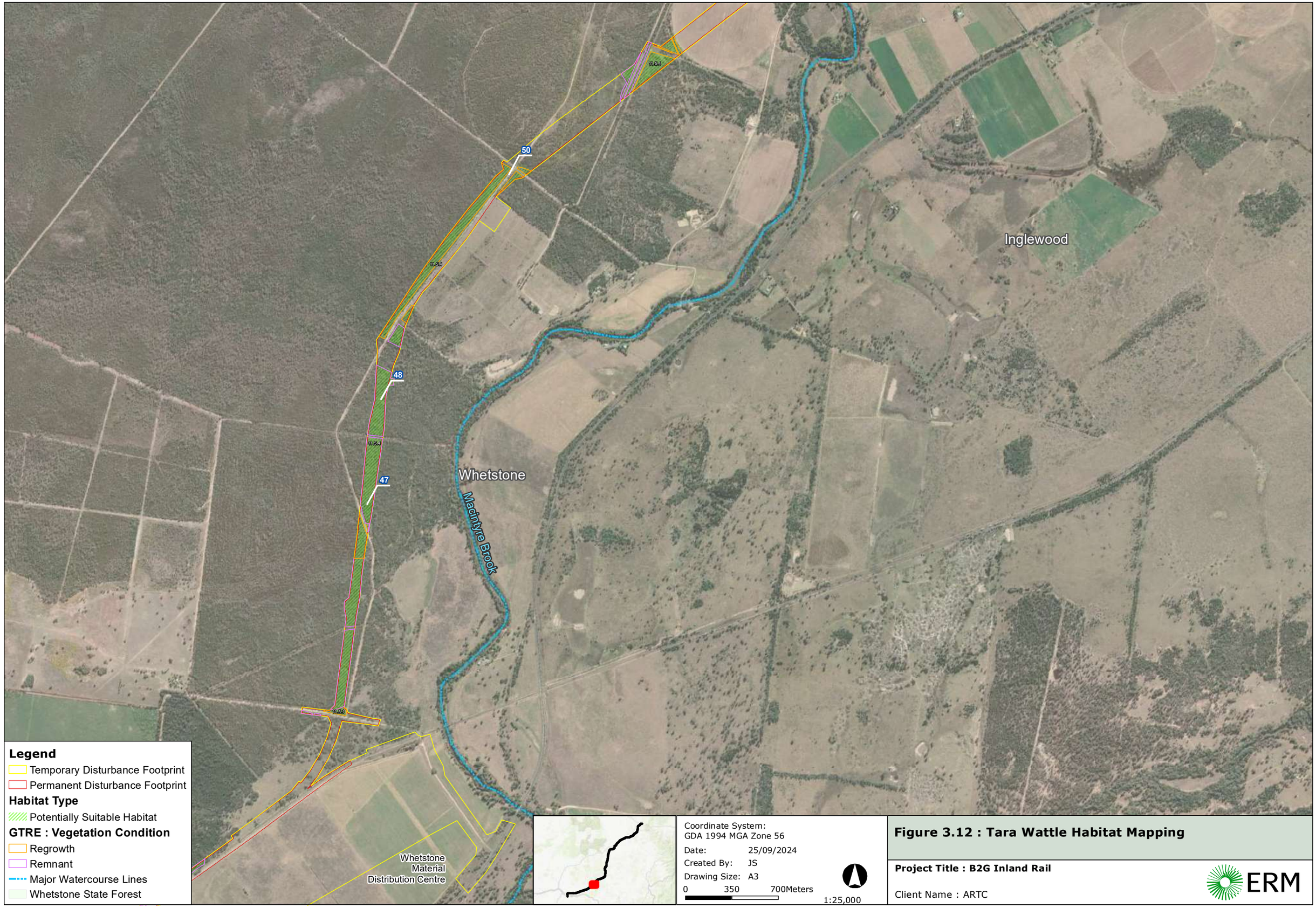

Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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Canning Creek

Inglewood Non-Resident Workforce Accommodation

Mosquito Creek

Bringalily State Forest

Inglewood

Borrow Pit Site 4

Canning Creek

Borrow Pit Site 3

Coolmunda

Legend

- Temporary Disturbance Footprint
- Permanent Disturbance Footprint

Habitat Type

- Potentially Suitable Habitat

GTRE : Vegetation Condition

- Regrowth
- Remnant
- Major Watercourse Lines
- Bringalily State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3

0 350 700Meters

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Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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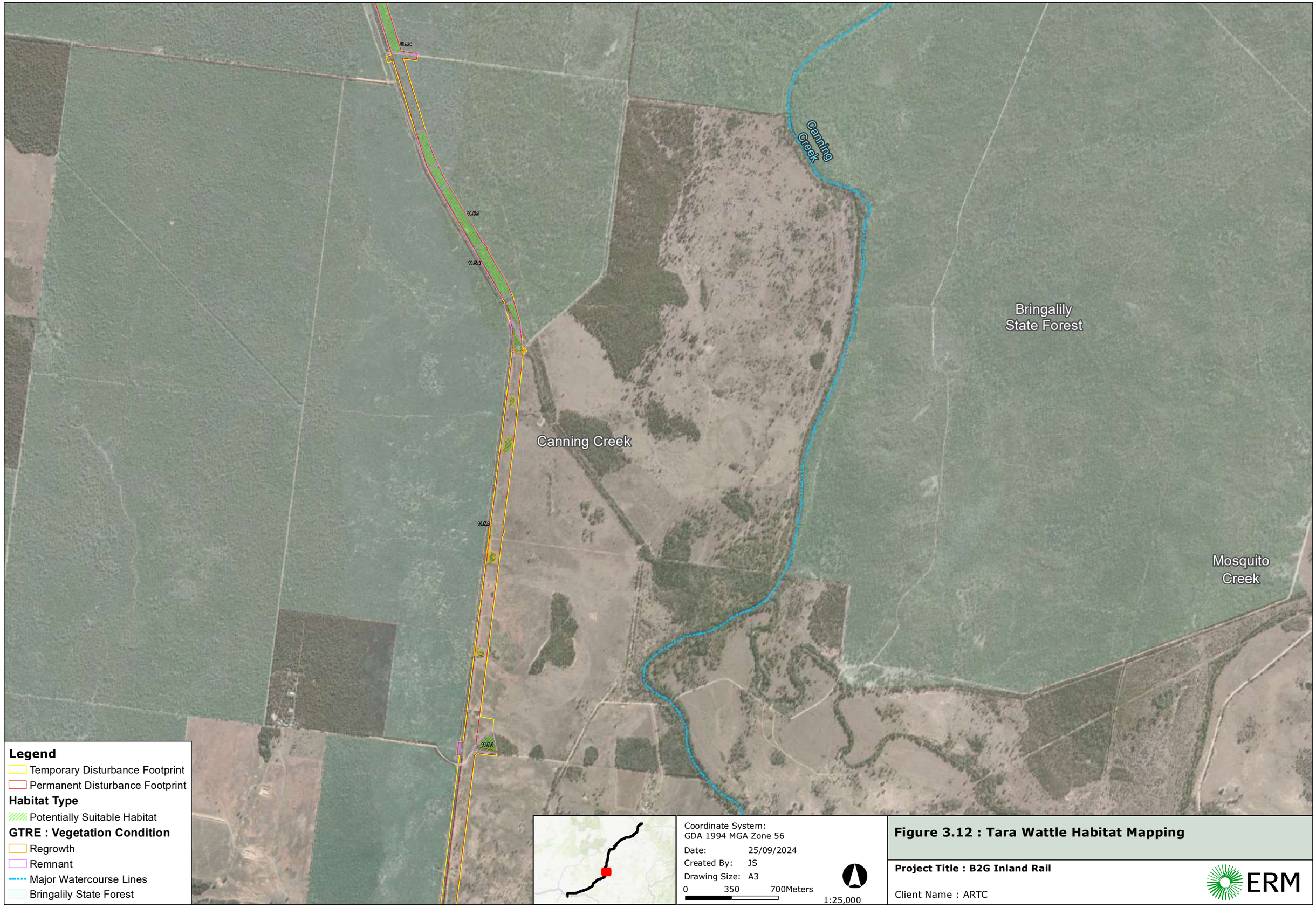

Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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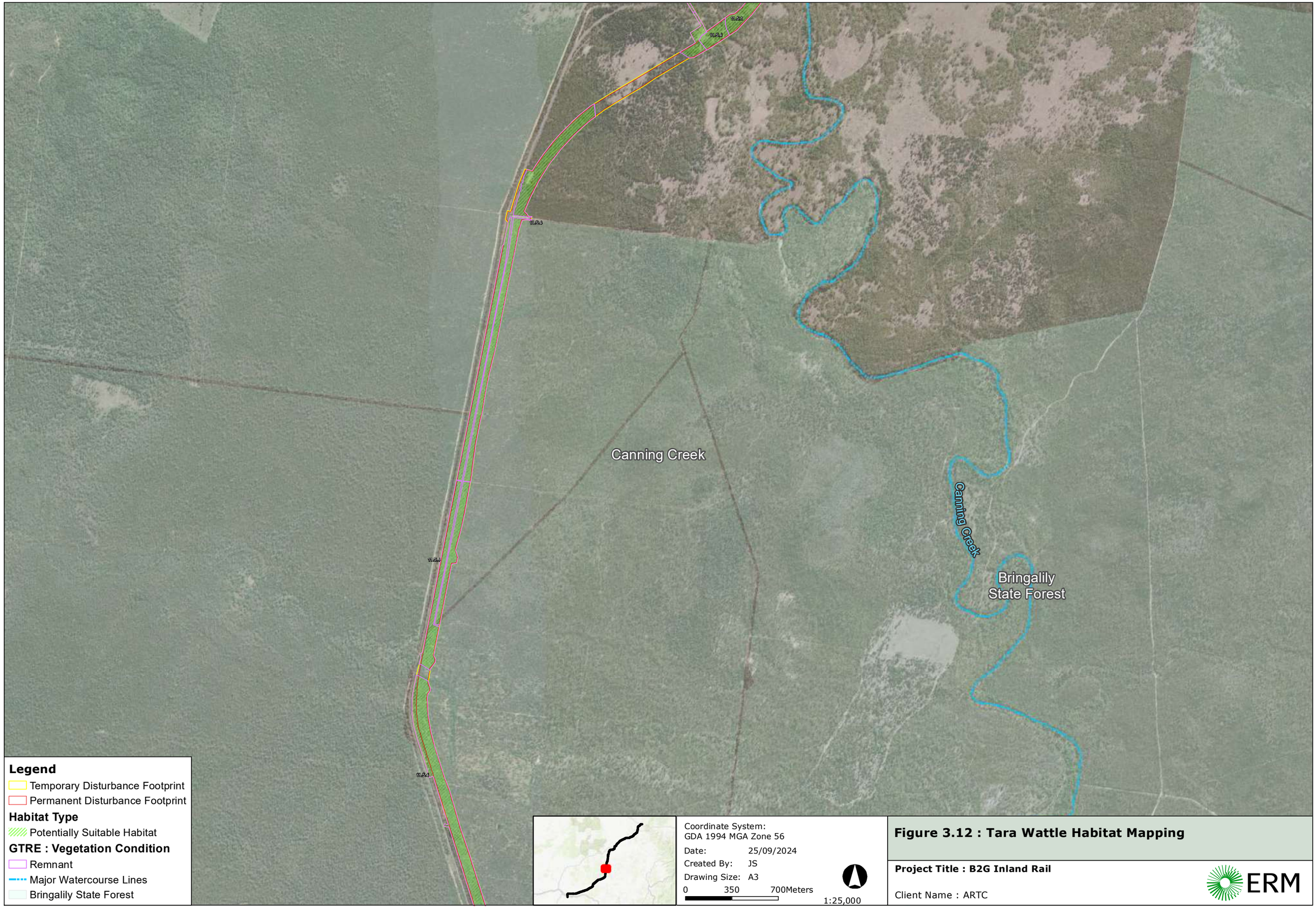

Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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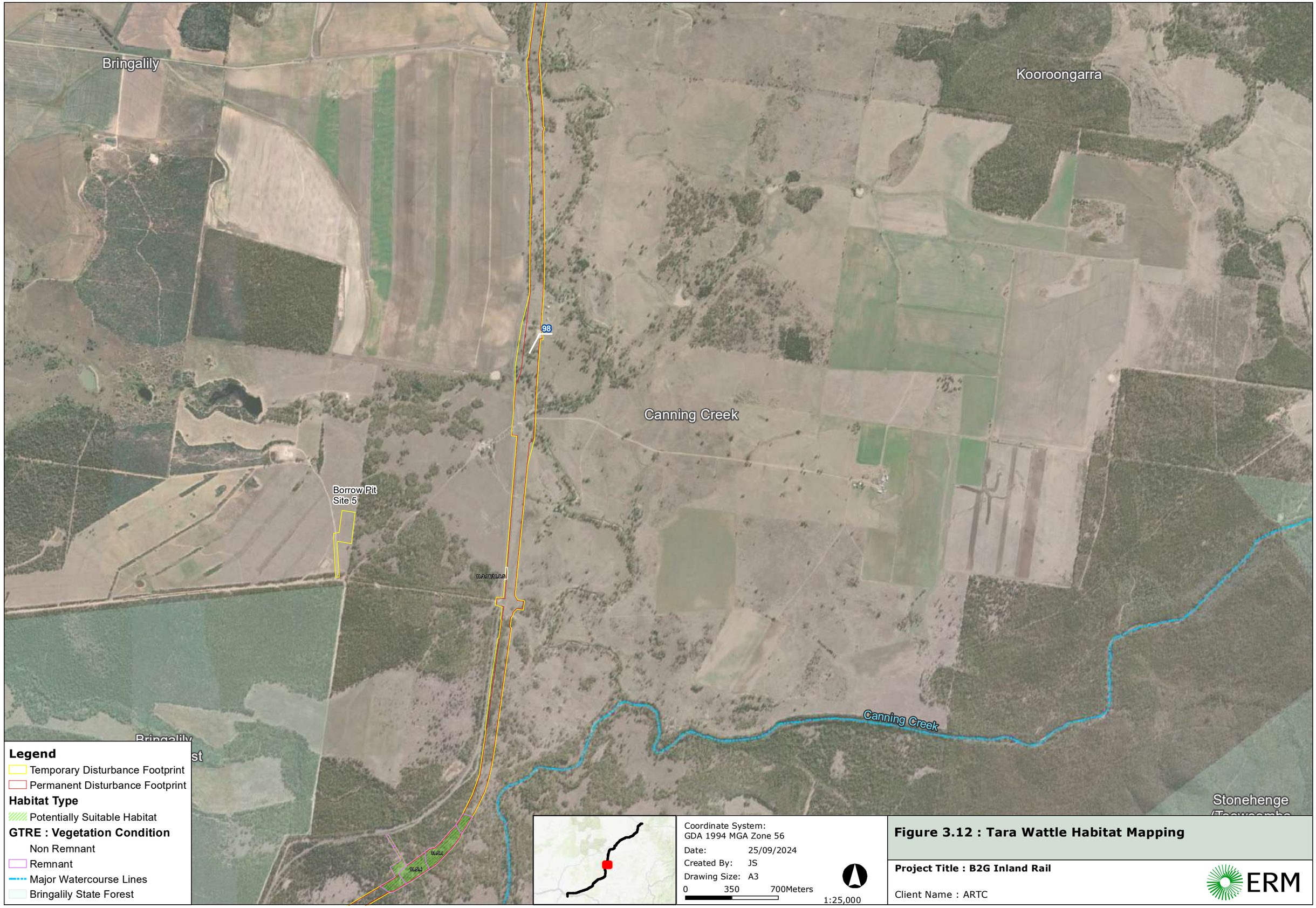

Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 3.12 : Tara Wattle Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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3.10.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to Tara wattle:

- Susceptibility to disturbance such as road widening; and
- Frequent fires which deplete the soil seed bank (DEWHA, 2008).

3.10.5 EPBC STATUTORY DOCUMENTS

There are no adopted or made recovery plan or threat abatement plants relevant for Tara wattle (DoE, 2024). There is no recovery plan required. The species conservation advice is as follows:

- Approved Conservation Advice for *Acacia lauta* (DEWHA, 2008).

3.10.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice lists the following priority actions:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate or vegetation disturbance in areas where A. lauta occurs do not adversely impact on known populations;
  - Protect populations of the listed species on private land through the development of conservation agreements and/or covenants;
  - Manage any other known, potential or emerging threats;
  - Control access routes to suitably constrain public access to known sites on public land;
  - Suitably control and manage access on private land; and
  - Minimise adverse impacts from land use at known sites.
- Fire:
  - Develop and implement a suitable fire management strategy for *A. lauta*; and
  - Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigative measures in bush fire risk management plans, risk register and/or operation maps.
- Conservation information:
  - Raise awareness of *A. lauta* within the local community;
  - Enable recovery of additional sites and/or populations;
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

3.10.7 REFERENCES

Atlas of Living Australia (2024). *Acacia lauta*. Available from: https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2886854#overview [Accessed 23 January 2024].

Department of the Environment (2024). *Acacia lauta* in Species Profile and Threats Database, Canberra. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=4165 [Accessed 23 January 2024].

Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Acacia lauta*. Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/4165-conservation-advice.pdf.

Queensland Herbarium. (2018 Tara wattle (*Acacia lauta*). [Image] [Online] Available from https://images.ala.org.au/image/details?imageId=746f0ac2-d9ee-474d-8de6-b9b9cb43579f. [19 September 2019].

3.11 WINGED PEPPERCRESS (*LEPIDIUM MONOPLOCOIDES*)

3.11.1 STATUS

EPBC Act – Endangered, effective 16 July 2000

3.11.2 BIOLOGY AND ECOLOGY

3.11.2.1 CHARACTERISTIC

Winged peppercress (*Lepidium monoplocoides*) is an erect annual herb or perennial forb growing approximately 15 – 20 cm tall, with angular and striped stems roughened with small warts (DoE, 2024). The species has narrow and linear leaves, typically 2 – 7 cm in length (refer to Plate 3-31). Winged peppercress produces small flowers which are borne in elongated clusters and the petals are minute or absent. Fruit are two-celled, flattened circular pods on a spreading stalk, approximately 5 mm long and 4 mm wide, with pointed wings extending to a narrow notch at the tip (DoE, 2024).

PLATE 3-31 WINGED PEPPERCRESS (*LEPIDIUM MONOPLOCOIDES*)

Source: Copeland (n.d.)

3.11.2.2 KNOWN DISTRIBUTION

Winged peppercress is widespread in the semi-arid western plains regions of NSW and through to north-western Victoria (DoE, 2024). In Queensland, several specimens have been recorded near the border of NSW around Goondiwindi and Yelarbon, however there are no specimens in herbaria to support this (DoE, 2024) (refer to Plate 3-32).

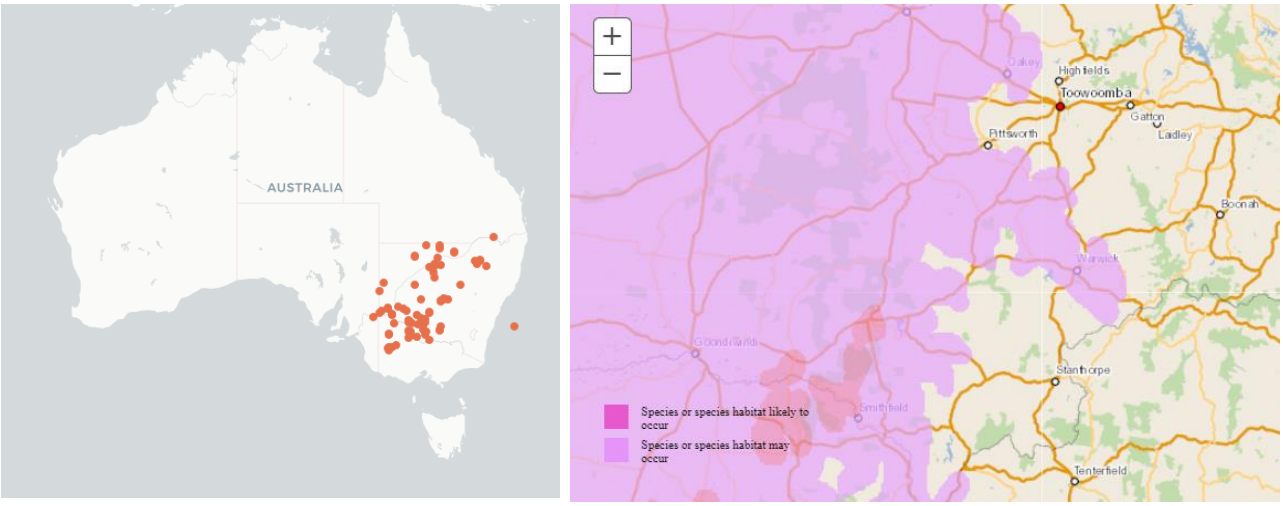

PLATE 3-32 DISTRIBUTION RANGE OF WINGED PEPPERCRESS

Source: ALA (2024); DoE (2024)

3.11.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Winged peppercress is assessed as being known to occur within the Project footprint due to numerous populations of the species recorded during field surveys.

There is one desktop record (ALA) of the species within the Project footprint, recorded in 2005 along Yelarbon – Keetah Road in Yelarbon (ALA, 2024). There is an additional record north of Yelarbon, in proximity to the Yelarbon Sewage Plant, approximately 500 m from the Project footprint, recorded in 2011 (ALA, 2024). There is only one (1) additional record within 50 km of the Project footprint, recorded in 2001 along Tarwoona Road (NSW), approximately 7.8 km south of the Project footprint (refer to Plate 3-33; ALA, 2024).

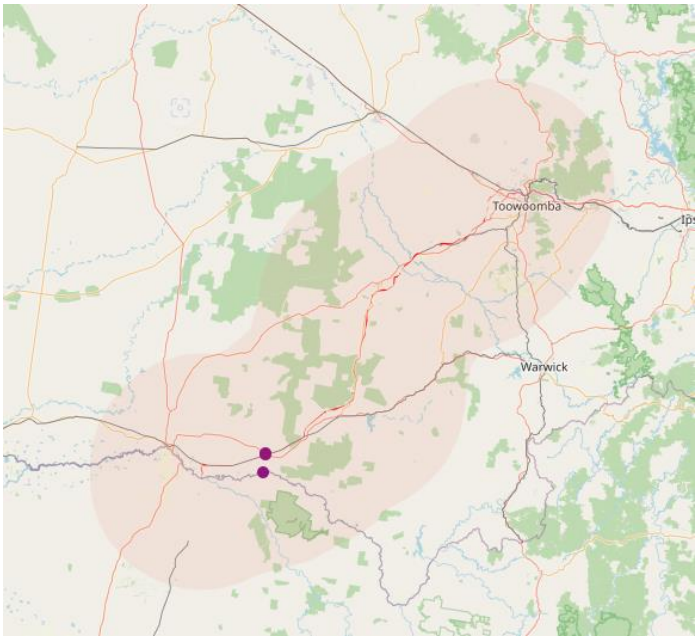

PLATE 3-33 DISTRIBUTION RANGE OF WINGED PEPPERCRESS IN RELATION TO THE PROJECT

Source: ALA (2020)

3.11.2.4 BIOLOGY AND REPRODUCTION

Winged peppercress flowers between August and October (DoE, 2024).

3.11.3 HABITAT

Winged peppercress occurs in mallee scrub in semi-arid areas where sites are seasonally moist to waterlogged (DoE, 2024). The species grows in areas with heavy fertile soils and a mean annual rainfall of 300 – 500 mm. Within these habitats, the species generally grows in open woodland dominated by bulloak (*Allocasuarina luehmannii*) and/or *Eucalyptus* spp., particularly black box (*Eucalyptus largiflorens*) or poplar box (*Eucalyptus populnea*) (DoE, 2024).

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons. For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. No Essential Habitat for this species occurs within the Project footprint. Habitat mapping for the species within the study area is presented in Figure 3-13. Habitat mapping within a 5 km buffer of the Project was used for the flooding assessment and is presented in Figure 3-14 (see Section 5.2.13 of the MNES technical report).

Figure 3.13 : Winged Peppercress Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Yelarbon Non-Resident Workforce Accomodation

Burrow Pit Site 2

Whetstone

Yelarbon

Brigalow Creek

Macintyre Brook

22

23

25

27

28

29

30

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Potentially Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Regrowth

Remnant

Major Watercourse Lines

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024

Created By: JS

Drawing Size: A3

0 400 800Meters

1:30,000

Figure 3.14 : Winged Peppercress Habitat Mapping Within 5 Km Buffer

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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3.11.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the winged peppercress (Mavromihalis, 2010; OEH, 2018):

- Agricultural development;
- Habitat removal;
- Grazing and trampling;
- Disturbances associated with communications towers, service roads and fire-breaks;
- Recreational 4WD vehicles;
- Altered hydrology;
- Increased salinity;
- Weed invasion; and
- Drought and climate change.

3.11.5 EPBC STATUTORY DOCUMENTS

The species has adopted the following recovery plan:

- National Recovery Plan for the Winged Peppercress *Lepidium monoplocoides* (Mavromihalis, 2010)

The following threat abatement plans has been identified as being relevant for this species:

- Threat abatement plan for competition and land degradation by rabbits (DoEE, 2016); and
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (DoEE, 2017).

3.11.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The recovery plan outlines the following priority recovery objectives for the species:

- Determine distribution, abundance and population structure;
- Determine habitat requirements;
- Manage threats to populations;
- Identify key biological functions;
- Determine growth rates and viability of populations;
- Establish a seed bank; and
- Build community support for conservation.

Relevant management strategies relevant to *Lepidium monoplocoides* include population control. Following the plan, control efforts should be:

- Targeted to protect sites where rabbits pose the greatest threat to biodiversity;
- Undertaken in a strategic manner to take advantage of the environmental conditions and other complementary activities; and
- Monitored to ensure that objectives are met and allow management options to be adapted to changing circumstances.

Threat abatement actions as outlined in the threat abatement plan for feral pics (*Sus scrofa*) include:

- Implementation of control measures including trapping, aerial and ground shooting, poisoning and fencing;
- Using tracking dogs to detect and flush out feral pigs by commercial harvesters;
- Manipulating habitat by reducing watering point and crop waste; and
- Manage feral pigs within a policy, legislative and planning framework.

3.11.7 REFERENCES

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3.12 *XEROTHAMNELLA HERBACEA*

3.12.1 STATUS

EPBC Act – Endangered, effective 16 July 2000

3.12.2 BIOLOGY AND ECOLOGY

3.12.2.1 CHARACTERISTIC

Xerothamnella herbacea is a sparse, sprawling, perennial herb growing approximately 30 cm in height. The plant's stems extend from a central point, however they can root at the nodes when in contact with the soil (DAWE, 2008).

Leaves are arranged in opposite pairs and are soft, linear to narrowly ovate in outline, dark green above and paler beneath (DAWE, 2008). The species produces small, bright pink to mauve flowers, which are two lipped and 6.5 mm in length and occur in the upper leaf axils (refer to Plate 3-34; DAWE, 2008).

PLATE 3-34 *XEROTHAMNELLA HERBACEA*

Source: QLD Herb (2018), ALA (2024)

3.12.2.2 KNOWN DISTRIBUTION

Xerothamnella herbacea has a restricted distribution as the species is only known to occur from two sites; Theodore and Yelarbon, Queensland (refer to Plate 3-35; DEWHA, 2008).

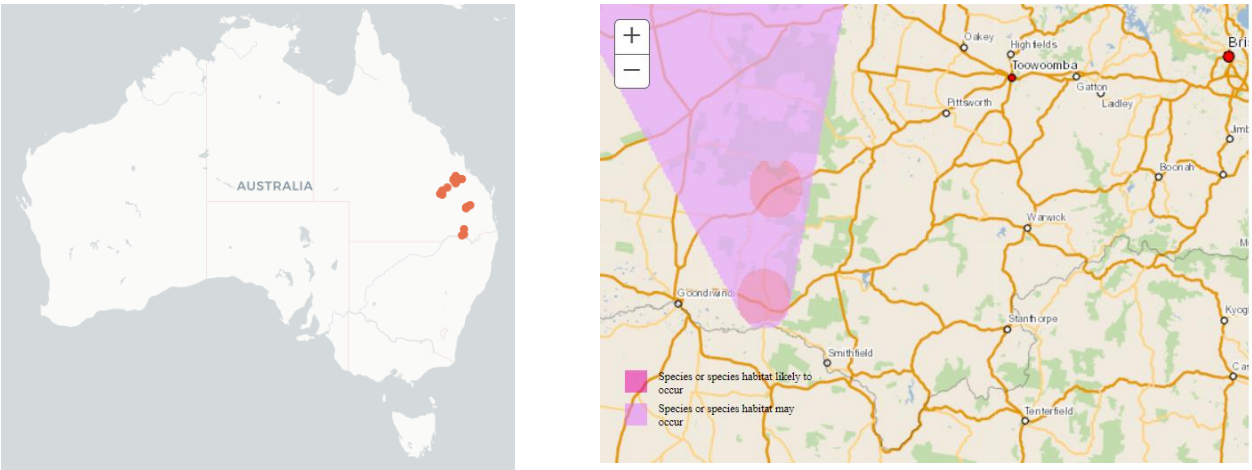

PLATE 3-35 DISTRIBUTION RANGE OF *XEROTHAMNELLA HERBACEA*

Source: ALA (2024), DoE (2024)

3.12.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Xerothamnella herbacea is known to occur within the Study Area as it has been recorded within the Project footprint. Multiple individuals of the species were identified within the Project footprint, south-west of Yelarbon.

There is one desktop record (ALA) of the species within the Project footprint, recorded in 2020 along Yelarbon-Kurumbul Road, between Goondiwindi and Yelarbon (ALA, 2024). There are an additional two (2) records within 50 km of the Project footprint, of which, one was recorded in 2006, in close proximity to Merton Road north of Yelarbon; and the other was recorded along the Gore Highway north of Yelarbon, in 2007 (refer to Plate 3-36; ALA, 2024).

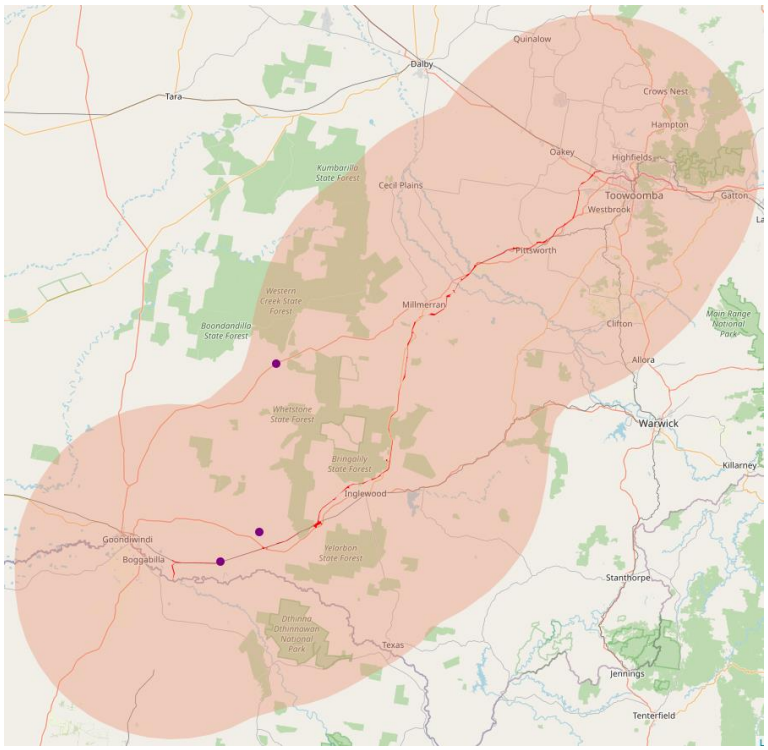

PLATE 3-36 DISTRIBUTION RANGE OF *XEROTHAMNELLA HERBACEA* IN RELATION TO THE PROJECT

Source: ALA (2024)

3.12.2.4 BIOLOGY AND REPRODUCTION

There is no information available on the biology and reproduction of *Xerothamnella herbacea*.

3.12.3 HABITAT

Xerothamnella herbacea grows on heavy, grey to dark brown clay soils in shaded areas and in leaf litter of Brigalow (*Acacia harpophylla*) dominated communities (DEWHA, 2008). The species is also known to grow in association with gilgais (DEWHA, 2008). Of the four known populations, three grow in cleared areas or non-remnant vegetation (DEWHA, 2008).

Habitat mapping for areas subject to detailed surveys was conducted in accordance with the Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020). Individuals identified by point locations were buffered by a 30 m radius, with overlapping boundaries combined to form complete polygons.

For all other flora records, habitat was mapped in accordance with the Method for mapping matters of state environmental significance (Version 7) (DESI, 2024) where all flora records were compiled, vetted and buffered by 1 km to map areas of suitable habitat. Areas mapped as Essential Habitat for this species were also included. Habitat mapping for the species within the study area is presented in Figure 3-15.

Figure 3.15 : *Xerothamnella herbacea* Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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3.12.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to *Xerothamnella herbacea*:

- Competition and alteration of fire regimes from invasive plant species;
- Road widening and maintenance activities;
- Surface erosion; and
- Grazing and trampling by cattle and native macropods (DEWHA, 2008).

3.12.5 EPBC STATUTORY DOCUMENTS

There is no adopted or made recovery plan or threat abatement plan relevant for *Xerothamnella herbacea* (DoE, 2024). There is no recovery plan required. The species consevration advice is as follows:

- Approved Conservation Advice for *Xerothamnella herbacea* (DEWHA, 2008).

3.12.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice outlines the following as priority actions:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate or vegetation disturbance in areas where *X. herbacea* occurs do not adversely impact on known populations;
  - Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on *Xerothamnella herbacea*; and
  - Investigate formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure.
- Invasive weeds:
  - Develop and implement a management plan for the control of Green Panic and Buffel Grass in the local region.
- Trampling, browsing or grazing:
  - Develop and implement a management plan for the control of stock and native macropods, particularly the Black-striped Wallaby (*Macropus dorsalis*).
- Fire:
  - Develop and implement a suitable fire management strategy to minimise the intensity and frequency of fires in remnant Brigalow and Semi-evergreen vine thicket communities; and
  - Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigative measures in bush fire risk management plans, risk register and/or operation maps.

- Conservation information:
  - Raise awareness of the *X. herbacea* within the local community.
- Enable recovery of additional sites and/or populations:
  - Undertake appropriate seed collection and storage;
  - Investigate options for linking, enhancing or establishing additional populations; and
  - Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

3.12.7 REFERENCES

Atlas of Living Australia (2024). *Xerothamnella herbacea*. Available from: https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2908833 [Accessed 24 January 2024].

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4. FAUNA SPECIES – THREATENED SPECIES – INVERTEBRATES

4.1 BRIGALOW WOODLAND SNAIL (*ADCLARKIA CAMERONI*)

4.1.1 STATUS

EPBC Act – Endangered, effective 7 December 2016

4.1.2 BIOLOGY AND ECOLOGY

4.1.2.1 CHARACTERISTIC

The Brigalow woodland snail (*Adclarkia cameroni*) has a thin, medium to large shell (diameter 20 mm) exhibiting a light brownish-yellow colouration, with reddish bands on the whorls. The shell is somewhat flattened, with a low, domed spire. The whorls are rounded and tightly coiled and the last whorl is flared. The sutures are weakly present and the tip of the shell bares small rounded knobs. Much of the rest of the shell bares fine, scaly knobs on the upper half of the whorls and is glossy underneath. The shell also bares very fine, wavy ridges running across each whorl (TSSC, 2016).

4.1.2.2 KNOWN DISTRIBUTION

The Brigalow woodland snail is endemic to south-east Queensland, occurring only in small remnant patches of Brigalow (*Acacia harpophylla*) and eucalypt woodland patches dominated by coolibah (*Eucalyptus coolabah*) and black box (*E. largiflorens*) on the Condamine River floodplain, particularly in the area surrounding Dalby and Chinchilla (refer to Plate 4-1; TSSC, 2016).

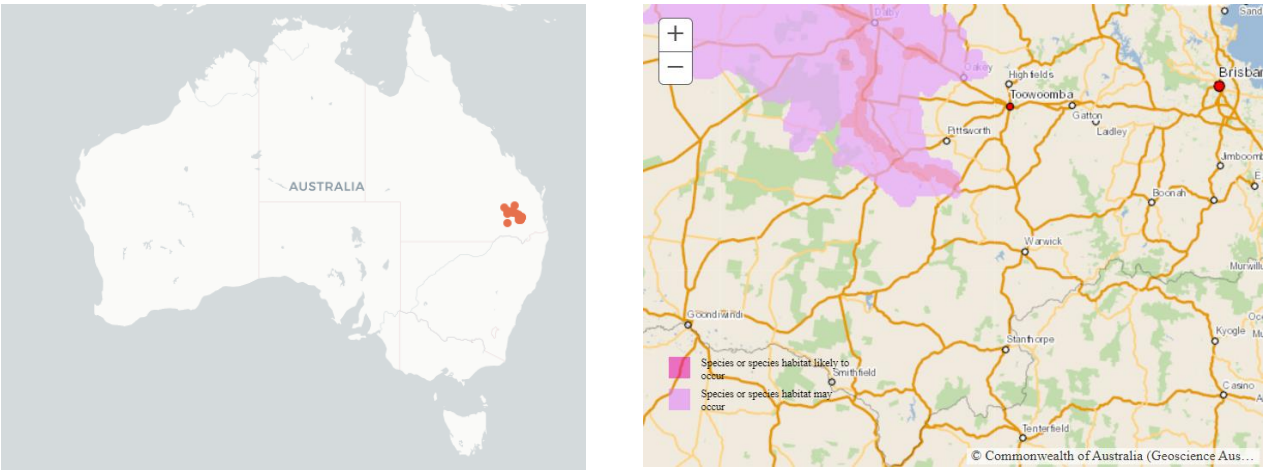

PLATE 4-1 DISTRIBUTION RANGE OF BRIGALOW WOODLAND SNAIL

Source: ALA (2024), DoE (2024)

4.1.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Brigalow woodland snail is assessed as known to occur within the Project footprint due to direct records at 11 surrey locations between Brookstead and Canning Creek by Boobook. Whilst being directly recorded during field surveys, there are no desktop records of the species within the Project footprint or within the MNES Study Area (ALA, 2024).

There is one record of the species within 50 km of the Project footprint, recorded along the Gore Highway approximately 45km west of the northern-most portion of the alignment, in 2002 (refer to Plate 4-2; ALA, 2024). Species records outside of a 50 km radius of the Project are concentrated between Dalby and Miles.

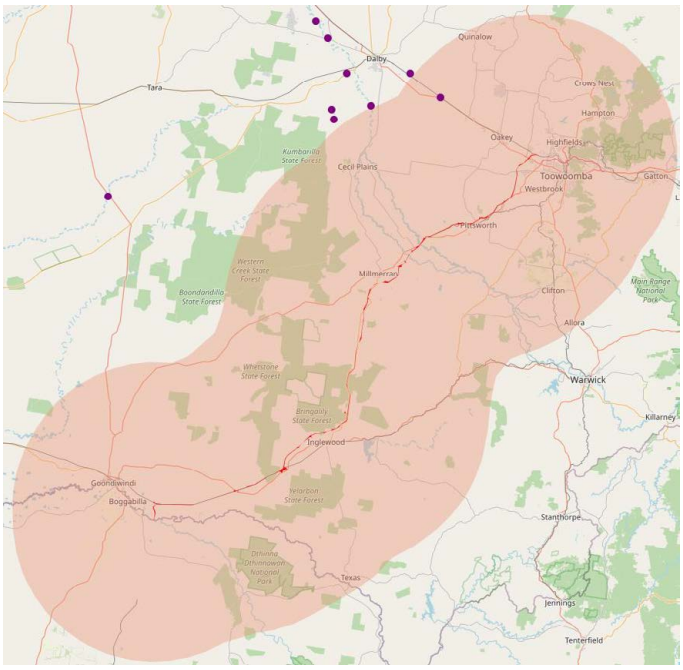

PLATE 4-2 DISTRIBUTION RANGE OF BRIGALOW WOODLAND SNAIL IN RELATION TO THE PROJECT

Source: ALA (2024)

4.1.2.4 BIOLOGY AND REPRODUCTION

Brigalow woodland snail likely feeds on fungi, lichen, algae, and other detritus/biofilm growing on and underneath forest debris (TSSC, 2016). Feeding has not been observed but is likely to occur in the evenings or during rain events when humidity is high.

Although egg-laying has not been recorded for this species, the species is likely to lays their eggs in depressions in the soil under logs and other debris, similar to other snails. The species aestivate during drier phases and require moisture and therefore canopy cover to keep their eggs from desiccating. Based on other snail species from the same family, sexual maturity is most likely reached at two years and life expectancy five years. Mature snails lay eggs on an annual basis depending on favourable weather conditions and can lay more than one clutch if the summer rainy period is long enough (TSSC, 2016).

This species requires canopy, shrubs, and on-ground timber cover for survival at all life stages – as desiccation is one of the greatest threats to eggs (TSSC, 2016).

4.1.3 HABITAT DESCRIPTION AND DEFINITION

Stanisic et al. (2010) states: The brigalow woodland snail is endemic to South-east Queensland and is found in small remnant patches of brigalow (*Acacia harpophylla*) and eucalypt woodland patches dominated by coolibah (*Eucalyptus coolabah*) and poplar box (*E. populnea*) on the Condamine River floodplain. The brigalow patches occur on black alluvial soils and adjoining undulating low hills with heavy clays, both soils with high water retention.

The Condamine River riparian corridor features dense canopy, and scattered timber from flood debris, both of which ensure that the environmental moisture remains high and stable (TSSC, 2016).

Eddie (2022) goes on to add: Virtually no other habitat information has been published since the species description and subsequent Commonwealth listing (TSSC 2016). There are currently no documented RE associations or vegetation structural/floristic data available for known sites. Brigalow Woodland Snail was detected, through the survey for this Project undertaken by C. Eddie (2022), in the following remnant and/or regrowth habitat types Regional Ecosystems 11.3.2, 11.3.25, 11.3.17 and 11.9.5. He notes, although much of the habitat within the Project Area has been cleared and fragmented the survey has demonstrated that a significant population of Brigalow Woodland snail occurs within the Project Area.

The railway alignment partially overlaps species modelled distribution of habitat that may occur and is likely to occur, however the majority of the railway alignment is located outside of the modelled species distribution (as per the modelled distribution mapping on the species SPRAT profile) (DoE, 2023).

The brigalow woodland snail has very limited mobility. Under favourable conditions, such as rain, this species can move between suitable areas of microhabitat, but the extent to which this occurs will be limited by the spatial arrangement of microhabitat patches and it likely only moves a matter of meters within its lifetime. Hoofed animals (e.g., cows, pigs) can directly trample the snails and disturb and reduce ground cover and leaf litter. Feral pigs can also overturn and destroy some microhabitat (small logs and timber) which provides feeding and breeding habitat (TSSC, 2016; C. Eddie pers. comm., 2024).

Habitat critical to the survival of the species is not defined in the Conservation Advice (TSSC, 2016), however, important habitat would be microhabitat which includes: logs, rocks, timber/vegetation piles, loose bark piles, loose bark at the base of trees, and dense leaf litter. One or more of the above microhabitat features needs to be present for the species to be present at any given site. However, there is no data available concerning the abundance/density of microhabitat features required to support the species. The brigalow woodland snail has been found to persist in narrow strips of vegetation (<30 m wide). Note that such strips may not necessarily meet remnant vegetation mapping criteria (Neldner et al. 2022), however for the purposes of the snail they represent known or potential habitat (Eddie, 2022).

Habitat mapping for the species within the Project footprint has been undertaken using the habitat criteria in Table 4-1 and is presented in Figure 4-1. The DCCEEW standard break down for habitat (i.e. breeding, foraging, dispersal) is not used due to the niche ecology of the species described above.

TABLE 4-1 HABITAT CRITERIA FOR BRIGALOW WOODLAND SNAIL WITHIN THE STUDY AREA

Habitat function	Habitat Description	Regional Ecosystems	Habitat mapping rules
Suitable habitat	Patches of woodland areas featuring brigalow, coolibah or poplar box with ground debris is critical to survival and increases the species' ability to disperse and recolonise.	11.3.1, 11.3.2, 11.3.4, 11.3.17, 11.3.25, 11.4.3, 11.4.10, 11.9.5, 11.9.7, 11.9.10 11.3.14 and 11.3.18 only where soils have good water retention	Patches of woodland areas featuring brigalow, coolibah or poplar box. Fallen logs (woody debris), fallen bark cover, leaf litter cover or flood debris are common to abundant (>10% coverage). Areas include narrow strips of roadside vegetation (<30 m wide). REs 11.3.14 and 11.3.18 as habitat only where soils are clay to loam and microhabitat as above is present. Areas not impacted by grazing or cropping. Only areas between the lowlands of the Toowoomba range and Canning Creek are to be included in mapping. These areas align with areas surveyed during the snail surveys conducted by Boobook (Eddie, 2022). Areas outside of this range are considered to be outside of the species' distribution.
Suitable habitat buffer	Mapped as suitable habitat.	11.8.4, 11.8.5	A 50 m buffer around the above defined areas, only where they are adjacent to REs 11.8.4 or 11.8.5 and where fallen logs (woody debris), fallen bark cover, leaf litter cover or flood debris are common to abundant (>10% coverage).
Not suitable habitat	Cleared land free of ground debris, particularly if used for grazing.		Areas with scattered to no microhabitat present or where grazing or cropping are present.

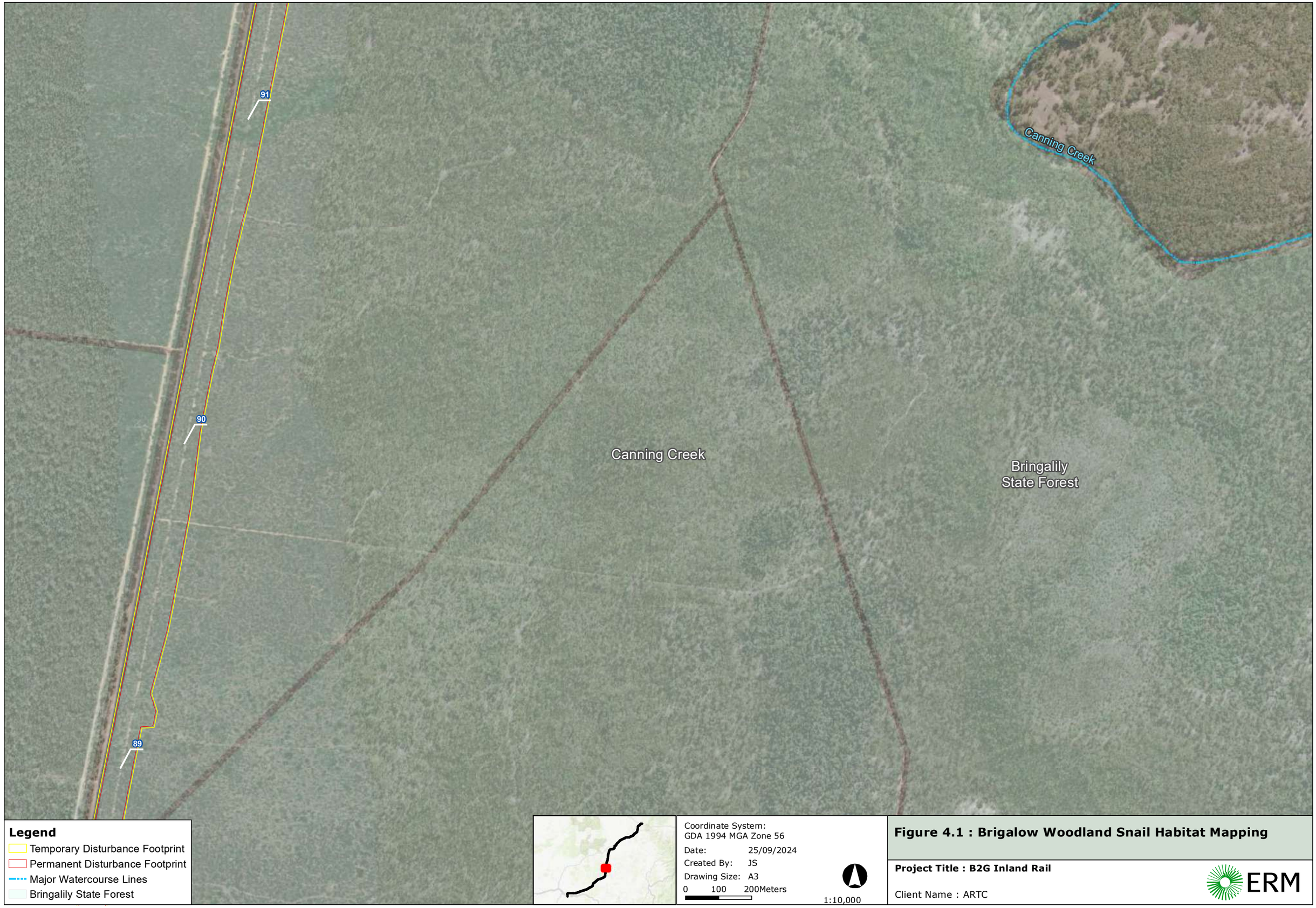

Figure 4.1 : Brigalow Woodland Snail Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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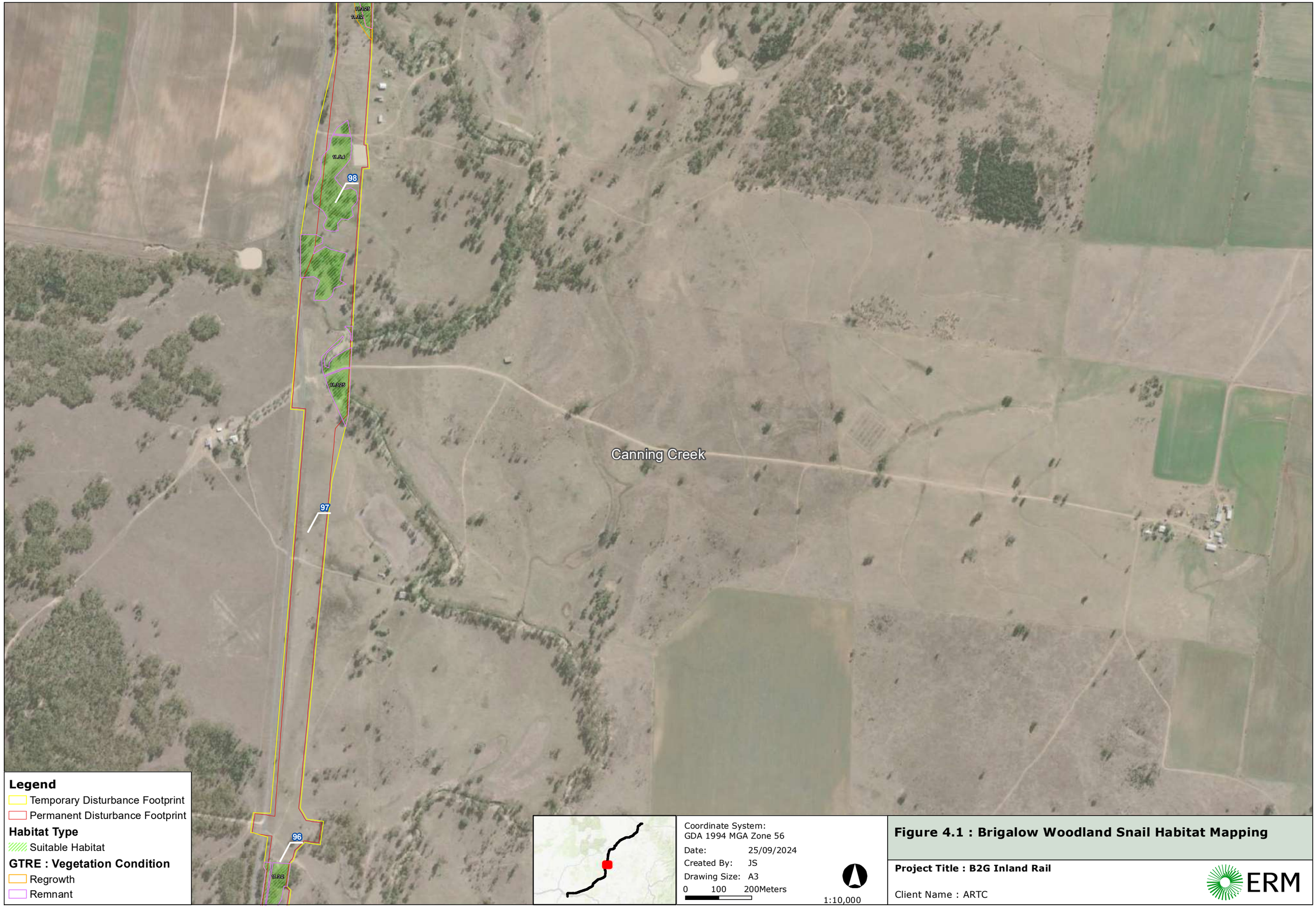

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Project Title : B2G Inland Rail

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ERM

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105

104

103

Bringalily

Kooroongarra

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Remnant

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 100 200Meters

1:10,000

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ERM_ANZ_2023_A3_Landscape_MNES.mxd

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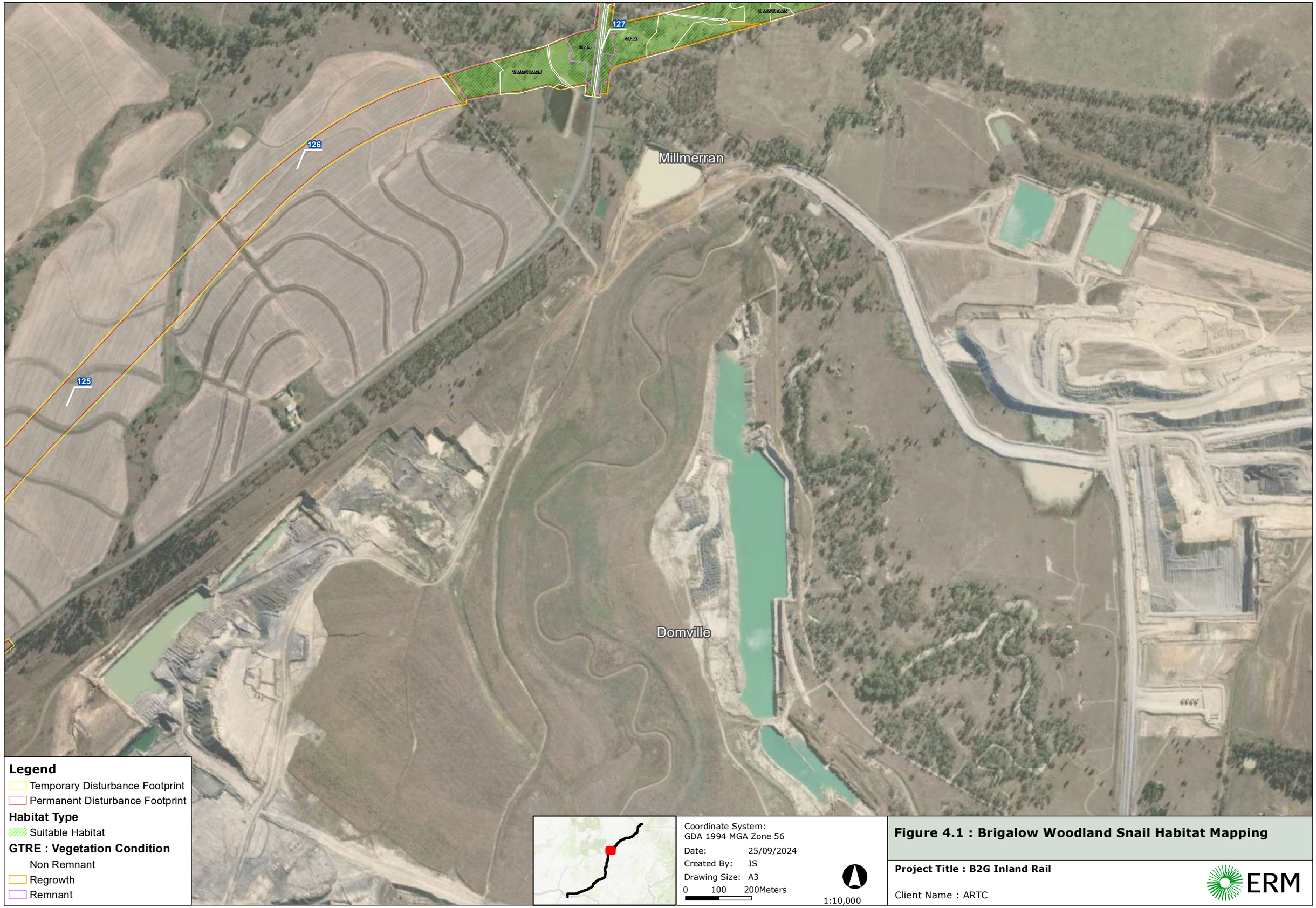

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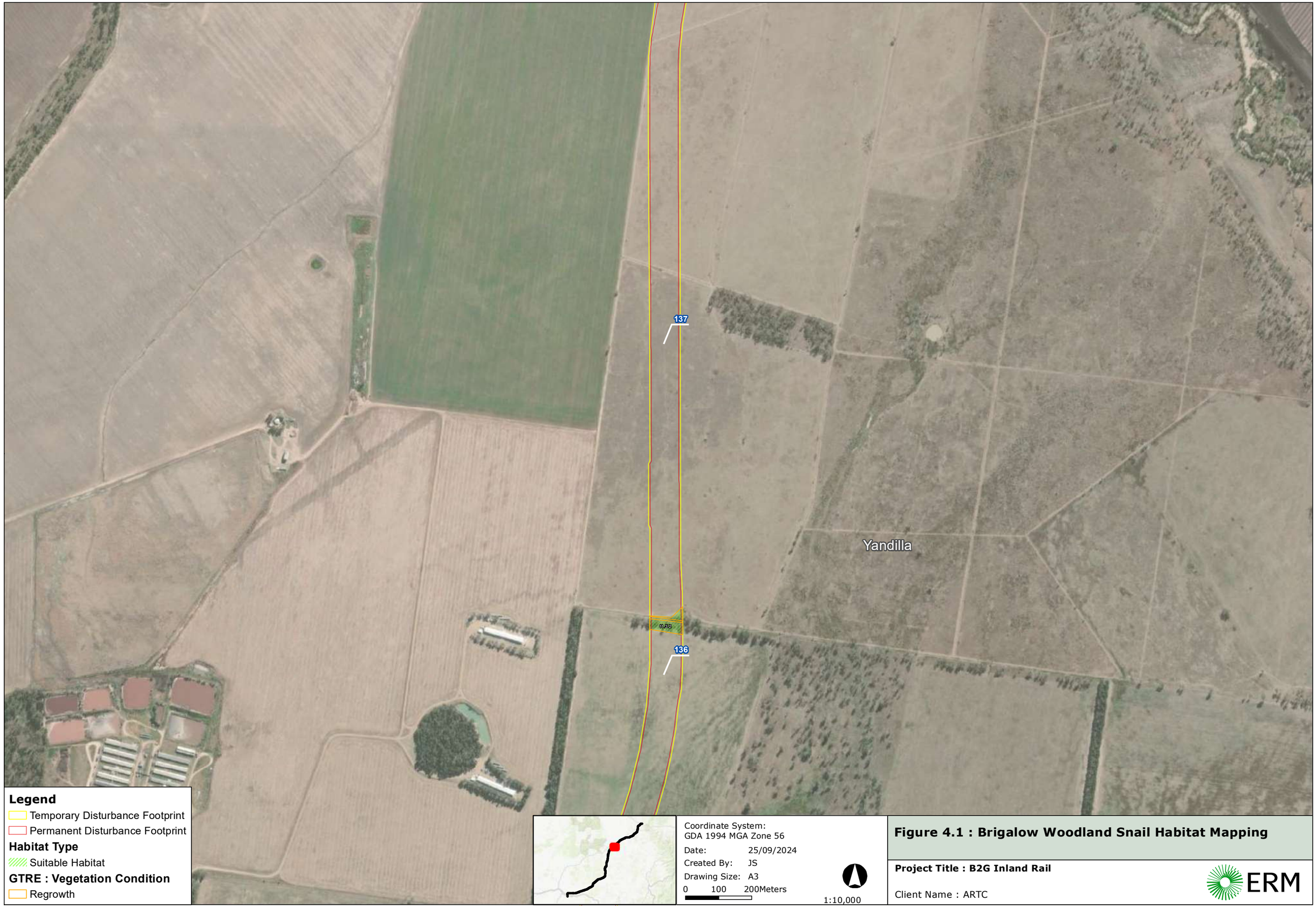

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Project Title : B2G Inland Rail

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Figure 4.1 : Brigalow Woodland Snail Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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4.1.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to brigalow woodland snail:

- Land clearing and habitat disturbance from agriculture and mining;
- Invasive species (i.e. predation by introduced rat species and pigs);
- Invasion of buffel grass (*Cenchrus ciliaris*);
- Trampling by livestock; and
- High intensity fires (TSSC, 2016).

4.1.5 EPBC STATUTORY DOCUMENTS

No adopted or made recovery plan or threat abatement plan is relevant for brigalow woodland snail. A recovery plan is not required for the species as the approved conservation advice provides sufficient direction to implement priority actions and mitigate against key threats. The species conservation advice is as follows:

- Conservation Advice *Adclarkia cameroni* brigalow woodland snail (TSSC, 2016).

4.1.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

- Land clearing:
  - Prevent clearing of all brigalow habitat within the species' range, and in other areas where the brigalow woodland snail may occur; and
  - Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate and/or secure inclusion in reserve tenure if possible. Seek to increase the level of legislative protection and active management planning for localities where this species occurs.
- Habitat disturbance and modifications:
  - Retain a buffer of native vegetation and leaf litter around all occurrences of this species;
  - Manage any other likely, potential or emerging threats to habitat quality, such as further invasion of weeds and habitat modification by removal of firewood;
  - Erect appropriate signage to indicate conservation of individuals or groups of this species; and
  - Ensure land managers are aware of the species' occurrence and provide protection measures against key and potential threats.
- Invasive species:
  - o Identify and control buffel grass and any other weeds that could threaten the brigalow woodland snail with the careful use of herbicides. Ensure that any mechanical disturbance and overspray associated with chemical control are minimised, and do not impact this species;
  - o Manage predation and possible trampling by feral pigs at important sites through exclusion fencing or other barriers. Where possible, control feral pigs using appropriate methods; and

  - Where possible, manage predation by rats and mice using appropriate methods (e.g. DEWHA 2009). Consider monitoring the impact of feral predator control after any large fire or large rain event.
- Impacts of domestic species:
  - If livestock or horses occur in the area, manage trampling (and potential grazing of native vegetation) at important sites through exclusion fencing or other barriers.
- Fire:
  - Prevent all high intensity fires. Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the brigalow woodland snail, that they support rather than degrade the habitat necessary to this species, that they do not promote invasion of exotic species, and that they do not increase the impacts of grazing/predation;
  - If fire operations are necessary, physical damage to the habitat and individuals of the brigalow woodland snail must be avoided during and after operations, noting that fires during the active life stages of the snail are likely to be highly detrimental;
  - Fire management authorities and land management agencies should use suitable maps and install field markers to avoid damage to this species;
  - Ensure that a high proportion of the habitat is maintained with a post-fire age sufficient to provide adequate canopy cover (or habitat) for the brigalow woodland snail; and
  - Ensure that areas of dense ground cover/leaf litter are retained within the habitat if any prescribed low intensity fires are implemented.
- Stakeholder Engagement:
  - Raise awareness of the brigalow woodland snail within the local community. Engage with the relevant land managers (especially managers of private land and the Western Downs Regional Council) and encourage these key stakeholders to contribute to the implementation of conservation management actions;
  - Engage with additional stakeholders that could contribute to the implementation of conservation management actions, such as local catchment organisations (e.g., Queensland Murray-Darling Committee), land regeneration and wildlife care groups, local schools, ecological consultants, and the Queensland Museum;
  - Land managers (including pastoralists and the Western Downs Regional Council) should be given information about managing fire for the benefit of this threatened species; and
  - Prepare a management strategy with input from local experts.

4.1.7 REFERENCES

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5. FAUNA SPECIES – THREATENED SPECIES – FISH

5.1 MURRAY COD (*MACCULLOCHELLA PEELII*)

5.1.1 STATUS

EPBC Act – Vulnerable, effective 3 July 2003.

5.1.2 BIOLOGY AND ECOLOGY

5.1.2.1 CHARACTERISTICS

The Murray cod (*Maccullochella peelii*) is the largest freshwater species of fish in Australia, measuring up to 1.8 m in length and weighing approximately 10 kg; although, there are few records of the species reaching 100 kg. The Murray cod has a broad head, rounded snout, equal length jaws and a concaved facial profile (DoE, 2024). The species has light olive to dark green scales featuring a mottled pattern and white ventral colouration (DoE, 2024). The pectoral fins of the fish are rounded and large with soft dorsal, anal and caudal fins with distinctive red or white edging) (refer to Plate 5-1; DoE, 2024).

PLATE 5-1 MURRAY COD (*MACCULLOCHELLA PEELII*)

Source: flagstaffotos (2006)

5.1.2.2 KNOWN DISTRIBUTION

The natural distribution of the Murray cod was throughout the Murray Darling Basin, from south Australia, through Victoria, the Australian Capital Territory, New South Wales to southern Queensland, up to 1000 m above sea level (refer to Plate 5-2; DoE, 2024). Although the species still occurs in parts of this distribution, there have been numerous attempts of introduction the species outside of their natural range, including in waterways, impoundments. In Queensland, the species has been introduced to the Burnett and Fitzroy River systems and into the Cooper Creek system (DoE, 2024).

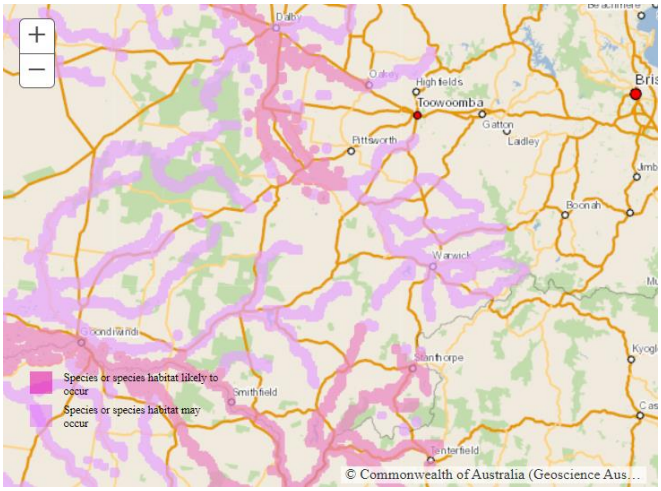

PLATE 5-2 DISTRIBUTION RANGE OF MURRAY COD

Source: ALA (2024), DoE (2023)

5.1.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

The Murray cod is assessed having the potential to occur within the MNES Study Area and is known to occur within the Project footprint through direct sightings within the Macintyre River and Macintyre Brook systems. The species was not recorded elsewhere along the Project footprint and aquatic habitat assessments indicated waterways associated with the Project footprint on the Condamine River floodplain and Oakey Creek were not suitable for the permanent presence of the species. These areas, particularly on the Condamine floodplain, are only likely to be used by the species during and following large flooding events.

Further database records (i.e., ALA) indicate that there are numerous records of the species within 10 km of the Project footprint, with the nearest record occurring within the Macintyre River, approximately 3 km south of the southern portion of the footprint and was recorded in 2011 on three occasions. There are an additional 16 records of the species downstream within the Macintyre River, recorded between 2005 – 2015 (ALA, 2024). There is one record of the species within Lake Coolmunda, approximately 10 east of the Project footprint near Inglewood, recorded in 2019. There is one dated record of the species (1998) near Millmerran, approximately 5 km west of the Project footprint. There are an additional 12 records of the species within 50 km of the Project footprint, recorded between 2008 – 2019, in Toowoomba, Clifton, Goondiwindi and between Oakey and Dalby (ALA, 2024).

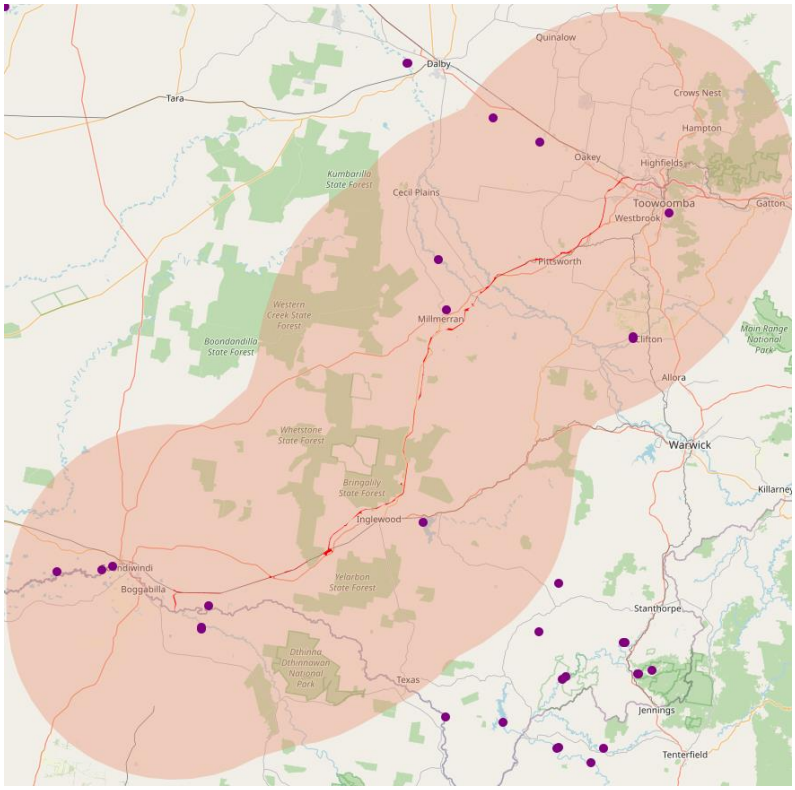

PLATE 5-3 DISTRIBUTION RANGE OF MURRAY COD

Source: ALA (2024)

5.1.2.4 BIOLOGY AND REPRODUCTION

The Murray cod is considered the apex predator of the Murray-Darling River system, due to the species' size. Murray cod hunt from sunset to sunrise, feeding on spiny crayfish, shrimp, reptiles and other fish species including cod (DoE, 2024).

The Murray cod has a relatively low fertility when compared to other freshwater fish, with the species generally reaching sexual maturity at 5 years of age, however this is dependent on size. Male Murray cod mature at a larger size than females, with females producing up to 10,000 eggs when reaching 3 kg in size (DoE, 2024). Eggs are laid in logs or snags after being developed from winter until spawning, which is triggered by an increase in temperature and day length (DoE, 2024).

Breeding occurs as a pair, however males guard and fan the eggs during incubation. Hatching larvae typically remain clustered in their nest for up to 11 days, with the male continually providing protection until larvae disperse from the nest and drift downstream to feed on zooplankton and other aquatic insects (DoE, 2024).

5.1.3 HABITAT

The habitat of the species is diverse, ranging from clear rocky streams to slow-flowing, turbid lowland rivers or billabongs where the fish is found frequently in the main channel. Due to the species preferred breeding environment, it is often found in streams containing large rock, snags, overhanging vegetation, stumps, or other woody structures (DoE, 2023).

The Murray cod occurs in a range of flowing and standing waters, from small, clear, rocky streams on the inland slopes and uplands of the Great Diving Range, to the large, turbid, meandering slow-flowing rivers, creeks, anabranches, and lakes and larger billabongs, of the inland plains of the Murray-Darling Basin (MDB) (NMCRT, 2010). The species is considered to be a 'main channel specialist' as it frequents the main river channel, larger tributaries, and anabranches (TSSC, 2003).

The species prefers microhabitat featuring complex structural cover such as large rocks, large snags and smaller structural woody habitat, undercut banks and over-hanging vegetation. These structures influence the flow of the river and provide shelter from fast currents and opportunities for foraging with ambush predation. A reduction in snaggy habitat throughout the river channel has resulted in large areas that are unsuitable habitat. This is compounded by the low number of potential fish per snag, as it is a large, aggressive, and highly territorial fish (TSSC, 2003). Riparian vegetation (e.g., river red gum (*Eucalyptus camaldulensis*)) woodland in the lowland river systems of the Murray-Darling Basin, not only provides an ongoing supply of structural habitat for the Murray Cod in the form of coarse woody debris or snags, but aids stream bank stability and protects riparian soils from water and wind erosion (NMCRT, 2010).

As defined in the National Recovery Plan for the Murray cod (NMCRT, 2010) habitat critical to the survival of the species is:

> *"Murray cod are dependent on large structural woody habitat (snags: fallen tree trunks and branches, particularly River Red Gum Eucalyptus camaldulensis) for habitat and shelter."*

The species is known to take long distance journeys prior to spawning travelling up to several hundred kilometres upstream despite their naturally sedentary nature (Koehn et al. 2009).

Habitat mapping for the species within the Project footprint has been undertaken using the habitat criteria in Table 5-1 and is presented in Figure 5-1.

TABLE 5-1 HABITAT CRITERIA FOR MURRAY COD WITHIN THE STUDY AREA

Habitat function	General habitat	Habitat mapping rules
Suitable habitat	Main river channels featuring complex microhabitat features such as, large rocks, large snags, woody debris, undercut banks and over-hanging vegetation, particularly where riparian habitat with *Eucalyptus camaldulensis* is present. These features are required for foraging, habitat, navigation, and spawning.	Stream orders 2, 3, 4, and 5
Generally unsuitable habitat	Desnagged stretches of river that have had microhabitat features removed. Areas of reduced or cleared bank without riparian habitat. Ephemeral streams that seasonally dry out.	Dams, stream order 1.

Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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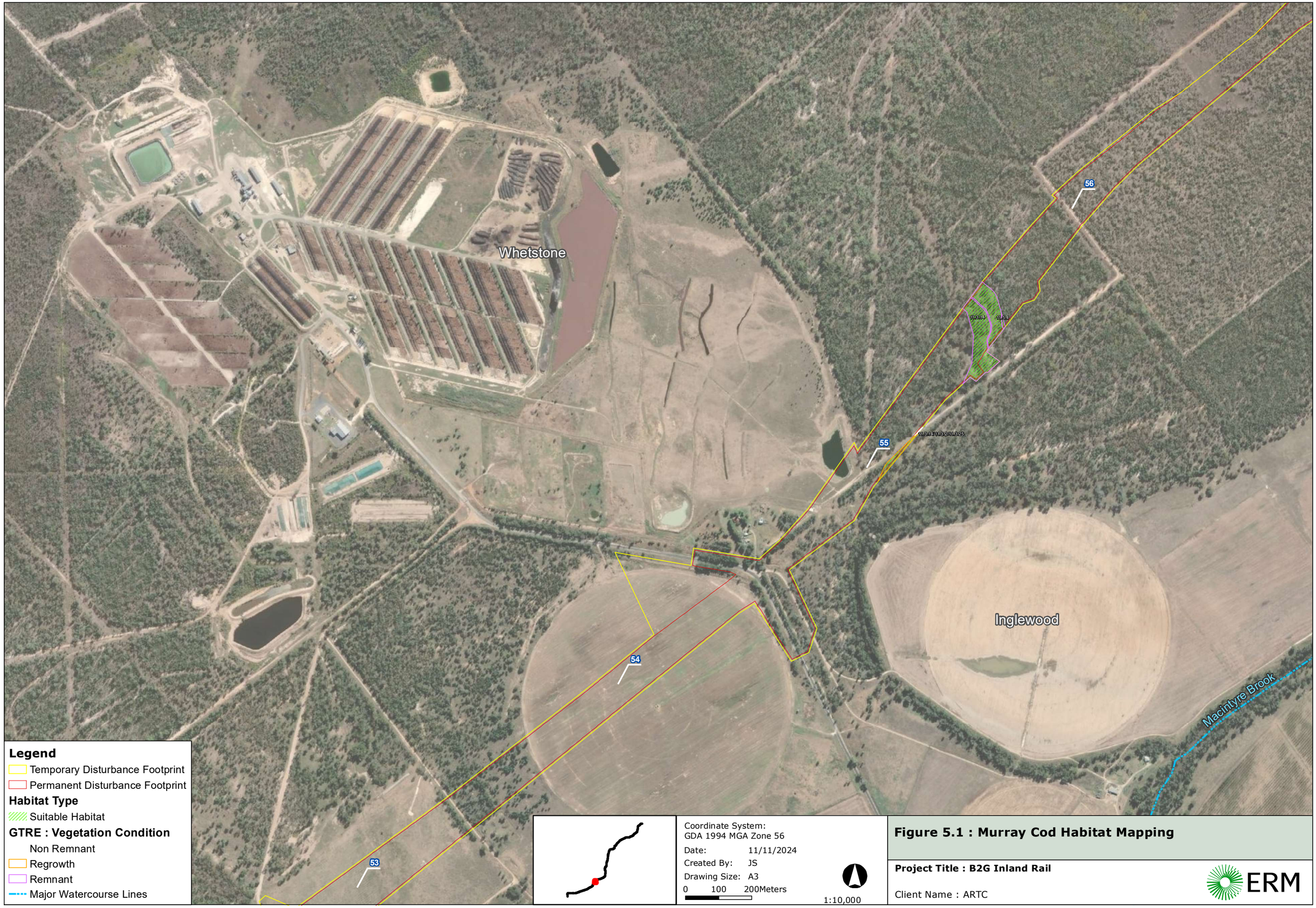

Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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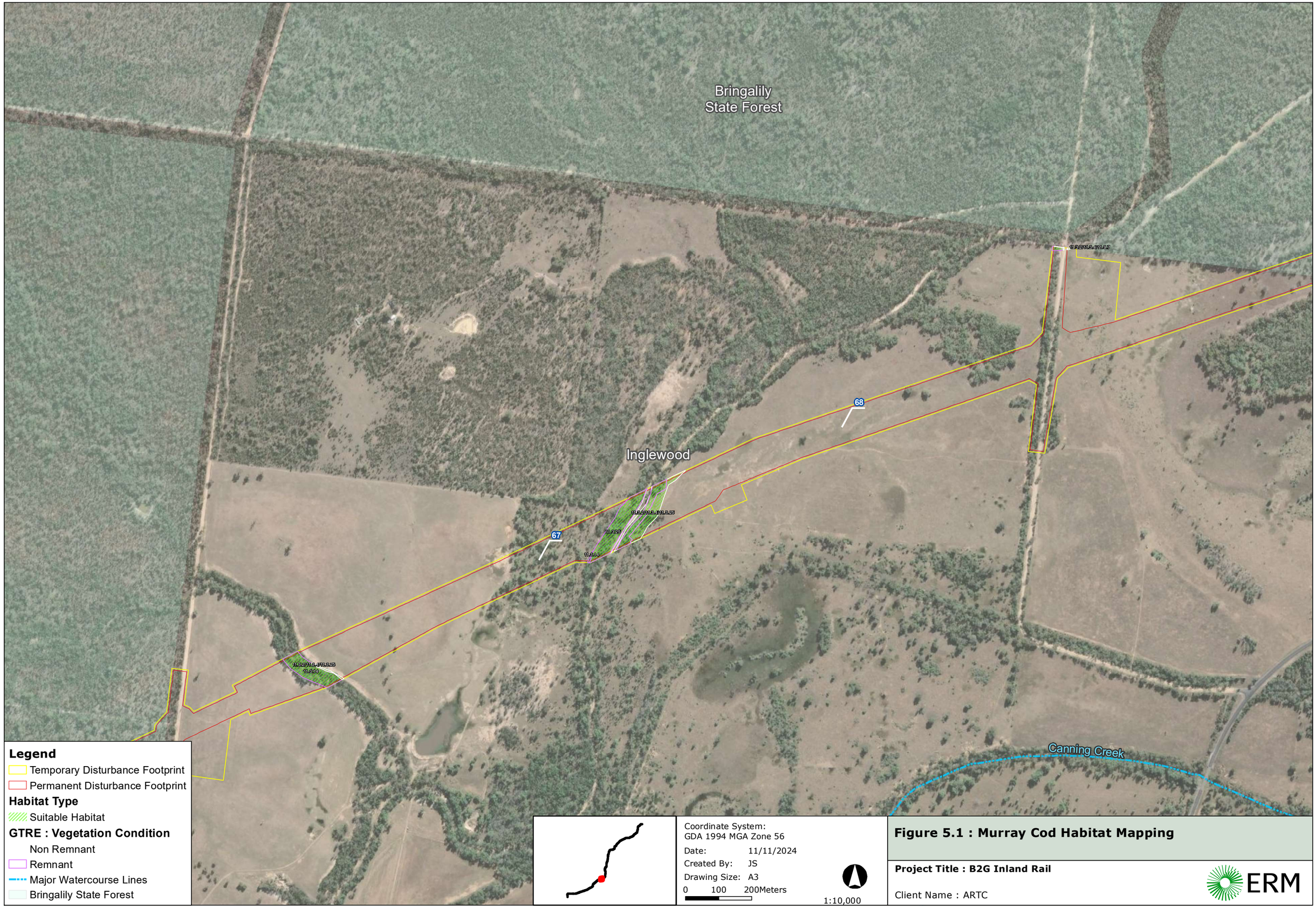

Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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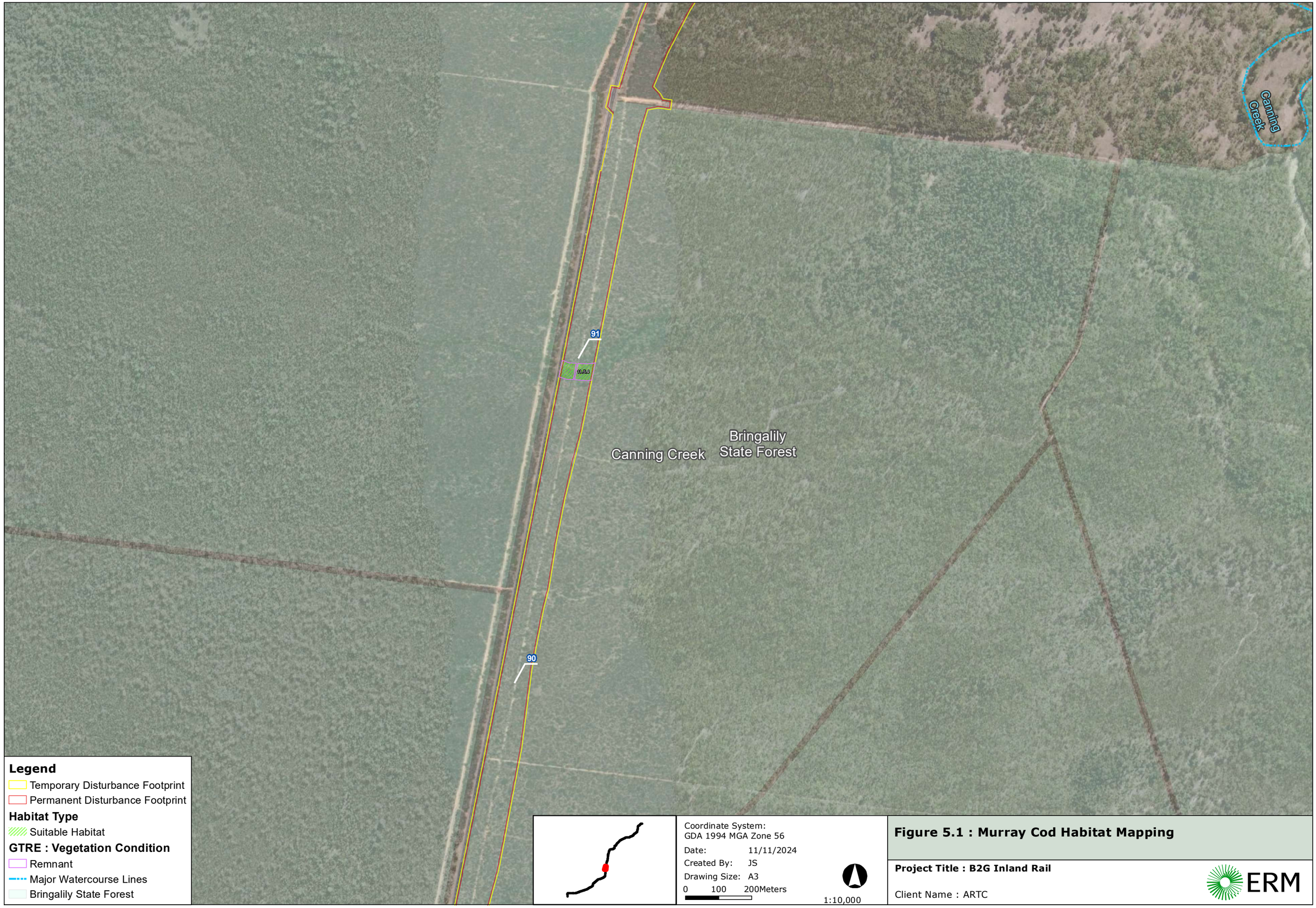

Figure 5.1 : Murray Cod Habitat Mapping

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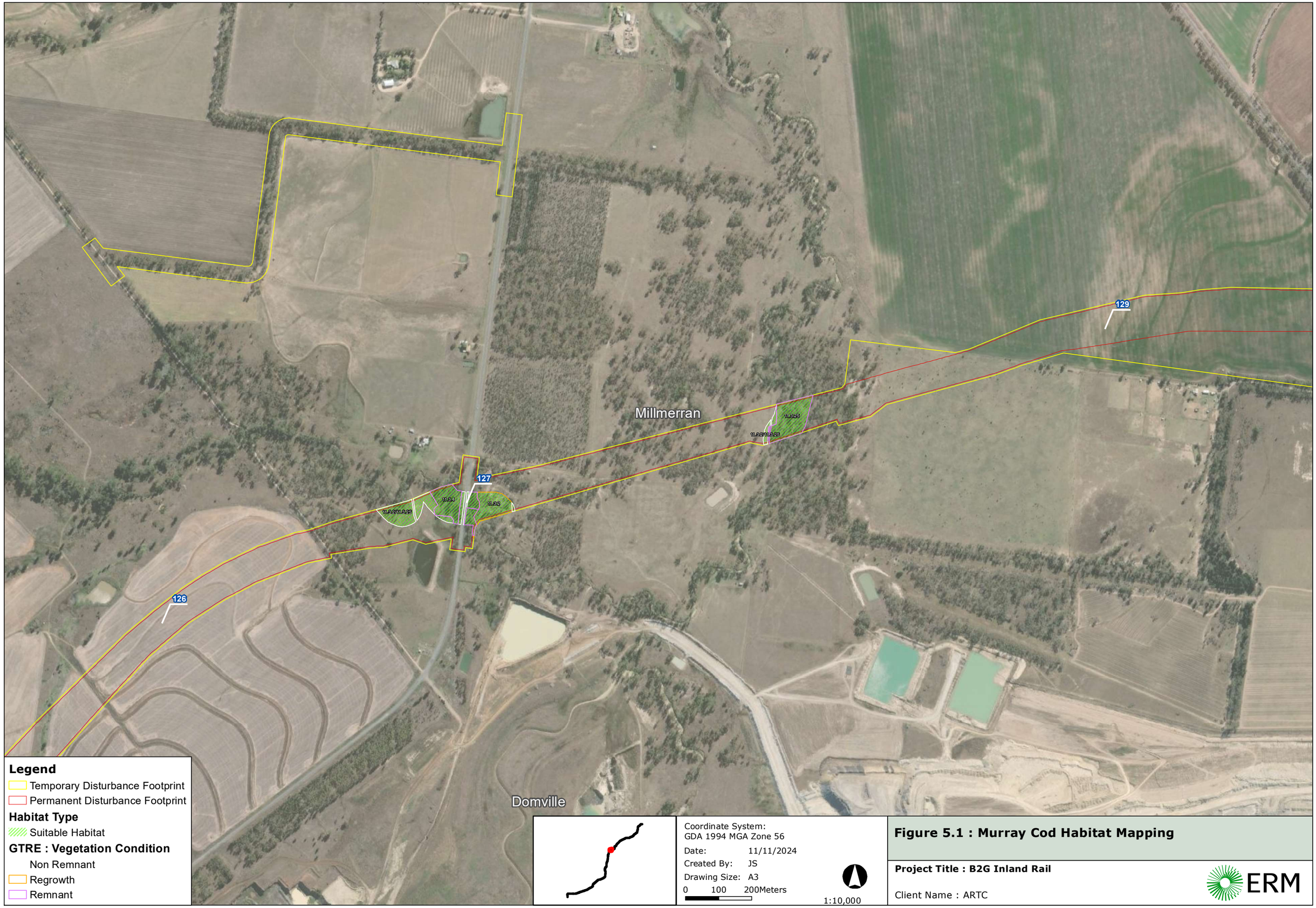

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024
Created By: JS
Drawing Size: A3
0 100 200Meters
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Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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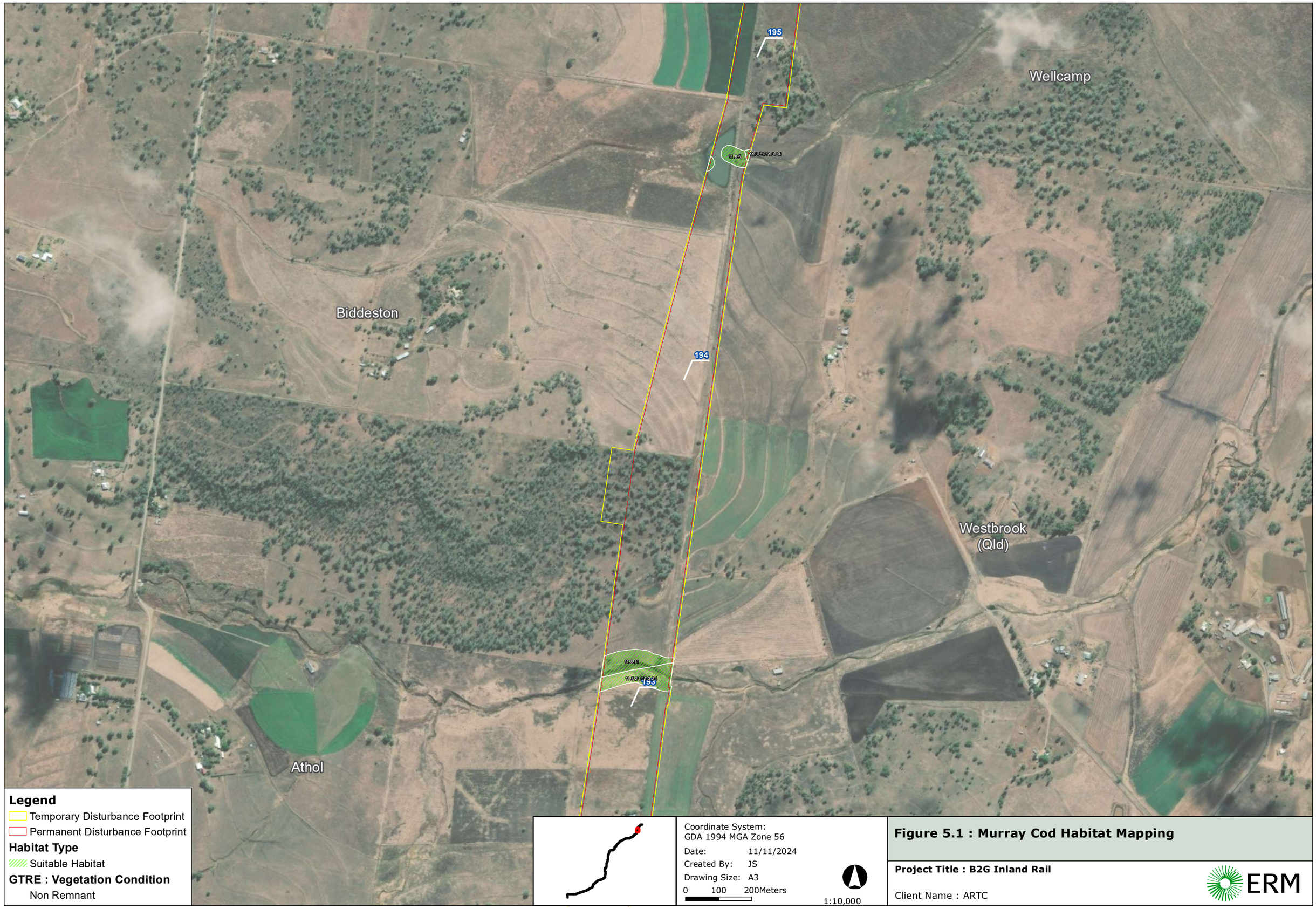

Figure 5.1 : Murray Cod Habitat Mapping

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Figure 5.1 : Murray Cod Habitat Mapping

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Inglewood

Mosquito Creek

Borrow Pit Site 3

Coolmunda

Legend

Temporary Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Remnant

Major Watercourse Lines

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024

Created By: JS

Drawing Size: A3

0 100 200Meters

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Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

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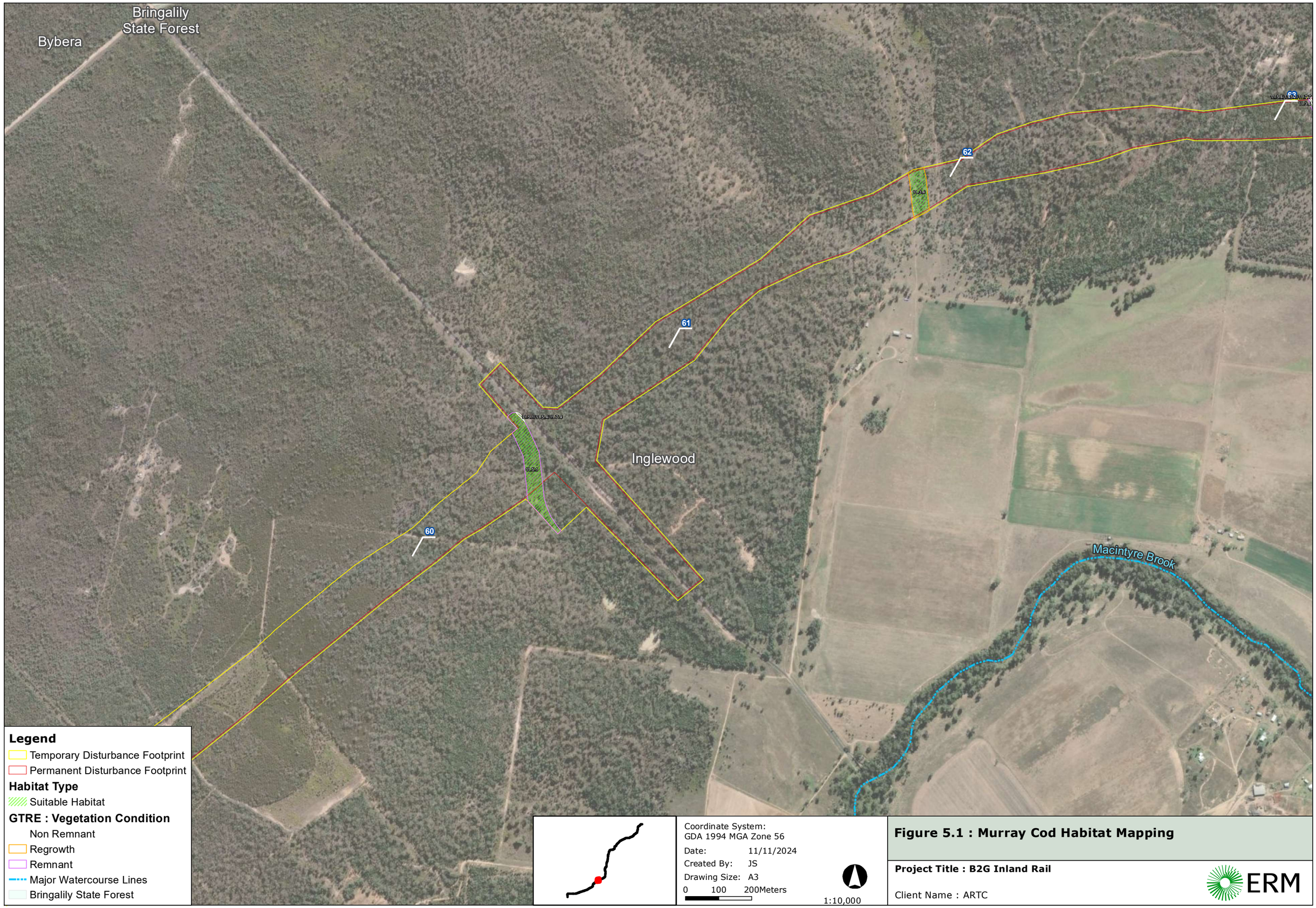

Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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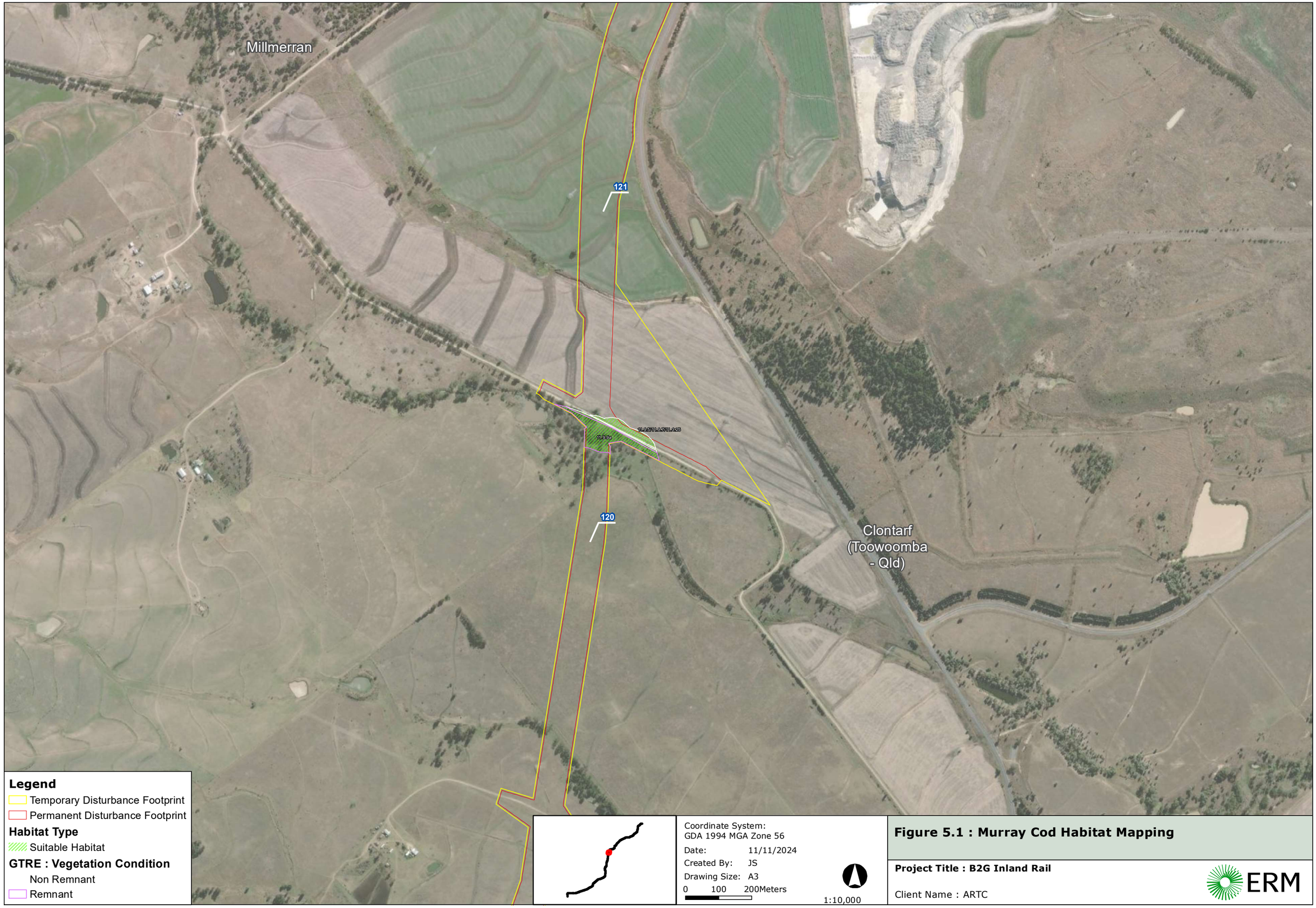

Figure 5.1 : Murray Cod Habitat Mapping

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Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Remnant

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11/11/2024

Created By: JS

Drawing Size: A3

0 100 200Meters

1:10,000

Figure 5.1 : Murray Cod Habitat Mapping

Project Title : B2G Inland Rail

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5.1.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the Murray cod:

- Impoundment of streams and altered water flow;
- Loss of riparian vegetation; and
- Habitat removal, modification and degradation (DoE, 2023).

5.1.5 EPBC STATUTORY DOCUMENTS

No threat abatement plan has been identified as being relevant for this species. The following recovery plan is applicable to this species:

- National Recovery Plan for the Murray cod *Maccullochella peelii peelii* (National Murray Cod Recovery Team, 2010).

5.1.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

Important populations outlined in the National Recovery Plan for the Murray Cod (*Maccullochella peelii peelii*) that may be relevant to the Project include:

- New South Wales: Darling River main channel and tributaries;
- New South Wales: Murray River main channel and tributaries;
- New South Wales: Murrumbidgee River from Wagga to Hay;
- New South Wales: Edwards River and tributaries;
- New South Wales: Naomi River, Peel River junction to Wee Waa;
- New South Wales: Gwydir River and major tributaries from Copeton Dam to Gwydir River;
- New South Wales: Birder rivers (Barwon and Macintyre) including major tributaries in NSW;
- Queensland: Border Rivers;
- Queensland: Condamine River;
- Queensland: Warrego River between Charleville and Cunnamulla; and
- Queensland: McIntyre River downstream of Texas.

Objectives outlined in the National Recovery Plan include:

- Determine the distribution, structure and population dynamics across the MDB;
- Manage river flows in a way that enhances recruitment;
- Risk assess the threats and evaluate benefits of recovery actions;
- Determine habitat requirements for various life stages;
- Manage recreational fishing in a sustainable manner taking into account the social, economic and recreational value of the fishery;
- Encourage community ownership of conservation for the species; and
- Manage recovery plan implementation.

5.1.7 REFERENCES

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Koehn J.D., J.A. McKenzie, D.J. O'Mahony, S.J. Nicol, J.P. O'Connor and W.G. O'Connor. (2009). Movements of Murray cod (*Maccullochella peelii peelii*) in a large Australian lowland river. Ecology of Freshwater Fish. 18:594-602. John Wiley and Sons A/S.

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6. FAUNA SPECIES – THREATENED SPECIES – REPTILES

6.1 COLLARED DELMA (*DELMA TORQUATA*)

6.1.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

6.1.2 BIOLOGY AND ECOLOGY

6.1.2.1 CHARACTERISTICS

The collared delma (*Delma torquata*) is a flap-footed lizard that has no forelimbs but retains vestigial hind limbs in the form of small scaly flaps. The body of the collared delma is brown to reddish-brown in colour becoming grey to bluish-grey on the tail. It has large black bands across the head and nape interspaced by four cream-yellow stripes (refer to Plate 6-1). This species moves with a snake-like gait through the matrix but travel with a series of wriggling leaps over open ground. The collared delma is a small cryptic species reaching a maximum size of 7 cm (snout-vent) and a maximum total length of approximately 190 mm (DoE, 2023).

PLATE 6-1 COLLARED DELMA (*DELMA TORQUATA*)

Source: ALA (2024)

6.1.2.2 KNOWN DISTRIBUTION

The collared delma is endemic to southeast Queensland, with the species known to occur in Lockyer Forest Reserves, in Western Creek near Millmerran, and the Toowoomba Range eastward to Moggill on the western outskirts of Brisbane (refer to Plate 6-2; DoE, 2024). The largest known occurrence of the species is located on the Toowoomba range, where large numbers of this species were subject to translocation activities associated with the Toowoomba second range crossing project (DoE, 2023; Schell and Stark pers. obs., 2017).

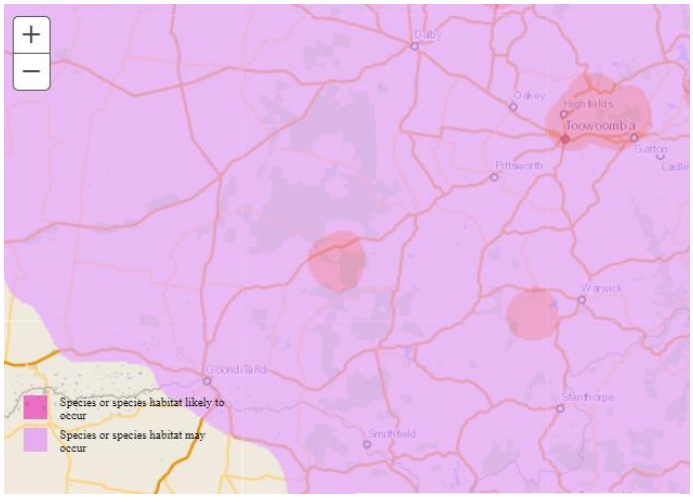

PLATE 6-2 DISTRIBUTION RANGE OF THE COLLARED DELMA

Source: ALA (2024), DoE (2023)

6.1.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Collared delma is assessed as having the potential to occur within the MNES Study Area, and suitable habitat (woodlands with loose surface rocks) for the species has been identified within the Project footprint.

However, the species was not recorded during any Project-associated field surveys including limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution. ALA database records do not reveal any specimen backed records within the Project disturbance footprint or within the MNES Study Area. The nearest record of the species is located at Jones Road, south of the Warrego Highway in Withcott, approximately 12 km east of the northern section of the Project footprint and was recorded twice in 2003. There is an additional record south of the Warrego Highway in Withcott, approximately 13 km east of the northern section of the Project footprint which was recorded in 2021. Additionally, there is one record of the species north of the Warrego Highway, approximately 13 east of the northern section of the Project footprint which was also recorded in 2021 (refer to Plate 6-3).

Within 50 km of the Project footprint there are an additional 11 records of the species, of which eight were recorded within Lockyer National Park, between 1990 – 2019; one was recorded along the Warrego Highway east of Helidon in 2020; and two were recorded near Bulli State Forest in 1998.

Outside of the Project footprint and 50 km buffer area, the species occurs in Bunya Mountains National park and Yarraman State Forest and surrounds (ALA, 2024). The Project footprint is located near the southern limit of the species range.

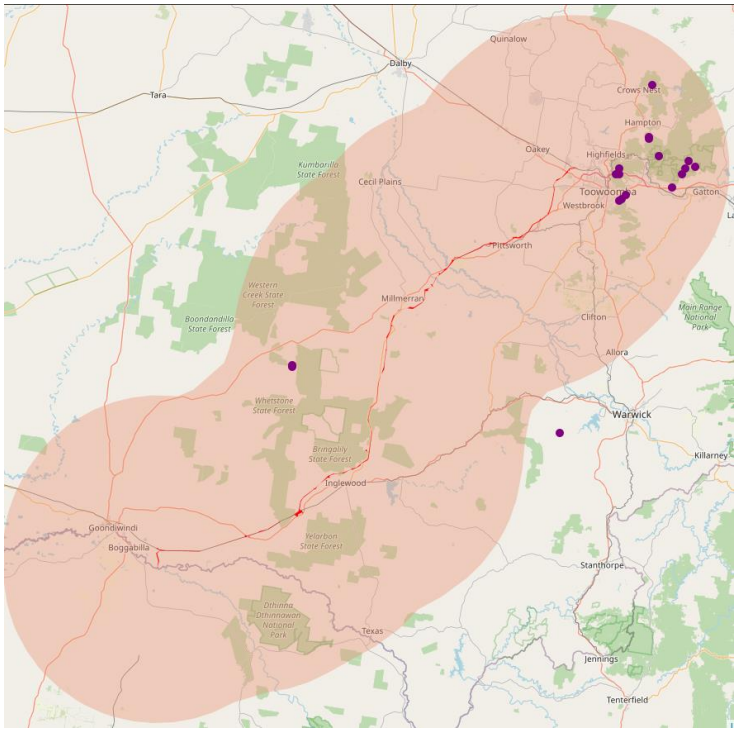

PLATE 6-3 DISTRIBUTION RANGE OF THE COLLARED DELMA IN RELATION TO THE PROJECT

Source: ALA (2024)

6.1.2.4 BIOLOGY AND REPRODUCTION

The collared delma feeds on cockroaches as their predominant food source, however, is also known to feed on insects and spiders (DoE, 2024). Some individuals have been captured in subterranean termite colonies (Davidson, 1993; Porter, 1998; Schell and Stark pers. obs., 2017).

The collared delma produces two small white, elongated eggs in December, which hatch from February to March (Peck and Hobson, 2007; Schell and Stark pers. obs., 2017).

6.1.3 HABITAT DESCRIPTION AND DEFINITION

The collared delma is endemic to Queensland, occurring between the western suburbs of Brisbane and the following sites Bunya Mountains, Blackdown Tableland National Park (NP), Bullyard Conservation Park, D'Aguilar Range NP, Expedition NP, Naumgna and Lockyer Forest Reserves, Western Creek near Millmerran and the Toowoomba Range (DEWHA, 2008). The railway alignment is located within the species distribution of both modelled habitat likely to occur and may occur (as per the modelled habitat on the species SPRAT profile (DoE, 2023)).

This species normally inhabits eucalypt-dominated woodlands and open-forests in Queensland RE Land Zones. Preferred REs are ones dominated by poplar box (*Eucalyptus populnea*) on alluvial plains, lemon-scented gum (*Corymbia citriodora*) open forest on coarse-grained sedimentary rocks and poplar box/brigalow (*Acacia harpophylla*) open forests on fine-grained sedimentary rocks.

There is no delineation between breeding, dispersal and foraging habitat for this species and as such, only suitable habitat and not suitable habitat are defined in Table 6-1.

However, microhabitat requirements include presence of rocks, logs and specific mats of leaf litter typically 30-100 mm thick. Habitat mapping for the species within the Project footprint is presented in Figure 6-1.

TABLE 6-1 HABITAT CRITERIA FOR COLLARED DELMA WITHIN THE STUDY AREA

Habitat function	Habitat description	Regional Ecosystems	Habitat mapping rules
Suitable habitat	Remnant and regrowth woodland and forest. The species requires areas with abundant leaf litter and woody debris or rocks. Microhabitat, including rocks, logs, bark, coarse woody debris, mats and leaf litter (30 – 100 mm thick) is essential for collared delma microhabitat. Habitat for this species includes eucalypt dominated woodlands and open forests and adjacent exposed rocky areas in QLD RE Land Zones 3, 9 and 10. Preferable habitat in areas west of Brisbane typically consists of red ash (*Alphitonia excelsa*), wattles (i.e., Brisbane wattle (*Acacia fimbriata*) and hickory wattle (*A. concurrens*)), brush box (*Lophostemon confertus*) and hovea (*Hovea longifolia*). In this area, the preferable ground cover is predominantly native grasses such as kangaroo grass (*Themeda triandra*), barbed-wire grass (*Cymbopogon refractus*), wiregrass (*Aristida* sp.) and lomandra (*Lomandra* sp.). Species records are typically in association with sandy loams, grey and black cracking clays, stony lithosols and basalt derived Podzolics.	11.3.2 11.3.25 11.9.5 11.9.10	Larger contiguous areas of remnant and regrowth woodland and forest, dominated by Eucalypts, with abundant woody debris (i.e., logs, bark), coarse woody debris, rocks, leaf litter (30 – 100 mm thick, within the species modelled distribution. Adjacent exposed rocky areas in QLD RE land zones 3, 9 and 10. Areas with sandy loams, grey and black cracking clays, stony lithosols and basalt derived Podzolics. Woodlands with the presence of the following species: red ash (*Alphitonia excelsa*), wattles (i.e., Brisbane wattle (*Acacia fimbriata*) and hickory wattle (*A. concurrens*)), brush box (*Lophostemon confertus*), hovea (*Hovea longifolia*) and a ground cover consisting of native grasses, within the species modelled distribution.
Not suitable habitat	Cleared pastoral areas that do not contain microhabitat features and have compacted soil as a result of grazing. Areas not on sandy loams, grey and black cracking clays, stony lithosols or basalt derived Podzolics.	11.3.1 11.3.14 11.3.17 11.3.18 11.3.21 11.3.24 11.3.27 11.3.27b 11.3.27i 11.3.4 11.4.3 11.4.10 11.5.1 11.5.1a 11.5.4 11.5.14 11.5.20 11.7.4 11.7.5 11.7.7 11.8.3	Areas not mapped as breeding and foraging habitat (i.e., Cleared pastoral areas and areas not on sandy loams, grey and black cracking clays, stony lithosols or basalt derived Podzolics). Areas outside the species modelled distribution. Areas with high density of dwarf lantana (*Lantana montividensis*).

Habitat function	Habitat description	Regional Ecosystems	Habitat mapping rules
		11.8.4 11.8.5 11.8.11 11.9.7 11.9.9a	

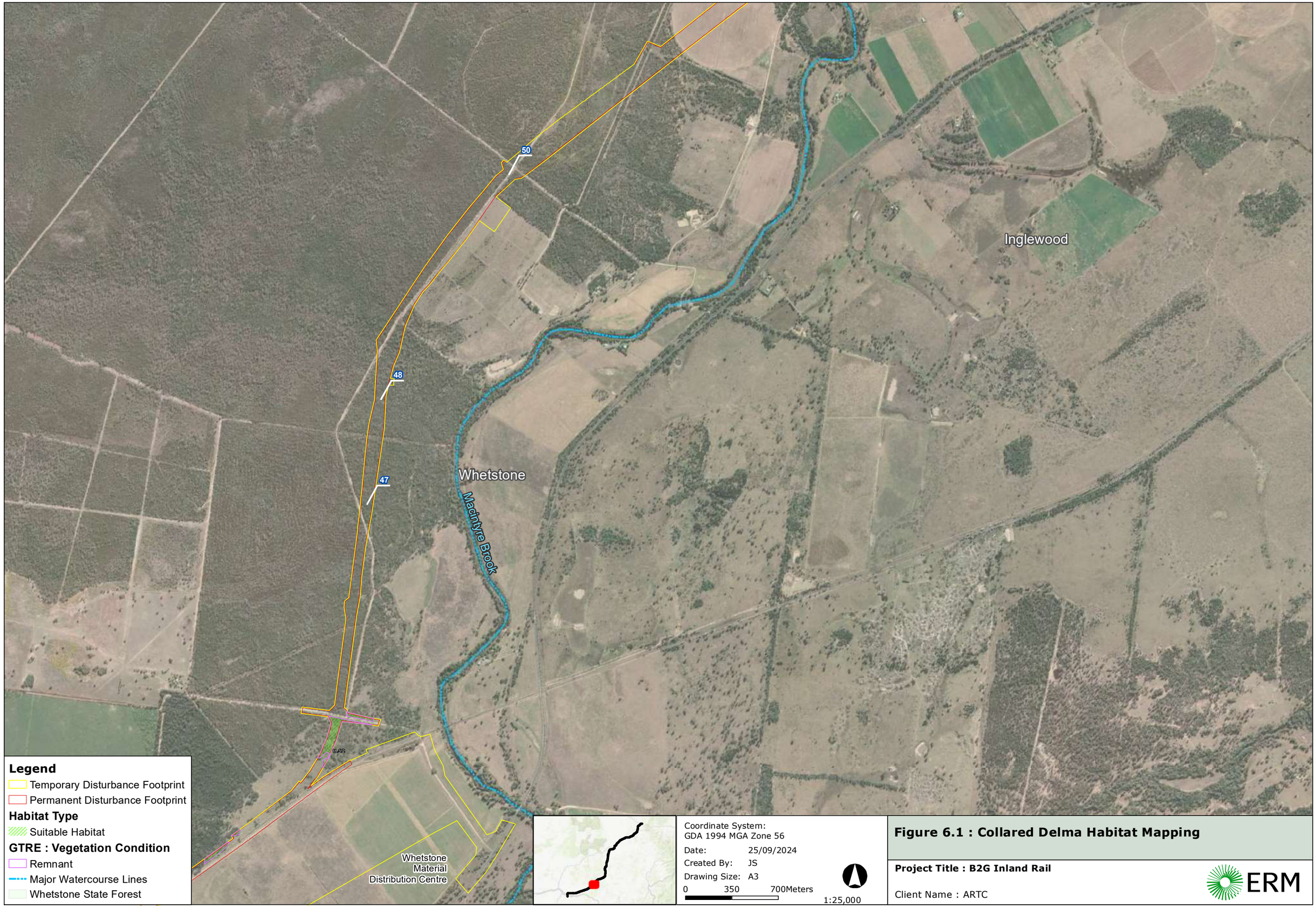

Figure 6.1 : Collared Delma Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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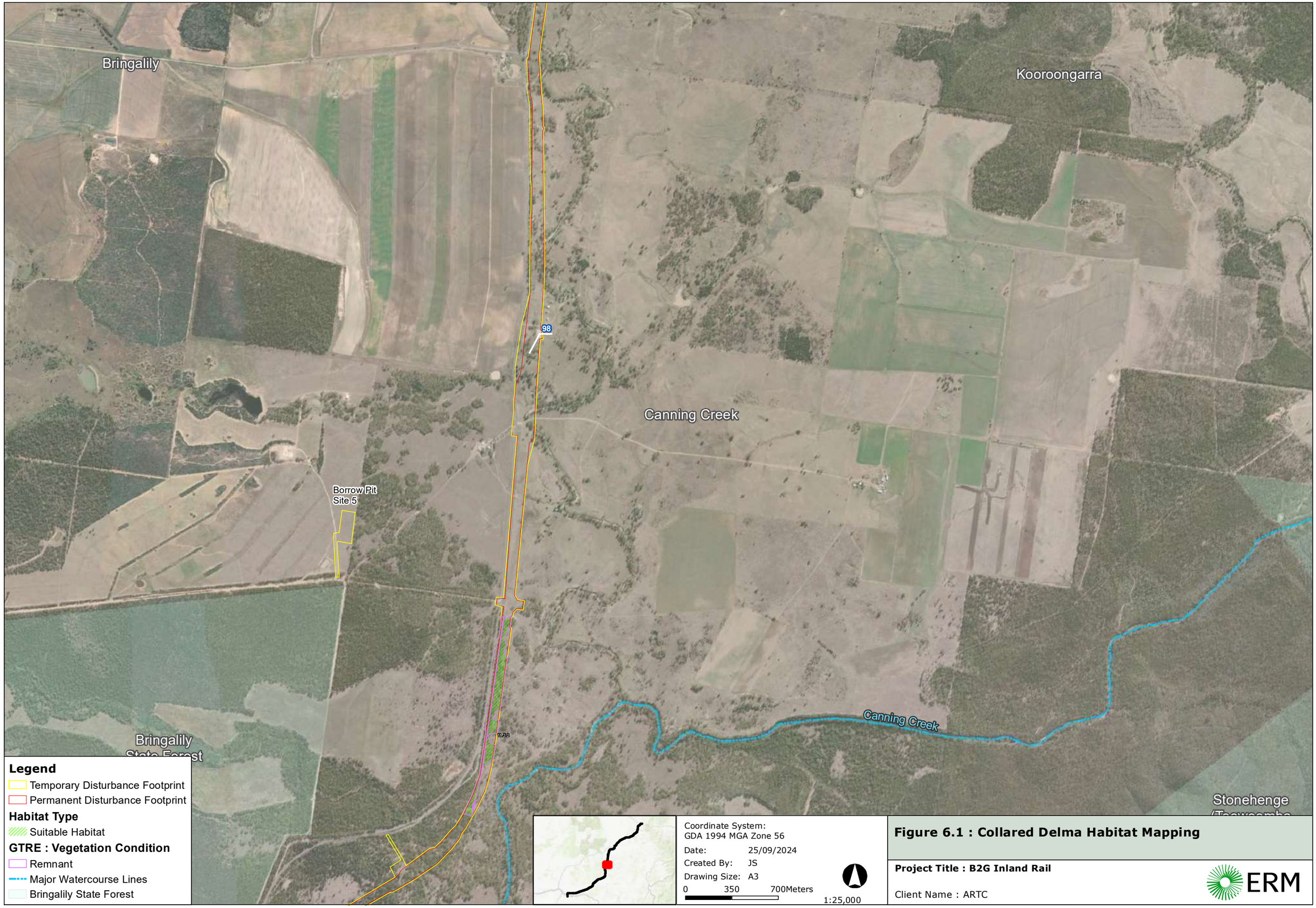

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Figure 6.1 : Collared Delma Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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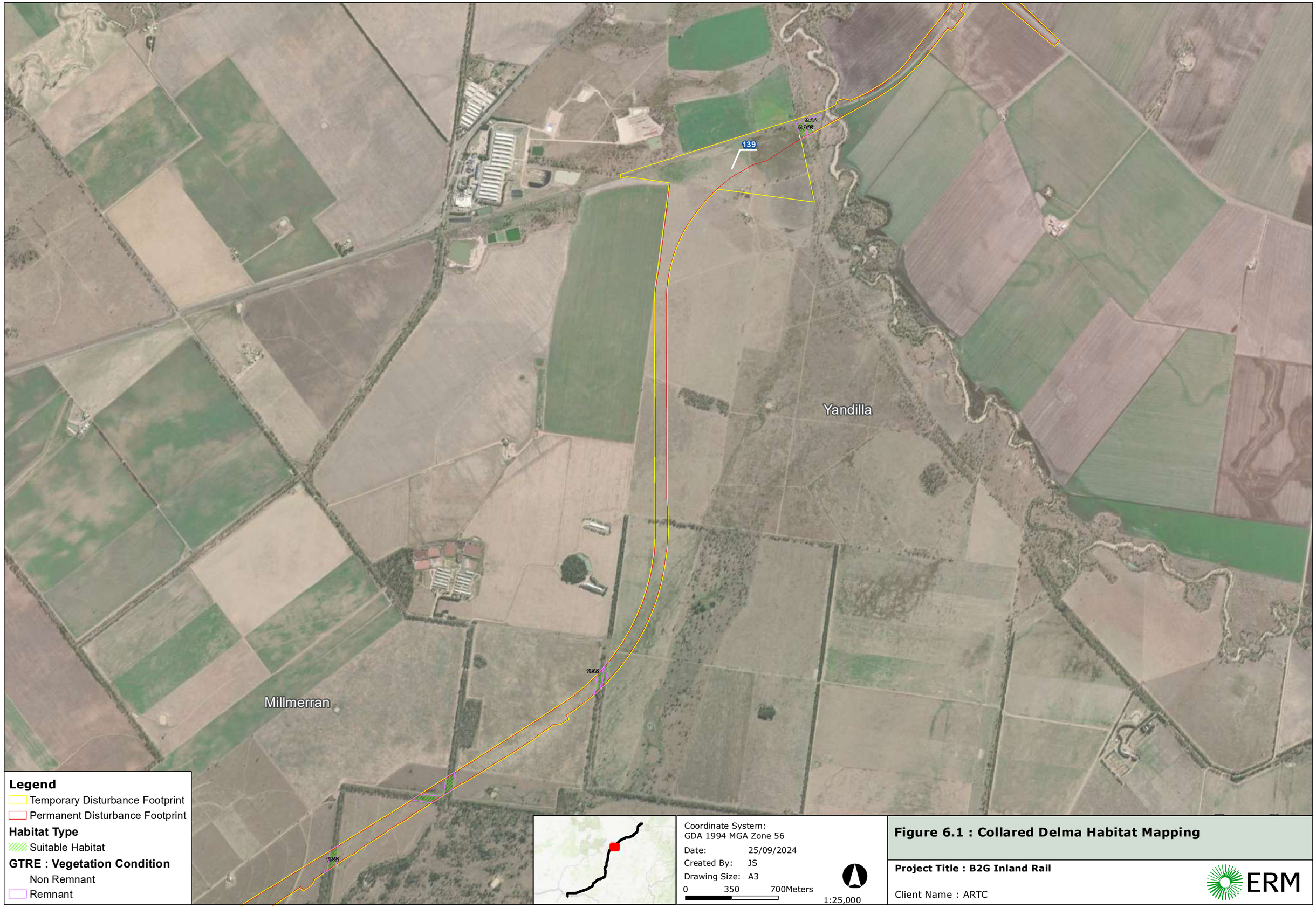

Figure 6.1 : Collared Delma Habitat Mapping

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6.1.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the collared delma:

- Loss and modification of habitat due to urban and agricultural development;
- Landscaping activities removing surface rocks; and
- Invasive weed species such as dwarf lantana (*Lantana montevidensis*) (DoE, 2023).

6.1.5 EPBC STATUTORY DOCUMENTS

There are no adopted or made recovery plan or threat abatement plan relevant for the collared delma (DoE, 2024). A recovery plan is not required for the species. The species conservation advice is as follows:

- Approved Conservation Advice for *Delma torquata* (Collared Delma) (DEWHA, 2008).

6.1.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

Given the difficulty in detecting the collared delma (*Delma torquata*) the Commonwealth environmental department considers that the presence of suitable and important habitat for this species is a surrogate for an important population of the species. Important habitat as described in the *Draft referral guidelines for the nationally listed Brigalow Belt reptiles* (DSEWPC, 2011) includes:

- Open forest eucalypt woodland dominated by ironbarks;
- Woodland adjacent to exposed rocky areas; and
- RE Land Zones 3, 9 and 10.

Priority recovery actions in the species conservation advice includes:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
  - Minimise adverse impacts from land use at known sites;
  - Actively discourage the removal of rocks from known and potential habitat sites;
  - Control access routes to suitably constrain public access to known sites on public land; and
  - Protect populations/occurrences of the Collared Delma through the development of conservation agreements and covenants.
- Invasive weeds:
  - Identify and remove weeds in the local area, which could become a threat to the Collared Delma, using appropriate methods;
  - Identify and undertake weed management of known sites to reduce or remove Dwarf Lantana, using appropriate methods; and
  - Manage sites to prevent introduction of invasive weeds, which could become a threat to the Collared Delma, using appropriate methods.

- Fire:
  - Implement an appropriate fire management regime for local populations.

6.1.7 REFERENCES

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6.2 CONDAMINE EARLESS DRAGON (*TYMPANOCRYPTIS CONDAMINENSIS*)

6.2.1 STATUS

EPBC Act – Endangered, effective 16 July 2000

6.2.2 BIOLOGY AND ECOLOGY

6.2.2.1 CHARACTERISTICS

The Condamine earless dragon (*Tympanocryptis condaminensis*) is a small, plump, spiny earless dragon that grows to an average size of 12 cm. The species colour ranges from reddish-brown to almost black with prominent pale banding of brown-black or white (TSSC, 2016). The throat and chin of the Condamine earless dragon can be yellow and marbled with black. It is through the species body colour assists with camouflage within their environment (refer to Plate 6-4) (DES, 2017).

Currently limited information is known about the difference in sex and life stages (juveniles or adults) of Condamine earless dragon. However, studies of similar species in the *Agamidae* family, suggest males tend to be more animated than females and feature a set of distinct pre-anal pores between the back legs; as well as, hemi-penal bulges at the vent area (Phipps and Titmuss, 2006).

PLATE 6-4 CONDAMINE EARLESS DRAGON (*TYMPANOCRYPTIS CONDAMINENSIS*)

Source: DES (2024)

6.2.2.2 KNOWN DISTRIBUTION

Condamine earless dragon occurs within the eastern Darling Downs region in southeast Queensland (refer to Plate 6-5; TSSC, 2016). The species is often found in the Condamine River floodplains surrounded by Jimbour in the northeast, Millmerran in the southwest, Clifton in the southeast and Toowoomba in the northeast, with records from Oakey, Bongeen, Bowenville, Brookstead and Mt Tyson (TSSC, 2016).

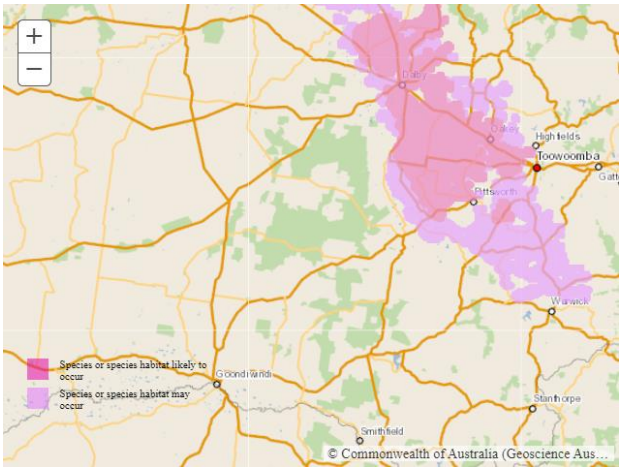

PLATE 6-5 DISTRIBUTION RANGE OF THE CONDAMINE EARLESS DRAGON

Source: ALA (2018), DoE (2023)

6.2.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Condamine earless dragon is known to occur within the Project footprint, due to direct sightings in an existing rail line easement, approximately 13 km north-east of Millmerran.

There are numerous database records of the species within 50 km of the Project footprint, north of Millmerran. The nearest record of the species was recorded 1.5 km south of the Project footprint near Brookstead, in 2009.

There are several clustered records located 3 – 4 km to the north of the Project footprint between Brookstead and Pittsworth, recorded between 2003 – 2014 (ALA, 2024). There are numerous records of the species located further north of this area (refer to Plate 6-6). There is one isolated record of the species located north of the Pittsworth-Felton Road (15 km south-west of Pittsworth) and was recorded twice in 2000 and 2009.

Condamine earless dragon was detected in an existing rail reserve located between Millmerran and Brookstead during preliminary field surveys. During more recent surveys between September 2023 and mid-February 2024, 76 dragons were captured to the north of the Project footprint in the Condamine River floodplain (Allen et al., 2023; JP Emery pers. comm., 2024).

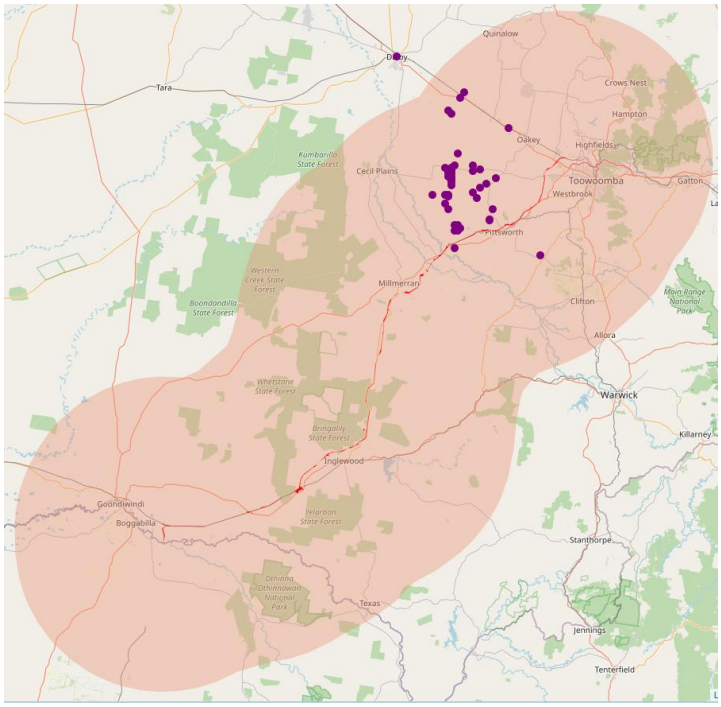

PLATE 6-6 DISTRIBUTION RANGE OF THE CONDAMINE EARLESS DRAGON IN RELATION TO THE PROJECT

Source: ALA (2024)

6.2.2.4 BIOLOGY AND REPRODUCTION

Knowledge of Condamine earless dragon diet is still limited; however it is thought the species feeds on small invertebrates with anecdotal evidence suggesting ants are a popular source of food (TSSC, 2016). Information on the species' reproductive biology is also limited, however males in breeding colour have been observed in December, with pregnant females recorded in November (TSSC, 2016).

All *Agamidae* species are known as to be oviparous and deposit their eggs in burrows, with snout to vent length a measure of sexual maturity. Clutch size studies undertaken for the Eyrean earless dragon (*Tympanocryptis tetraporophora*), a species of the *Tympanocryptis* genus, identified the species produces an average clutch size of 8 eggs. It is suggested that body size of females is a strong determinant of clutch size (Uetz, 2011).

6.2.3 HABITAT DESCRIPTION AND DEFINITION

The Condamine earless dragon is endemic to the eastern Darling Downs, particularly occurring on the Condamine River floodplain, bounded by the Pirrinuan/Jimbour area in the northwest, Millmerran in the southwest, Clifton in the southeast and Toowoomba in the northeast. The railway alignment is partially located within the species distribution of both modelled habitat likely to occur and may occur (as per the modelled habitat on the species SPRAT profile (DoE, 2023)).

The species inhabits intensively cropped black-cracking clays (TSSC, 2016), with almost all records occurring along narrow road reserves, in cropland (i.e., cotton, sorghum, maize and sunflower crops), remnant native grassland and exotic grassland, and in headlands of private properties (TSSC, 2016).

No habitat critical to survival has been defined for the species.

As per the species conservation advice (TSSC, 2016), dispersal habitat has not been defined for Condamine earless dragon. Breeding and foraging habitat have also not been defined for this species, as little is known about their diet or reproductive biology. As such, only suitable habitat and not suitable habitat has been included in Table 6-2. Habitat mapping for the species within the Project footprint is presented in Figure 6-2.

TABLE 6-2 HABITAT CRITERIA FOR CONDAMINE EARLESS DRAGON WITHIN THE STUDY AREA

Habitat function	Habitat description	Regional Ecosystems	Habitat mapping rules
Suitable habitat	Natural grasslands dominated by tussock grasses (*Poa* spp.), Queensland bluegrass (*Dichanthium queenslandicum*), and Mitchell grass (*Astrebla* spp.), on alluvial and cracking clay soils. This also includes the natural grasslands TEC associated with 11.3.21. Invasive grasses will be utilised provided they are tussock forming species. Preference is given to shorter grassland with an open structure or open areas, particularly where soil cracks, tussock grasses, mats of dead vegetation, and to a lesser extent, where scattered surface rocks and burrows exist. Stubble fields are known to provide foraging/refuge habitat for the species; as has been confirmed in field observations.	11.3.21 11.3.24 11.8.11	Tussock grasslands on vertisols. Well drained natural grasslands on alluvial and cracking clay soils dominated by tussock grasses (*Poa* spp.), Queensland bluegrass (*Dichanthium queenslandicum*), and Mitchell grass (*Astrebla* spp.) that are relatively undisturbed with minimal pasture modification, and/or the natural grasslands TEC within the species modelled distribution. Non-native grasslands that include tussock forming species. Small mixed cropping, including fallow provide suitable foraging and refugia habitat for the species. Road reserves, cropland, native grassland and exotic grassland, within the species modelled distribution. Grassland with open areas or an open structure and stubble fields should be mapped as foraging habitat for the species.
Not suitable habitat	Native grasslands that have undergone substantial modification through cultivations (i.e., ploughing and cropping) to form broad monocultures. Particularly if the crops are matting grasses (i.e. wheat) that do not form tussocks. Rocky habitat or rocky areas that do not facilitate dispersal.	11.3.1 11.3.2 11.3.25 11.3.4 11.3.14 11.3.17 11.3.18 11.3.27 11.3.27b 11.3.27i 11.4.3 11.4.10 11.5.1 11.5.1a 11.5.4 11.5.14 11.5.20 11.7.4 11.7.5 11.7.7 11.8.4 11.9.5 11.9.7 11.9.9a 11.9.10	Areas not mapped as habitat (i.e., cropping areas that are broad monoculture or are not dominated by tussock forming species). Areas outside of the species modelled distribution.

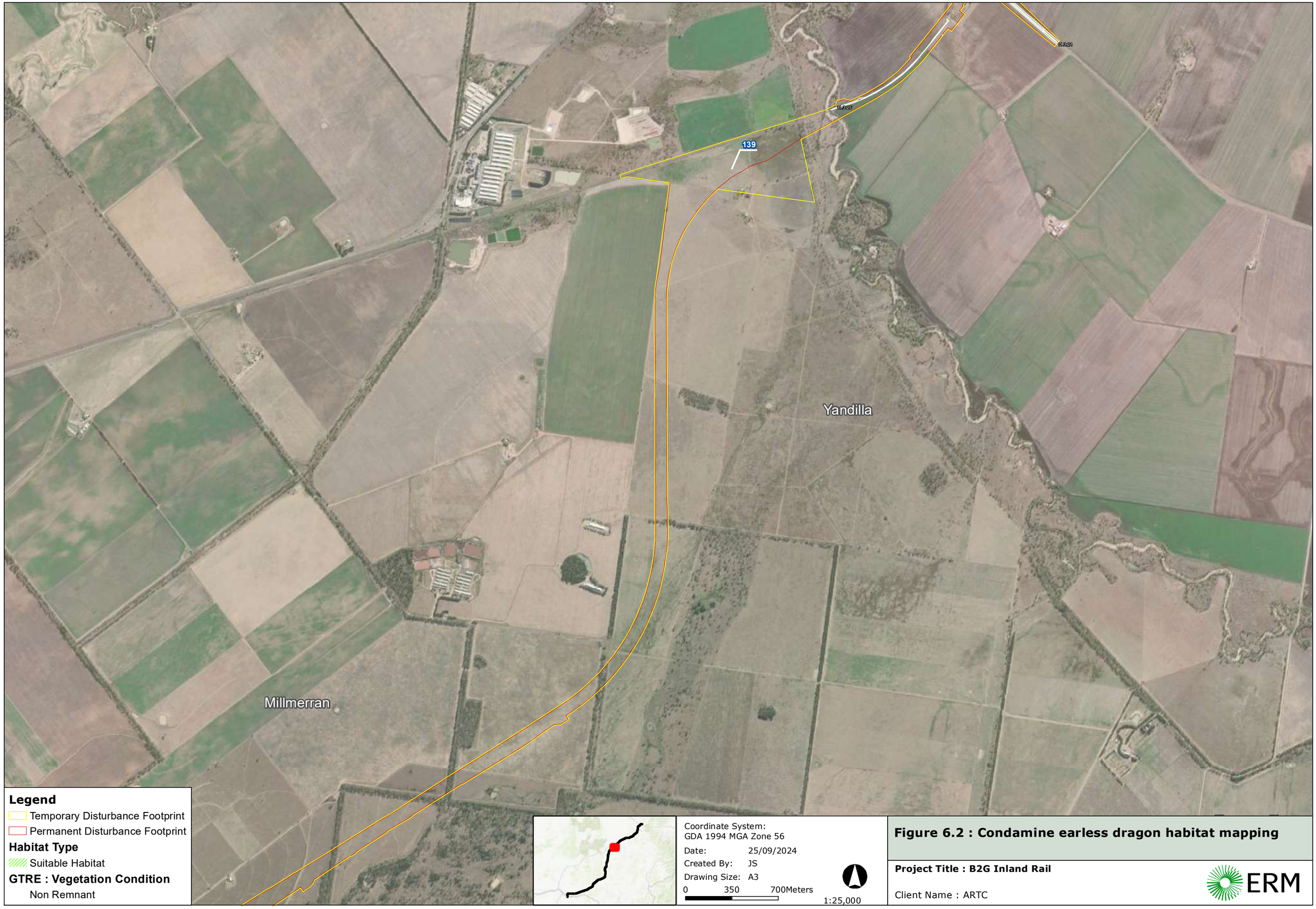

Figure 6.2 : Condamine earless dragon habitat mapping

Project Title : B2G Inland Rail

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Figure 6.2 : Condamine Earless Dragon Habitat Mapping

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6.2.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the Condamine earless dragon:

- Habitat loss due to development, including road development and maintenance;
- Soil degradation due to changed agricultural practices;
- Expansion of cropped areas;
- Introduction of weeds or pasture species; and
- Predation by cats and foxes (TSSC, 2016).

6.2.5 EPBC STATUTORY DOCUMENTS

The following recovery plan has been identified as being relevant for Condamine earless dragon:

- National Recovery Plan for the Grassland Earless Dragon *Tympanocryptis pinguicolla* (Roberston and Evans, 2009).

The following threat abatement plan is relevant to Condamine earless dragon:

- Threat abatement plan for predation by feral cats (DoE, 2015).

6.2.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

Important populations for the grassland earless dragon includes:

- All extant populations; and
- All currently known, and subsequently discovered populations should be considered in conservation strategies for this species.

Summary of recovery actions outlined in the National Recovery Plan for the Grassland Earless Dragon include:

- Determine the distribution and abundance of the species in order to define habitat critical to the survival of the species;
- Maintain and improve the current abundance and distribution by better understanding the species through ecological research to enable effective management;
- Better understand and address the threats faced by the species and their habitat so that impacts can be measured and abated;
- Protect and manage suitable habitat;
- Ongoing monitoring to enable adaptive management; and
- Salvage and translocate existing populations at sites that are not suitable for the long-term survival of the local population.

Threat abatement actions for feral cats include:

- Effectively control cats in different landscapes;
- Improve effectiveness of existing control measures for feral cats;
- Develop and maintain alternative strategies for the recovery of threatened species; and
- Gain public support for feral cat management and promote responsible cat ownership.

6.2.7 REFERENCES

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6.3 DUNMALL'S SNAKE (*FURINA DUNMALLI*)

6.3.1 STATUS

EPBC Act – Vulnerable, 16 July 2000

6.3.2 BIOLOGY AND ECOLOGY

6.3.2.1 CHARACTERISTICS

Dunmall's snake (*Furina dunmalli*) is a small to medium-sized, venomous (family Elapidae), snake that typically grows to a length of up to 75 cm. The species' head is large and distinctive from the body, which has a uniform dark grey-brown colouration on the top, fading to white at the lower flanks and has 21 rows on the mid-section (refer to Plate 6-7). Majority of the scales near the upper lip exhibit pale blotches (DES, 2017).

PLATE 6-7 DUNMALL'S SNAKE (*FURINA DUNMALLI*)

Source: ALA (2024)

6.3.2.2 KNOWN DISTRIBUTION

Dunmall's snake is endemic to Australia and inhabits areas near the Queensland border within the Brigalow Belt South bioregion to the Nandewar bioregion in NSW (refer to Plate 6-8). In Queensland, Dunmall's snake is often found in areas 200 to 500 m above sea level with recorded sightings in Oakey and Inglewood. In NSW, the species is predominantly found in the northeast inland region (DoE, 2023).

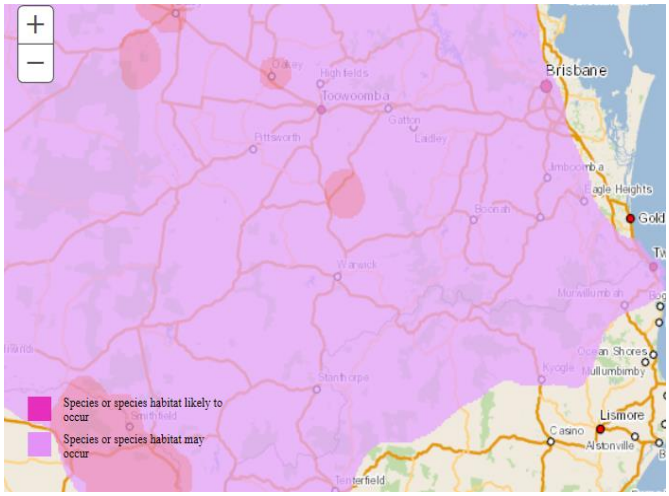

PLATE 6-8 DISTRIBUTION RANGE OF THE DUNMALL'S SNAKE

Source: ALA (2024), DoE (2023)

6.3.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Dunmall's snake is known to occur within the MNES Study Area, and habitat for the species has been identified within the Project footprint.

This species was not identified during any Project-associated field surveys including limited RE and TEC assessments and protected plant surveys where the alignment overlaps species distribution. The species was incidentally recorded in Bringalily State Forest beside a drainage line in bulloak forest in November 2023.

There is one database record of the species within the Study Area recorded in 2011 on Millmerran – Inglewood Road north of Inglewood where the Project footprint traverses Bringalily State Forest. This is the only specimen backed record within the Study Area or Project footprint. There are an additional 4 records of the species within 50 km of the Project footprint, of which, one was recorded in Oakey (no date); one within the Dthinna Dthinnawan National Park (1993); one along Inglewood Texas Road (1980); and one along Beebo Seventeen Mile Road (no date) (refer to Plate 6-9).

The Project is located at the southern end of the species distribution, particularly at the southern end of the alignment.

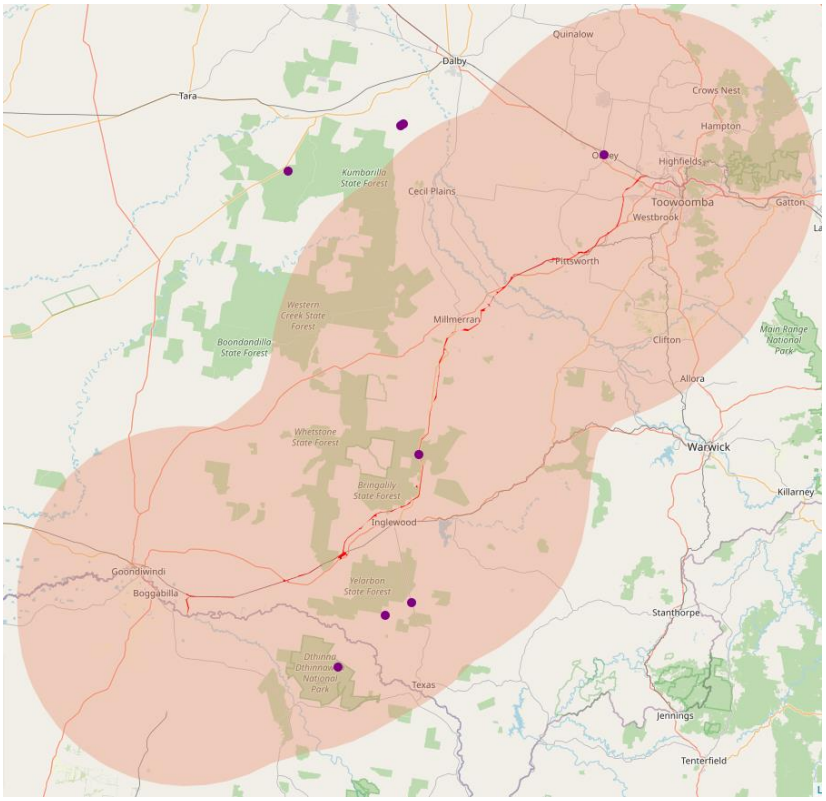

PLATE 6-9 DISTRIBUTION RANGE OF THE DUNMALL'S SNAKE IN RELATION TO THE PROJECT

Source: ALA (2024)

6.3.2.4 BIOLOGY AND REPRODUCTION

Dunmall's snake are known to eat small lizards, including skinks and geckos. Analysis of the gut contents of this species yielded the remains of tree skink (*Egernia striolata*). Limited knowledge is available on the species' life cycle or reproductive behaviour; however, evidence exists of egg laying rather than live young (DoE, 2023).

6.3.3 HABITAT DESCRIPTION AND DEFINTION

Dunmall's snake occurs from Yeppoon (QLD) south to south-central New South Wales. The railway alignment is located within the species distribution of modelled habitat that may occur (as per the modelled habitat on the species SPRAT profile (DoE 2023)).

In Queensland, the species has a distribution from Yeppoon to Oakey, Glenmorgan and Inglewood, with most records occurring between 200-500 m above sea level (DoE 2014). Dunmall's snake inhabits open forests dominated by brigalow (*Acacia harpophylla*) on floodplains of deep-cracking black clay and clay loams. Open forests and woodlands dominated by wattles (*A. burowii, A. deanii, A. leioclyx*), native cypress (*Callitris* spp.) or bull-oak (*Allocasuarina luehmannii*), are also commonly inhabited by the species. Additionally, the species occurs in blue spotted gum (*Corymbia citriodora*), ironbark (*Eucalyptus crebra* and *E. melanophloia*), white cypress pine (*Callitris glaucophylla*) and bull-oak open forest and woodland associations on sandstone derived soils.

There is no delineation between breeding, dispersal and foraging habitat for this species and as such, only suitable habitat and not suitable habitat are defined in Table 6-3. Microhabitat

features preferred includes fallen timber and ground litter. Habitat mapping for the species within the Project footprint is presented in Figure 6-3.

TABLE 6-3 HABITAT CRITERIA FOR DUNMALL'S SNAKE WITHIN THE STUDY AREA

Habitat function	Habitat description	Regional Ecosystems	Habitat mapping rules
Suitable habitat	Forests and woodlands on black alluvial cracking clay and clay loams dominated by brigalow (*Acacia harpophylla*), other wattles (*A. burowii, A. deanii, A. leioclyx*), native cypress (*Callitris* spp.) or bull-oak (*Allocasuarina luehmannii*). Microhabitat includes leaf litter, fallen timber and woody debris. The species may use cracks in alluvial clay soils.	11.3.1 11.3.2 11.3.4 11.3.14 11.3.17 11.3.18 11.4.3 11.4.10 11.5.1 11.5.4 11.5.20 11.7.4 11.7.7 11.8.4 11.8.5 11.9.5 11.9.9a 11.9.10	Larger contiguous areas of remnant and regrowth woodland and forest on black alluvial cracking clay and clay loams, dominated by brigalow (*Acacia harpophylla*), other wattles (*A. burowii, A. deanii, A. leioclyx*), native cypress (*Callitris spp.*) or bull-oak (*Allocasuarina luehmannii*), within the species modelled distribution. Larger contiguous areas of bull-oak open forest and woodland associations on sandstone derived soils, generally accompanied by blue spotted gum (*Corymbia citriodora*), ironbark (*Eucalyptus crebra* and *E. melanophloia*) and white cypress pine (*Callitris glaucophylla*), within the species modelled distribution. Microhabitat includes leaf litter, fallen timber, woody debris or cracks in alluvial clay soils. Areas mapped as Essential Habitat.
Not suitable habitat	Cleared pastoral areas without microhabitat features, associated vegetation, and areas where deep cracks do not form (i.e., hard-setting brown clays or sandy soil types).	11.3.21 11.3.24 11.3.25 11.3.27 11.3.27b 11.3.27i 11.5.1a 11.5.14 11.7.5 11.8.11 11.9.7	Areas not mapped as breeding and foraging habitat (i.e., cleared pastoral areas without microhabitat features, associated vegetation, and areas on hard-setting brown clays or sandy soil types). Areas outside the species modelled distribution.

Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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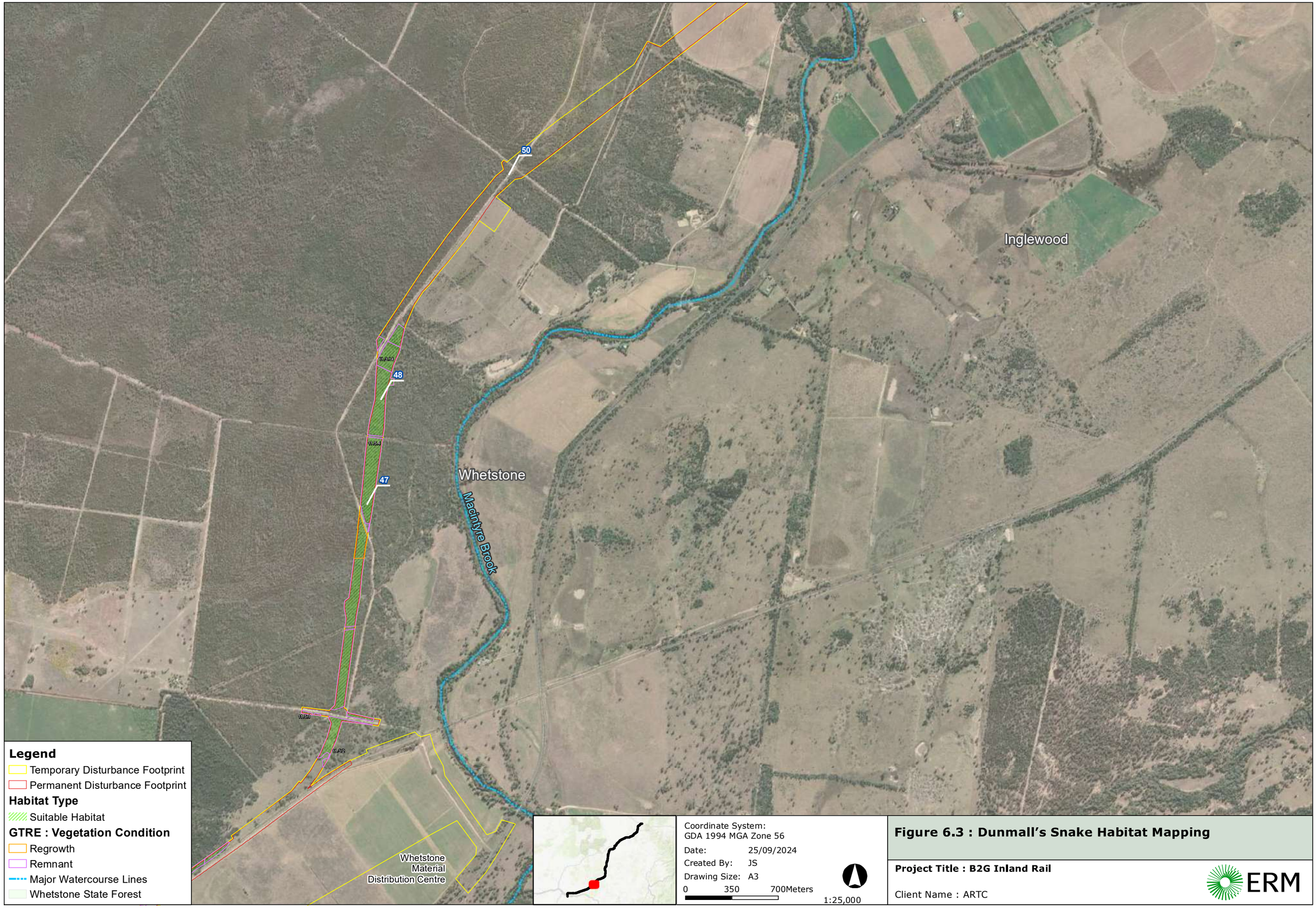

Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

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Bringalily
State Forest

Inglewood

Canning Creek

Macintyre Brook

Legend

- Temporary Disturbance Footprint
- Permanent Disturbance Footprint

Habitat Type

- Suitable Habitat

GTRE : Vegetation Condition

- Regrowth
- Remnant
- Major Watercourse Lines
- Bringalily State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3

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Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

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Canning Creek

Inglewood Non-Resident Workforce Accommodation

Mosquito Creek

Bringalily State Forest

Inglewood

Borrow Pit Site 4

Canning Creek

Borrow Pit Site 3

Coolmunda

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Remnant

Major Watercourse Lines

Bringalily State Forest

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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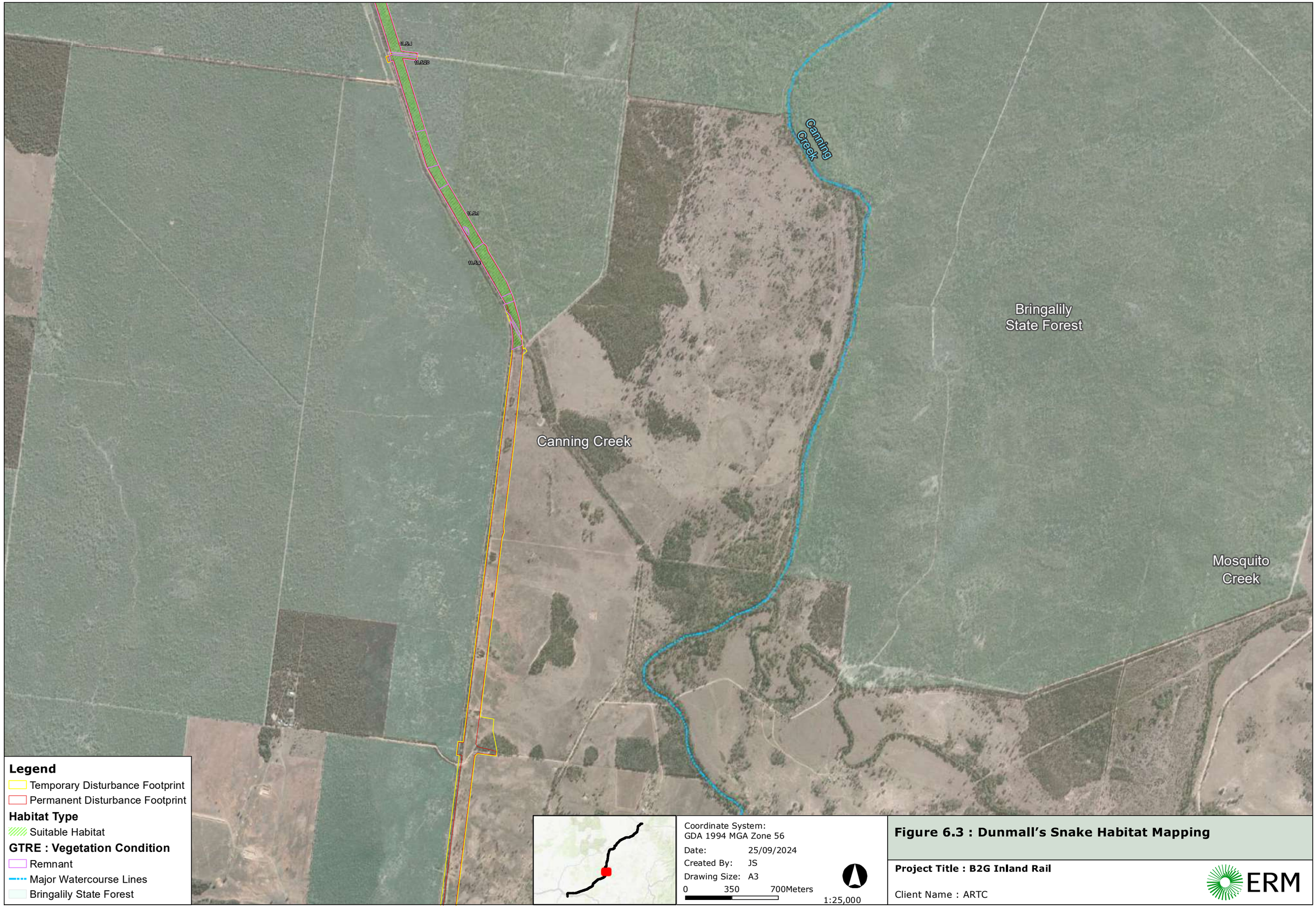


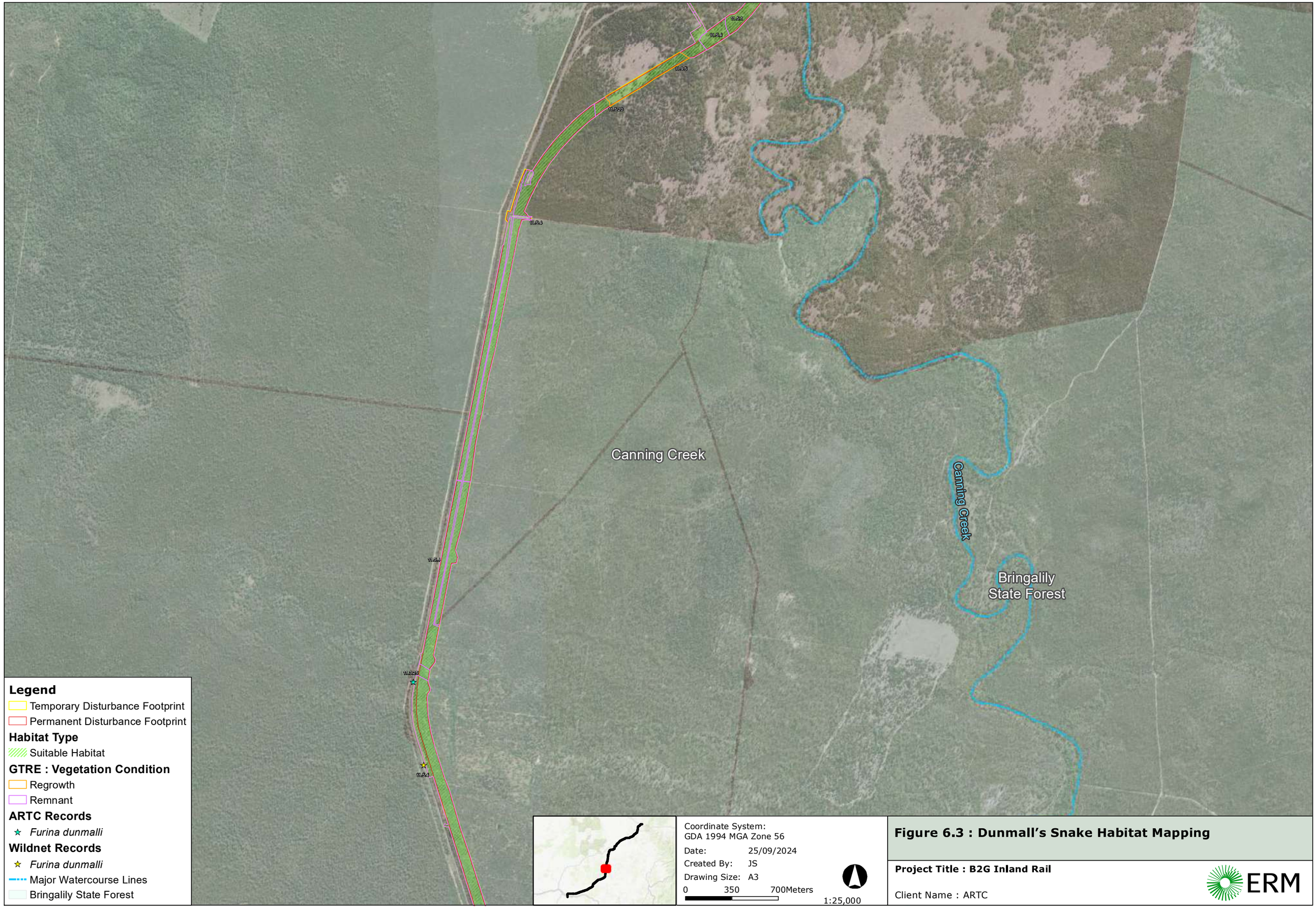
Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd



Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3

0 350 700Meters
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Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

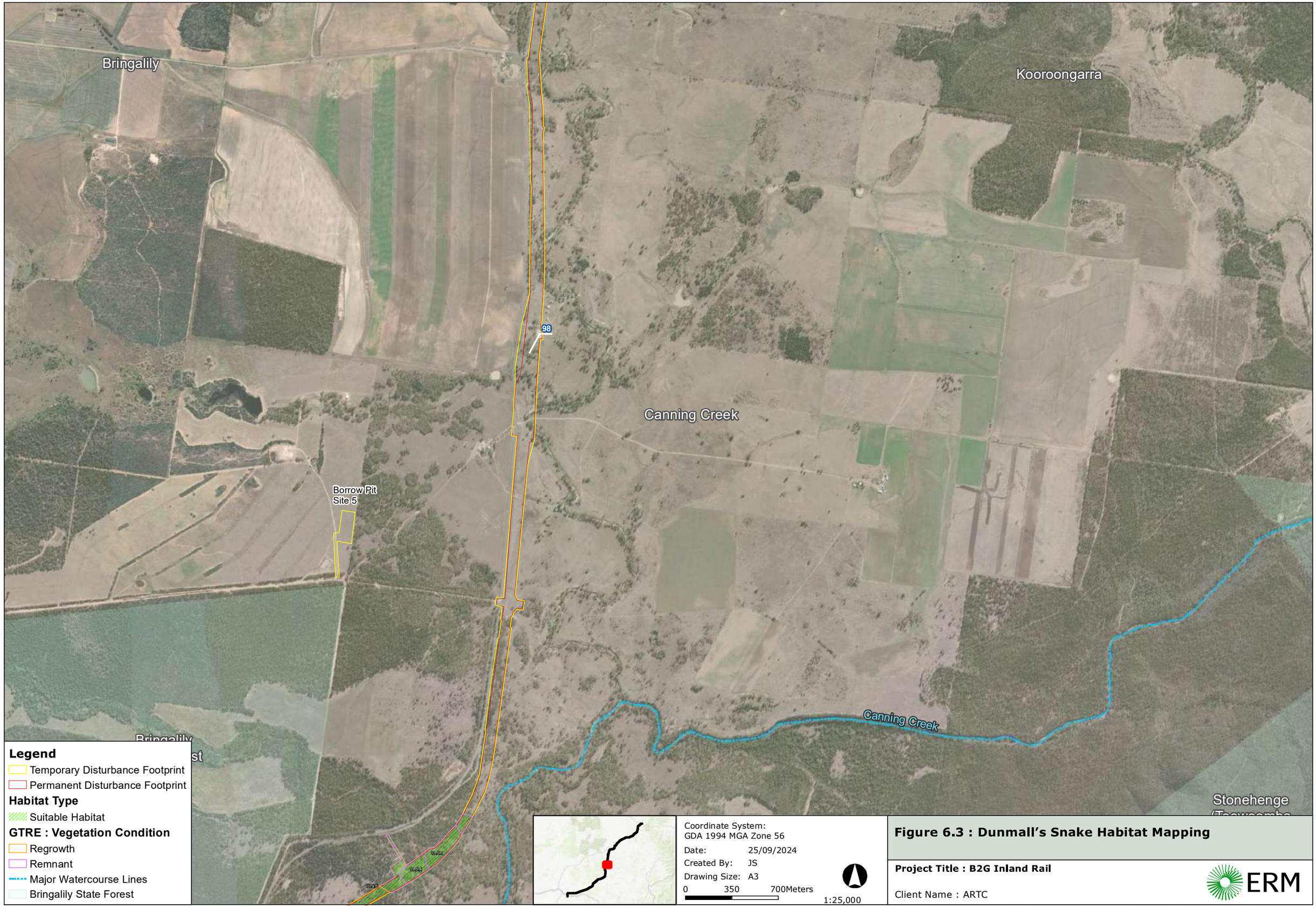

Figure 6.3 : Dunmall's Snake Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

6.3.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to Dunmall's snake:

- Habitat loss and fragmentation due to land clearing in core areas of the Darling Downs;
- Predation by feral animals such as foxes, cats, and pigs; and
- Inappropriate roadside management (DES, 2017).

6.3.5 EPBC STATUTORY DOCUMENTS

No threat abatement/recovery plan has been identified as being relevant for this species. A recovery plan is not required as the approved conservation advice for the species provides sufficient direction to implement priority actions and mitigate against key threats. The species conservation advice is provided below:

- Approved Conservation Advice for *Furina dunmalli* (Dunmall's Snake) (DoE, 2014).

6.3.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice lists the following priority actions as relevant:

- National priority actions:
  - Habitat loss, disturbance and modification:
    - Manage any disruptions to water flows and any modification of wetlands; and
    - Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.
  - Conservation information:
    - Raise awareness of Dunmall's Snake and other reptiles within the local community; and
    - Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.
- Local priority actions:
  - Habitat loss, disturbance and modification:
    - Minimise adverse impacts from land use at known sites.
  - Trampling, browsing or grazing:
    - If livestock grazing occurs in the area, ensure land owners/managers use an appropriate management regime and stocking density that does not detrimentally affect this species.
  - Animal predation or competition
    - Continue baiting to control population numbers of feral animals.

6.3.7 REFERENCES

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6.4 FIVE-CLAWED WORM-SKINK (*ANOMALOPUS MACKAYI*)

6.4.1 STATUS

EPBC Act – Vulnerable, 16 July 2000

6.4.2 BIOLOGY AND ECOLOGY

6.4.2.1 CHARACTERISTIC

Five-clawed worm-skink (*Anomalopus mackayi*), is a burrowing skink characterised by three fingers and two toes, and typically grows to 27 cm long. The species features smooth scales with an overall greyish-brown upper body, dark spots in longitudinal rows and a yellow-green with dark flecking ventral surface (refer to Plate 6-10). In the southern region of their distribution range, five-clawed worm-skink is unpatterned, whilst in the north, the species has longitudinal rows of dark spots on the dorsal and lateral surfaces (DoE, 2023).

PLATE 6-10 FIVE-CLAWED WORM-SKINK (*ANOMALOPUS MACKAYI*)

Source: ALA (2024)

6.4.2.2 KNOWN DISTRIBUTION

Five-clawed worm-skink has a patchy distribution from north-eastern New South Wales to south-east Queensland (refer to Plate 6-11; DoE, 2023). In south-eastern Queensland, five-clawed worm-skink occupy the upper Condamine River floodplain, from Warwick in the south, to the Jimbour region in the north, and the western edge of the granite belt (Brigalow Belt Reptiles Workshop 2010; DoE, 2023).

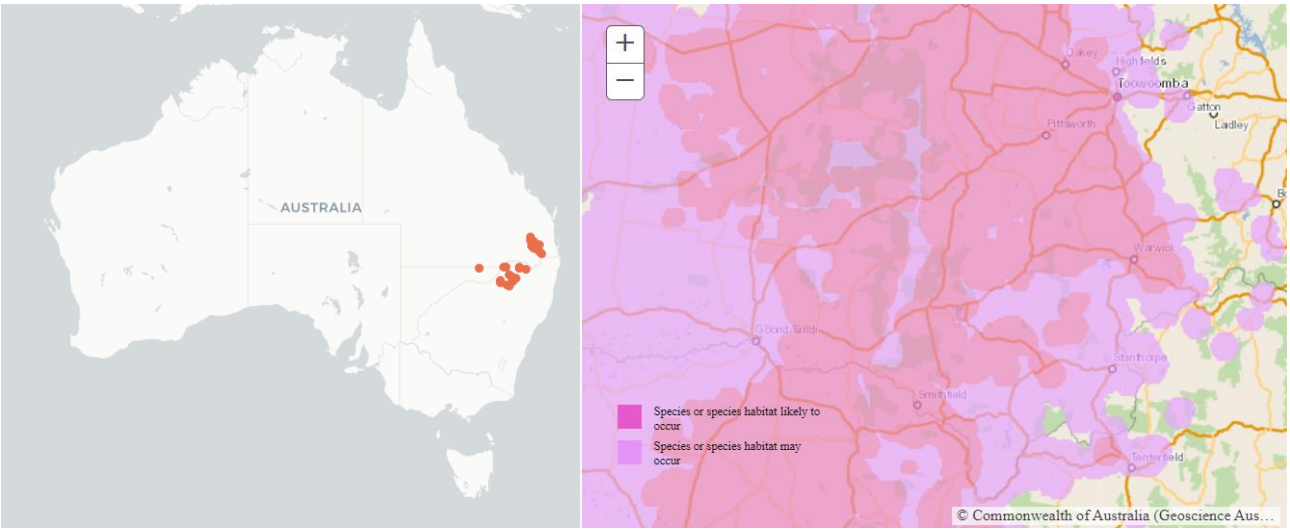

PLATE 6-11 DISTRIBUTION RANGE OF THE FIVE-CLAWED WORM-SKINK

Source: ALA (2024), DoE (2023)

6.4.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Five-clawed work skink is assessed as being likely to occur and habitat has been identified within the Project footprint. Despite targeted surveys, the species was not identified during any Project-associated field surveys. There are no desktop based records within the Project footprint; however, there are three records within the Study Area, recorded at the Broxburn railway siding / Broxburn Road junction, approximately 300 m east of the Project footprint, north-east of Pittsworth, and were recorded in 2002 and 2009.

There is one record of the species located approximately 2 km east of the northern-most portion of the Project footprint, which recorded alongside Paulsen's West Road and the western rail line in 1983.

There are an additional 216 records of the species within 50 km of the Project footprint, recorded between 1984 – 2022 (refer to Plate 6-12; ALA, 2024). Majority of these records are clustered together along Boggabilla Line in NSW, however other records exist between Oakey and Dalby, in Allora, east of Pittsworth and near Cecil Plains.

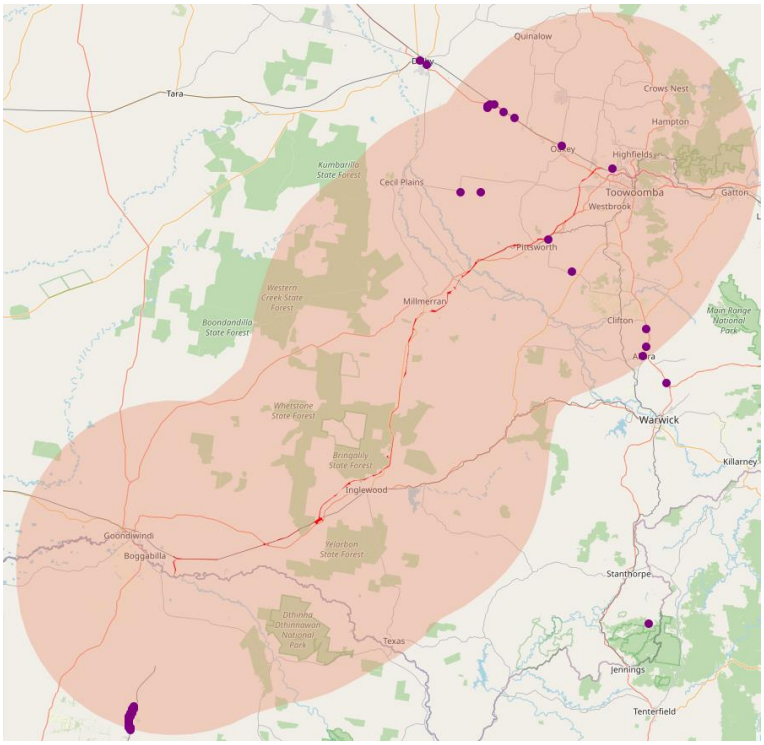

PLATE 6-12 DISTRIBUTION RANGE OF THE FIVE-CLAWED WORM-SKINK IN RELATION TO THE PROJECT

Source: ALA (2024)

6.4.2.4 BIOLOGY AND REPRODUCTION

Limited information is available on the species reproductive biology and diet, however the species is believed to feed on arthropods, including white ants and mealworms (DoE, 2023). Five-clawed worm-skink lay up to three eggs per clutch during spring (DoE, 2023).

6.4.3 HABITAT DESCRIPTION AND DEFINITION

The five-clawed worm-skink occurs in the Darling Downs bordering the lower western slopes of the Great Dividing Range, in both north-eastern New South Wales and south-eastern Queensland. In Queensland, the species known distribution is located on the upper Condamine River floodplain. The railway alignment is located within the species distribution of both modelled habitat likely to occur and may occur (as per the modelled habitat on the species SPRAT profile (DoE, 2023)).

Within this distribution, the species occurs in bluegrass (*Dichanthium sericeum*) and/or Mitchell grass dominated grasslands or mixed grasslands dominated by other grass species, but still classified as Queensland Regional Ecosystem (RE) 11.3.21.

In south-east Queensland, the species may occur in river red gum–Queensland blue gum–coolabah–bimble/poplar box grassy woodland/open forests (DoE, 2023). The species resides in permanent deep tunnel burrows and deep soil cracks. The species utilises fallen logs, matted tussocks/grass and timber for shelter.

There is no delineation between breeding, dispersal, and foraging habitat for this species and as such, only suitable habitat and not suitable habitat are defined in Table 6-4. However, microhabitat requirements include cracking clay soils or self-mulching friable basalt soils

(vertosol soils; NSW DCCEEW, 2023) and woody debris. Habitat mapping for the species within the Project footprint is presented in Figure 6-4.

TABLE 6-4 HABITAT CRITERIA FOR FIVE-CLAWED WORM-SKINK WITHIN THE STUDY AREA

Habitat function	Habitat description	Regional Ecosystems	Habitat mapping rules
Suitable habitat	Habitat areas include bluegrass and/or Mitchell grass dominated grassland and other grasslands categorised as Regional Ecosystem (RE) 11.3.21; river red gum – Queensland blue gum – coolibah-bimble/poplar box and weeping myall grassy woodlands; white box grassy woodland; myall woodland, and brigalow (*Acacia harpophylla* dominant and co-dominant). Microhabitat features including cracking clay soils or self-mulching friable basalt soils and woody debris.	11.3.1 11.3.2 11.3.21 11.3.25 11.3.4 11.4.3 11.8.4 11.8.5 11.8.11 11.9.5	Native grasslands and woodlands on alluvial, cracking clay soils or self-mulching, friable basalt soils in QLD and associated non-remnants. Habitats containing vertosol soils (cracking clay soils or self-mulching friable basalt soils), either with or without woody debris, and within the species modelled distribution. Areas mapped as Essential Habitat.
Not suitable habitat	Cleared pastoral areas and areas where deep cracks do not form (i.e., hard-setting brown clays or sandy soil types).	11.3.14 11.3.17 11.3.18 11.3.24 11.3.27 11.3.27b 11.3.27i 11.4.10 11.5.1 11.5.1a 11.5.4 11.5.14 11.5.20 11.7.4 11.7.5 11.7.7 11.8.3 11.9.7 11.9.9a 11.9.10	Areas not mapped as habitat (i.e., cleared pastoral areas and areas on hard-setting brown clays or sandy soil types). Areas outside the species modelled distribution.

Figure 6.4 : Five-Clawed Worm-Skink Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Figure 6.4 : Five-Clawed Worm-Skink Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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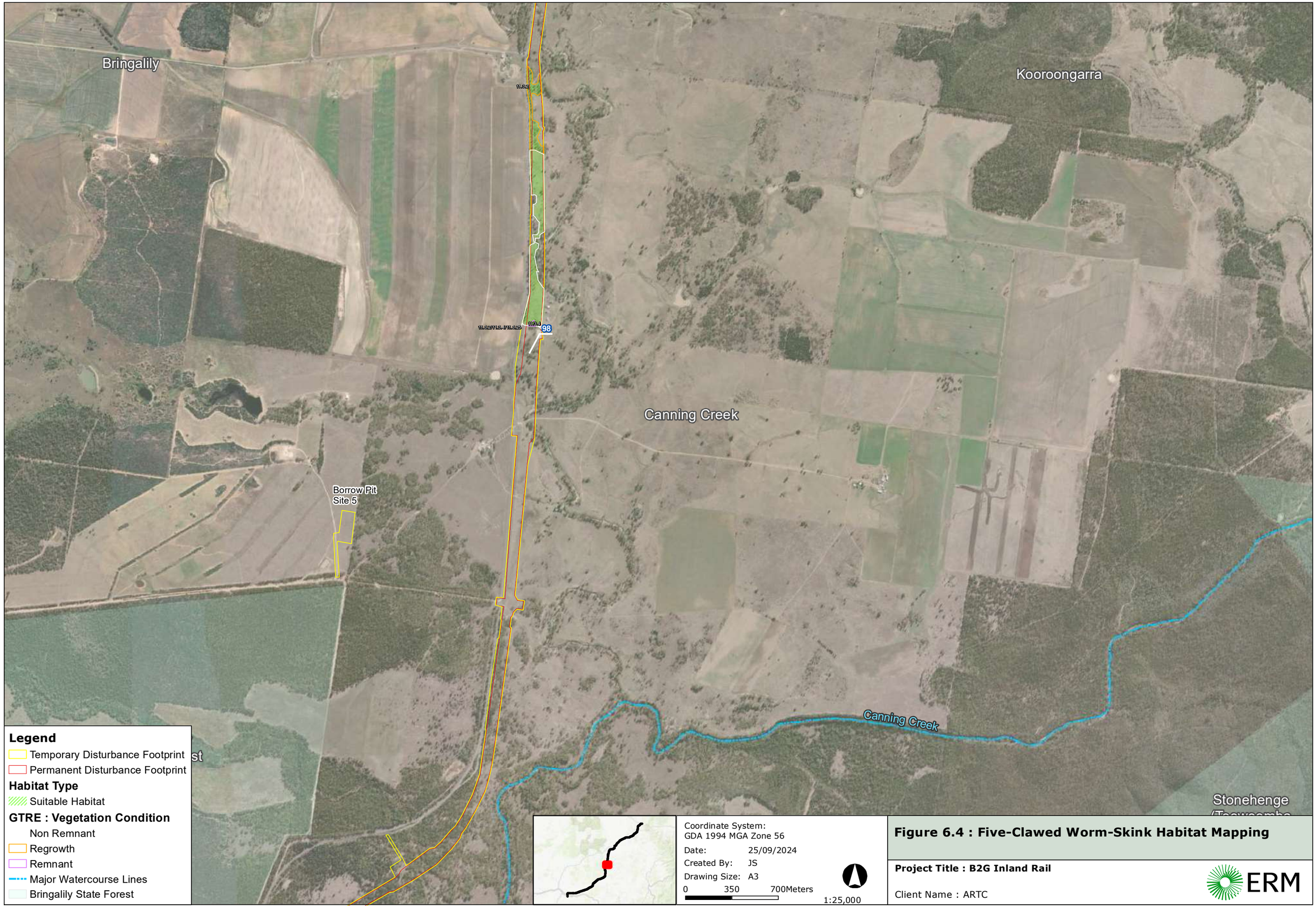

Figure 6.4 : Five-Clawed Worm-Skink Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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Project Title : B2G Inland Rail

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ERM_ANZ_2023_A3_Landscape_MNES.mxd

Captains Mountain

Domville

Grays Gate

Borrow Pit Site 6A

Clontarf (Toowoomba - Qld)

Borrow Pit Site 6B

Millwood

Lavelle

Legend

Temporary Disturbance Footprint

Permanent Disturbance Footprint

Habitat Type

Suitable Habitat

GTRE : Vegetation Condition

Non Remnant

Regrowth

Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024

Created By: JS

Drawing Size: A3

0 350 700Meters

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Figure 6.4 : Five-Clawed Worm-Skink Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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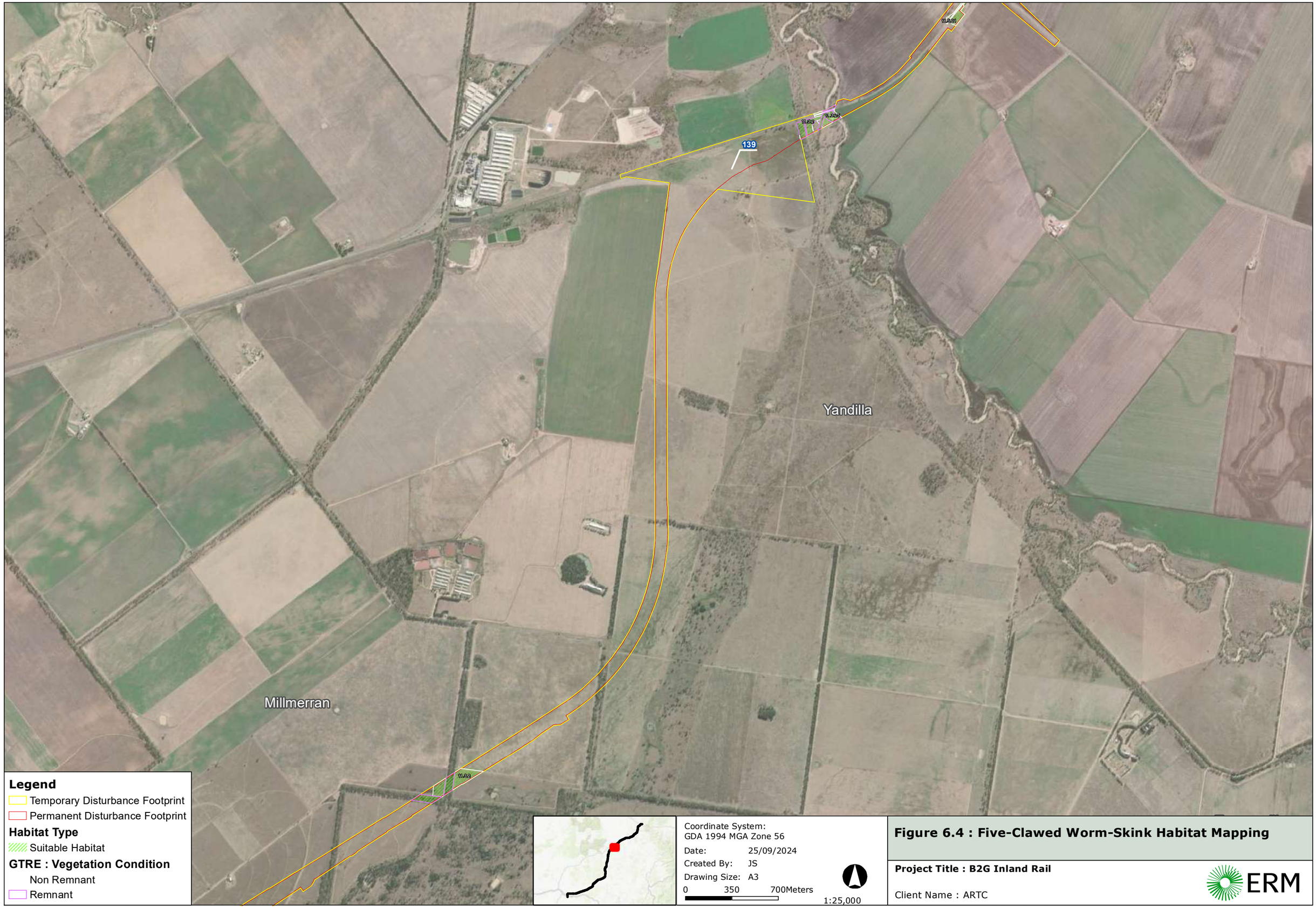

Figure 6.4 : Five-Clawed Worm-Skink Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

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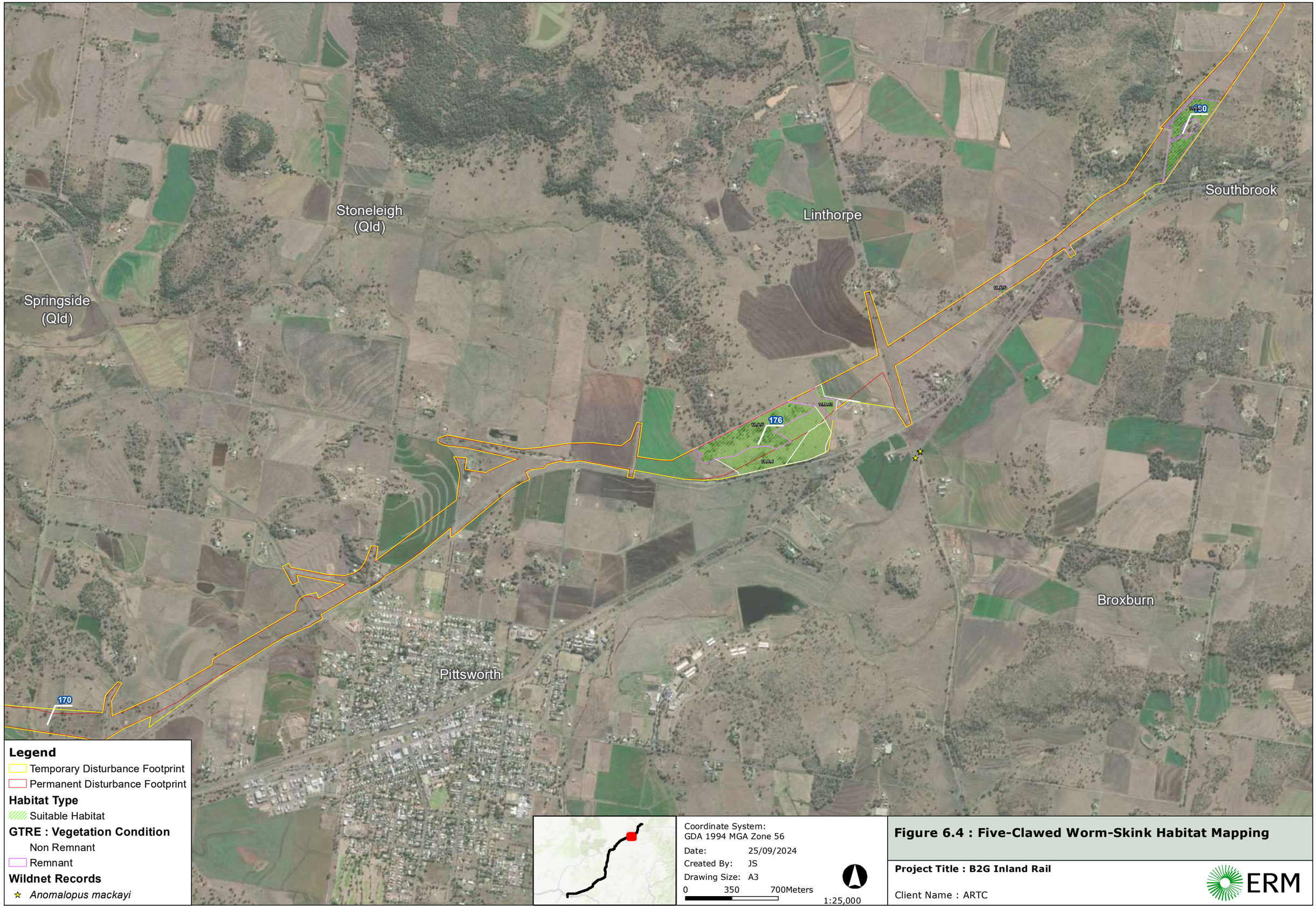

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Client Name : ARTC

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Coordinate System:
GDA 1994 MGA Zone 56

Date: 25/09/2024
Created By: JS
Drawing Size: A3

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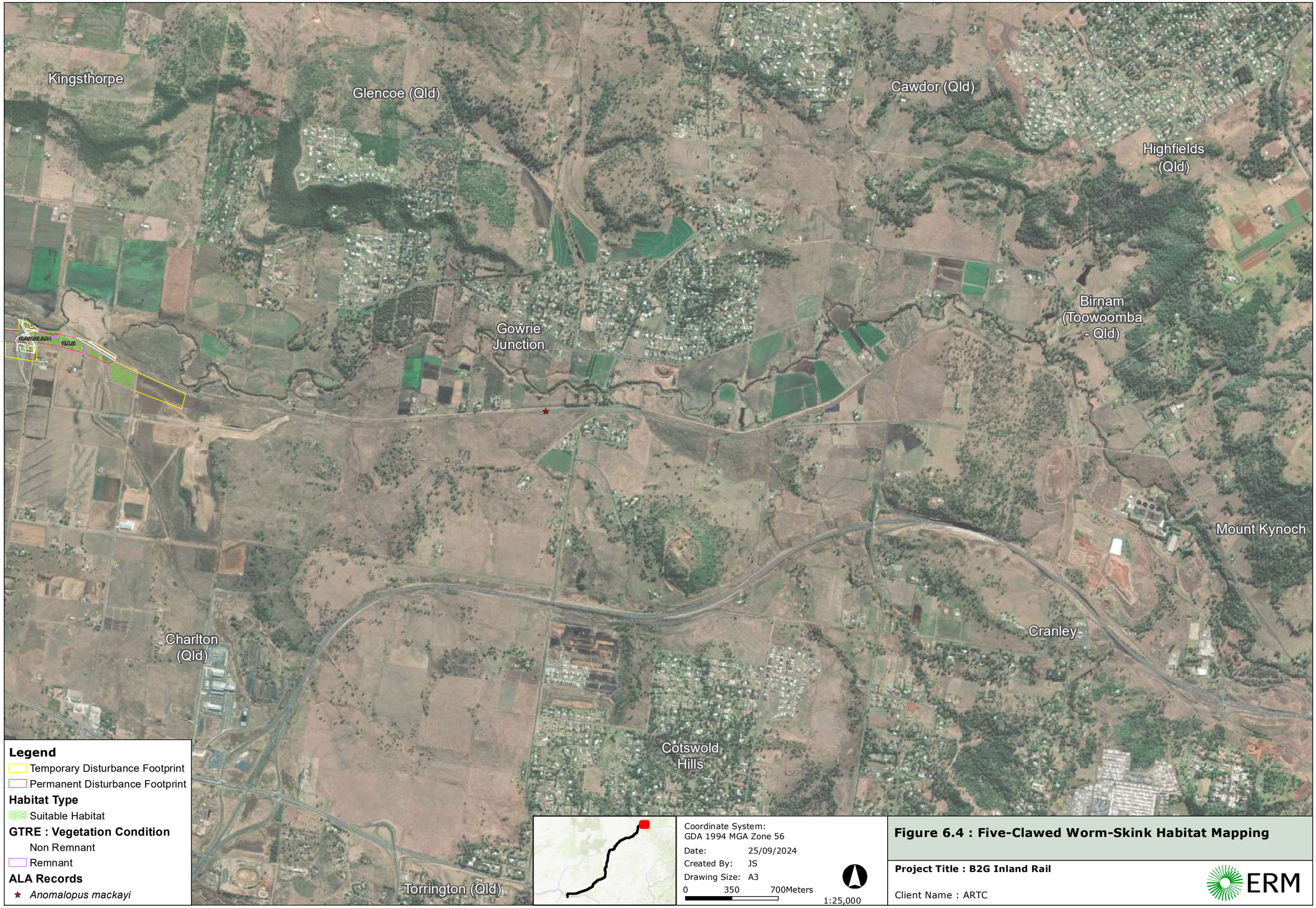

Figure 6.4 : Five-Clawed Worm-Skink Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

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6.4.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the five-clawed worm-skink:

- Land clearing for agriculture has been particularly severe within the five-clawed worm-skink's range;
- Overgrazing compacts soil making it difficult for the species to find suitable shelter;
- Removal of logs and timber also reduces soil humidity and the amount of shelter available for the species. Agricultural chemicals may poison and pollute the soil which may adversely affect the species; and
- Predation by feral species, such as cats and foxes, is another threat facing much of Australia's native wildlife including the five-clawed worm-skink (Brigalow Belt Reptiles Workshop, 2010).

6.4.5 EPBC STATUTORY DOCUMENTS

There is no adopted or made recovery plan relevant for the species, and a recovery plan is not required. The following threat abatement plan is relevant:

- Threat abatement plan for predation by feral cats (DoE, 2015).

6.4.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

Threats identified in the Threat abatement plan for predation by feral cats include:

- Predation on native species causing a critical decline in many species across animal groups;
- Competition for food with species they share dietary overlap and disease transmission; and
- Contributed to the extinction of many ground nesting bird species and the decline of small mammals.

Threat abatement actions for feral cats include:

- Effectively control cats in different landscapes;
- Improve effectiveness of existing control measures for feral cats;
- Develop and maintain alternative strategies for the recovery of threatened species; and
- Gain public support for feral cat management and promote responsible cat ownership.

6.4.7 REFERENCES

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NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW). (2023). Soil habitat of the endangered five-clawed worm skink. State of New South Wales. Available from: https://www.environment.nsw.gov.au/news/soil-habitat-of-the-endangered-five-clawed-worm-skink (accessed 20/03/2024).

6.5 YAKKA SKINK (*EGERNIA RUGOSA*)

6.5.1 STATUS

EPBC Act – Vulnerable, effective 16 July 2000

6.5.2 BIOLOGY AND ECOLOGY

6.5.2.1 CHARACTERISTIC

The yakka skink (*Egernia rugosa*) is a pale fawn reptile growing up to 40 cm long. The species has a broad dark brown to black stripe from nape to tail bordered on either side by a narrow, pale fawn back/side stripe. Dark brown to pale brown to reddish-brown scales on the flanks form a faintly variegated orange-brown pattern (refer to Plate 6-13). The throat is cream-yellow in colour, with blackish flecks/spots, and the chest and abdomen are yellow-orange. Mid-body scales are in rows of 26 to 30 (DoE, 2023; DES, 2017).

PLATE 6-13 YAKKA SKINK (*EGERNIA RUGOSA*)

Source: Farquhar (2017)

6.5.2.2 KNOWN DISTRIBUTION

The known distribution of the yakka skink extends from the coast to the hinterland of sub-humid to semi-arid eastern Queensland. Locations range from the Queensland/NSW border to the Brigalow Belt (North and South), Mulga Lands, Einasleigh Uplands and up to Cape York Peninsula (Brigalow Belt Reptiles Workshop, 2010; DoE, 2023) (refer to Plate 6-14).

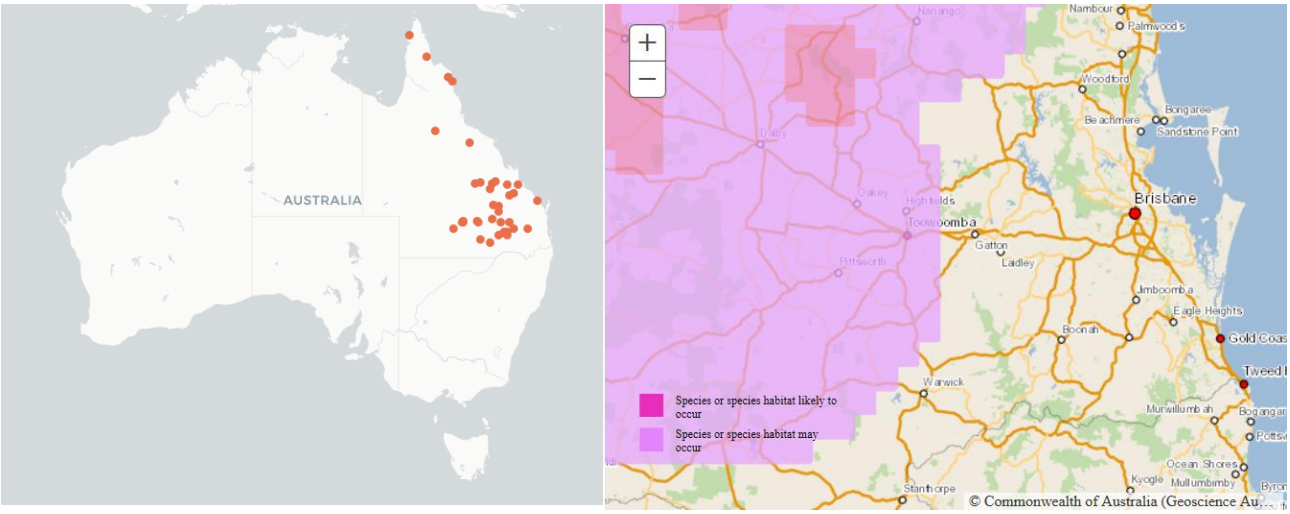

PLATE 6-14 DISTRIBUTION RANGE OF THE YAKKA SKINK

Source: ALA (2024), DoE (2023)

6.5.2.3 DISTRIBUTION IN RELATION TO THE PROJECT

Yakka skink is assessed as having the potential to occur within the Study Area and habitat for the species has been identified within the Project footprint; however, the species has not been directly recorded during field surveys.

There are no database records of the species within 50 km of the Project footprint (ALA, 2024). The nearest record is located 65 km north-west of the Project footprint (north of Goondiwindi), however this record is not dated and has been generalised to protect the exact location of the individual.

There is one record of the species in Bunya Mountains National Park located over 70 km north of the Project footprint, which was recorded in 1994; however, spatial accuracy is unreliable. All other records of the species occur to the north-west of the Project (refer to Plate 6-15). There are only two records of the species east of the project footprint, of which, one was recorded in Brisbane in 2020; and one was recorded in nightcap National Park in 2014 (ALA, 2024).

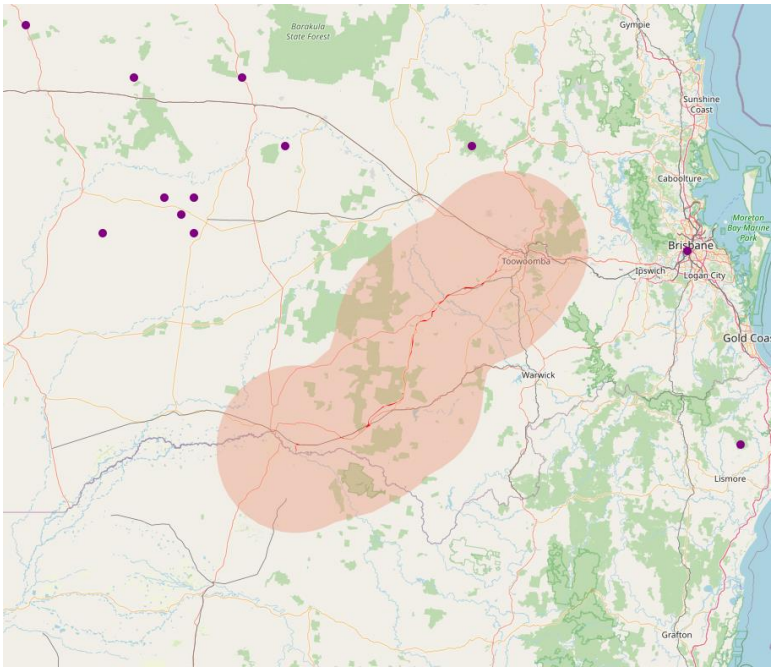

PLATE 6-15 DISTRIBUTION RANGE OF THE YAKKA SKINK IN RELATION TO THE PROJECT

Source: ALA (2024)

6.5.2.4 BIOLOGY AND REPRODUCTION

The Yakka skink is omnivorous, consuming soft plant materials and fruits and a wide variety of invertebrates which they ambush from their burrows (TSN, 2008).

The Yakka skink produces live young, with around six per litter. They are highly gregarious, with populations occurring primarily as colonies or aggregations. The breeding season for this species has not been recorded (QLD DERM, 2010; TSN, 2008).

6.5.3 HABITAT DESCRIPTION AND DEFINITION

The yakka skink is endemic to Queensland, from St George and north to Coen and Cape York. The core habitat of the yakka skink occurs in the Mulga Land and Brigalow Belt South Bioregions. The railway alignment is partially located within the species distribution of modelled habitat that may occur (as per the modelled habitat on the species SPRAT profile (DoE, 2023)).

Yakka skink inhabit open dry sclerophyll forests or woodlands, with microhabitats including dense ground vegetation, large hollow logs, fallen trees, and burrows for refuge (DoE, 2014). The species has the potential to occur in cleared areas, where shelter sites (i.e., tunnel erosion, rabbit warrens and log piles) are abundant. Rocky areas are not preferred habitat for this species in the southern Brigalow Belt.

The conservation advice does not delineate between breeding, dispersal and foraging habitat for this species and as such, only suitable habitat and not suitable habitat are defined in Table 6-5. Important habitat, as defined in the *Draft referral guidelines for the nationally listed Brigalow Belt reptiles*, includes areas where colonies are known or likely to occur, given the microhabitat features available (DSEWPC, 2011). Microhabitat features required for this species include cavities under and between partly buried rocks, logs and tree stumps as well as abandoned animal burrows. Habitat mapping for the species within the Project footprint is presented in Figure 6-5.

TABLE 6-5 HABITAT CRITERIA FOR YAKKA SKINK WITHIN THE STUDY AREA

Habitat function	Habitat description	Regional Ecosystems	Habitat mapping rules
Suitable habitat	Open forests to low-woodlands and scrub in QLD RE Land Zones (LZ) 3, 4, 5, 7, 8, 9 and 10. The species is particularly known to occur in mulga-dominated communities with microhabitat features. Colonies have been found in large hollow logs, abandoned rabbit warrens, cavities or burrows under large fallen trees, tree stumps, logs, stick-raked piles, dense ground-covering vegetation, and deeply eroded gullies, tunnels and sinkholes. The yakka skink is known to occur in the EPBC Act listed Brigalow (*Acacia harpophylla* dominant and co-dominant) and Poplar Box (*Eucalyptus populnea*) Grassy Woodland on Alluvial Plains ecological communities.	11.3.2 11.3.4 11.3.14 11.3.21 11.3.21/11.3.24 11.3.25 11.5.1 11.5.1a 11.5.4 11.5.20 11.7.7 11.8.4 11.8.5 11.8.11	Larger contiguous areas of remnant and regrowth woodland and open forest brigalow (*Acacia harpophylla*), mulga (*A. aneura*), bendee (*A. catenulata*), lancewood (*A. shirleyi*), belah (*Casuarina cristata*), poplar box (*Eucalyptus populnea*), ironbark (*Eucalyptus spp.*), and white cypress pine (*Callitris glaucophylla*). Larger contiguous areas of remnant and regrowth woodland and open forest on RE 11.3.2 with loamy soils. Large logs, coarse woody debris or burrows are common to abundant. Areas where cattle grazing is absent. Areas within the species modelled distribution only.
Not suitable habitat	Species is not generally found in grasslands, cropping areas, rocky habitats or areas devoid of large woody debris, burrows.	11.3.1 11.3.17 11.3.18 11.3.24 11.3.27 11.3.27b 11.3.27i 11.4.3 11.4.10 11.5.14 11.7.4 11.7.5 11.8.3 11.9.5 11.9.7 11.9.9a 11.9.10	Areas not mapped as habitat (i.e., grasslands, rocky habitats, areas devoid of large logs, burrows, and accumulations of woody debris, cropping areas, grazing areas). Areas outside of suitable QLD RE Land Zones (LZ) 3, 4, 5, 7, 8, 9 and 10. Areas outside the species modelled distribution.

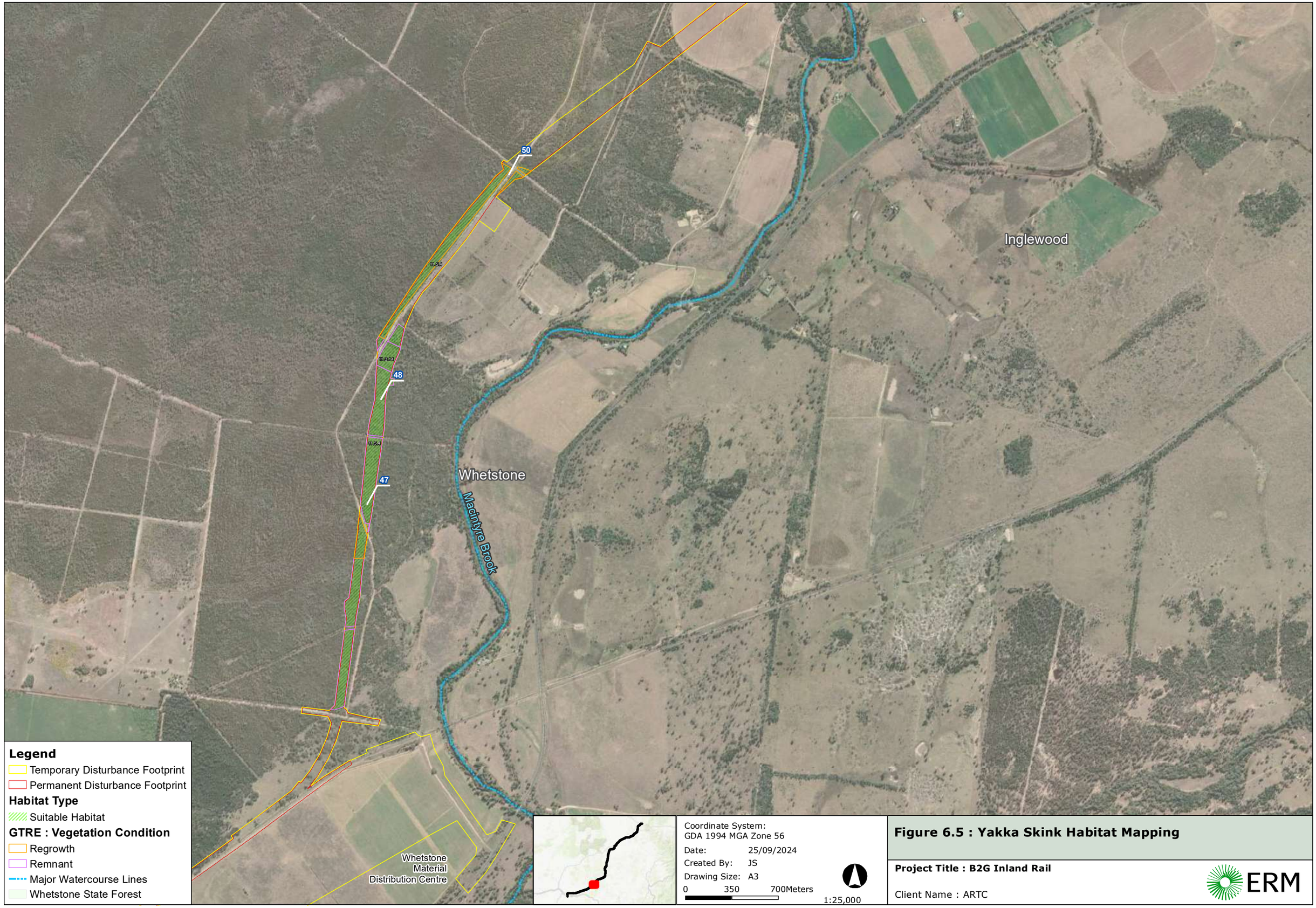

Figure 6.5 : Yakka Skink Habitat Mapping

Project Title : B2G Inland Rail

Client Name : ARTC

ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

Figure 6.5 : Yakka Skink Habitat Mapping

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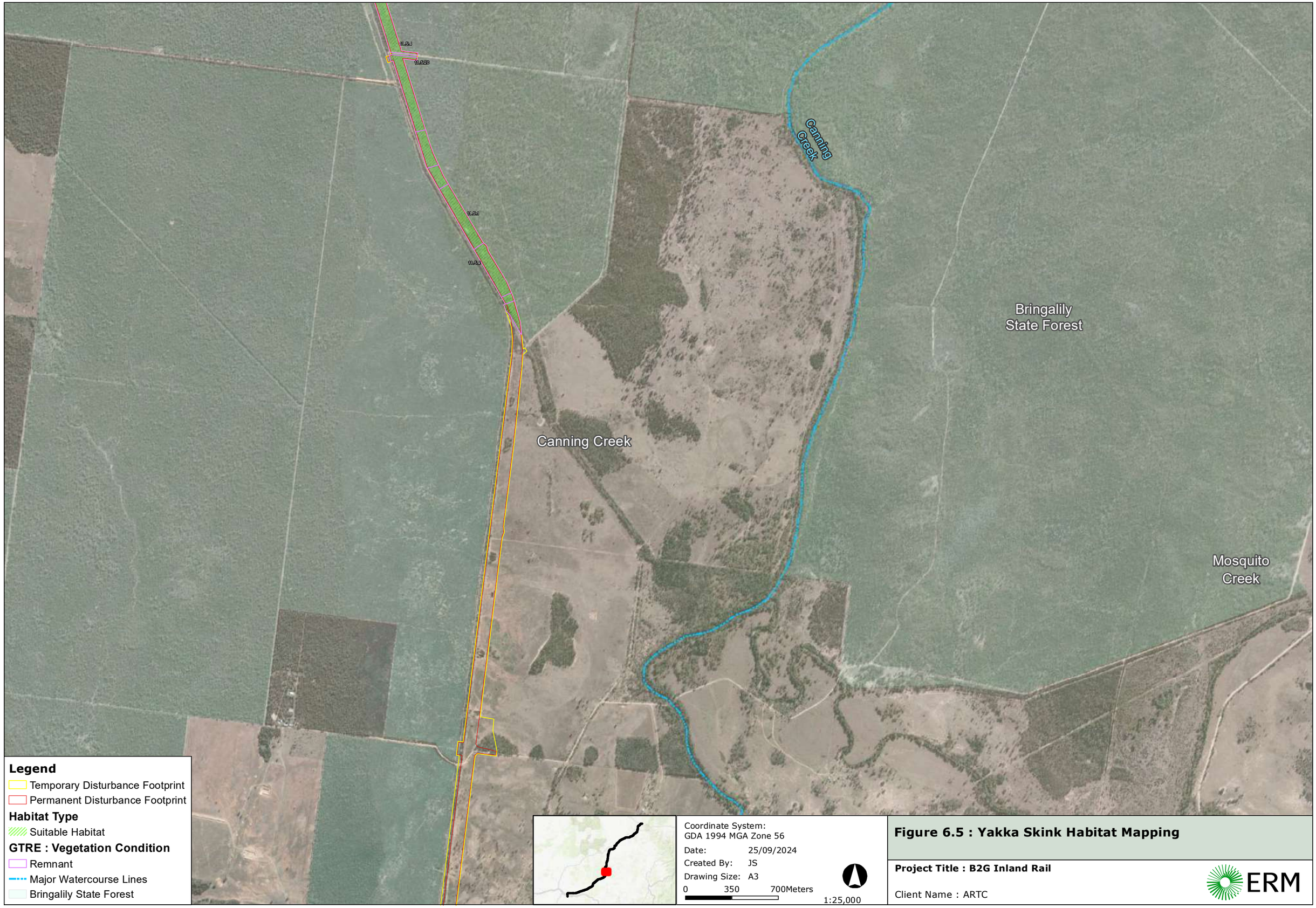

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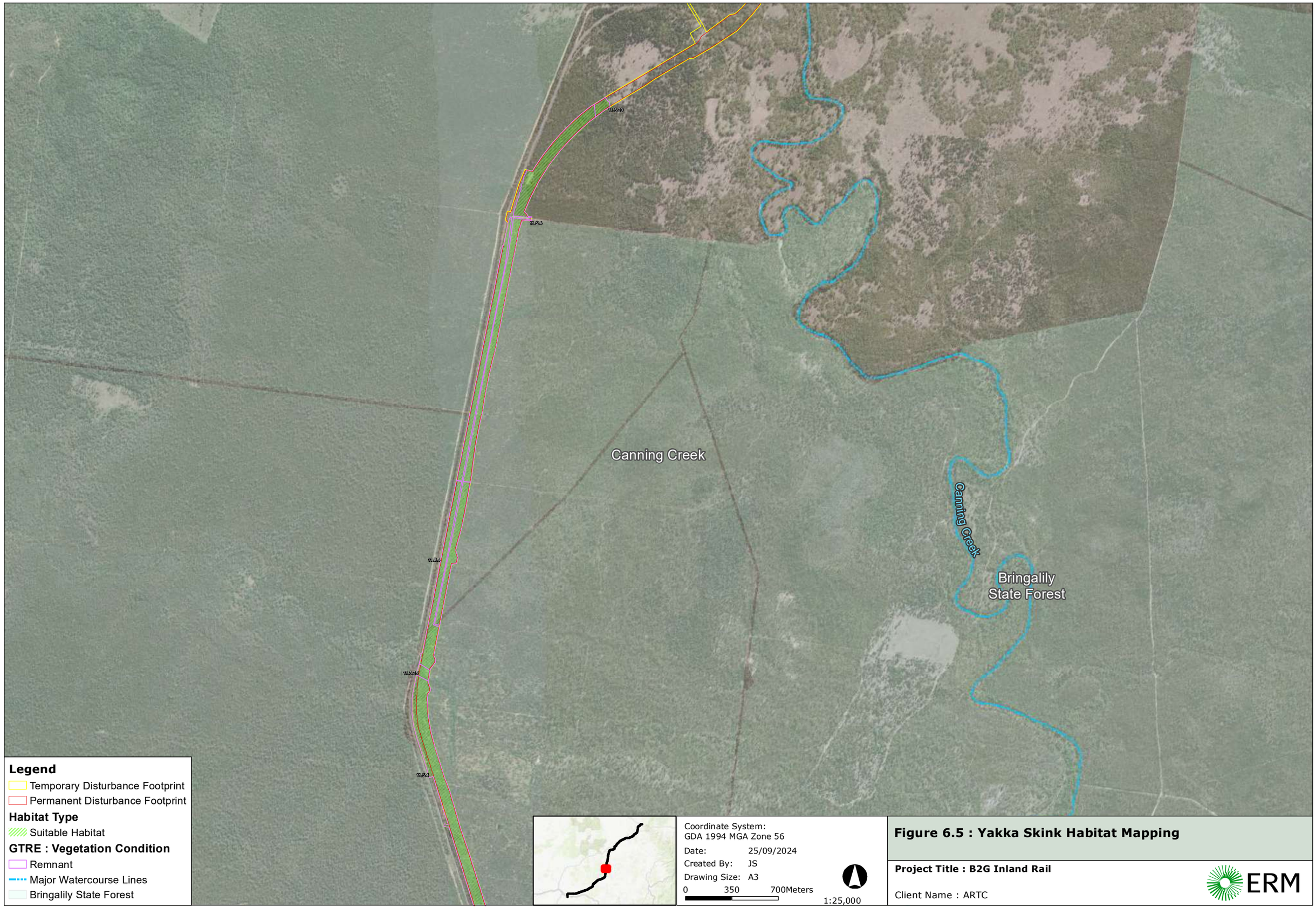

Figure 6.5 : Yakka Skink Habitat Mapping

Project Title : B2G Inland Rail

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ERM

ERM_ANZ_2023_A3_Landscape_MNES.mxd

6.5.4 THREATENING PROCESSES

The following have been identified as potentially threatening processes to the yakka skink:

- Habitat reduction and degradation due to agricultural and urban development;
- Inappropriate roadside management; and
- Feral animal impacts include predation by Red foxes and Feral cats and the ripping of rabbit warrens (DoE, 2023; TSN, 2008).

The yakka skink exhibits high site-fidelity, low fecundity and are long-lived which makes the species susceptible to potential population crashes or local extinctions given large environmental disturbances (Brigalow Belt Reptiles Workshop, 2010).

6.5.5 EPBC STATUTORY DOCUMENTS

No threat abatement/recovery plan has been identified as being relevant for this species. A recovery plan is not required as the approved conservation advice for the species provides sufficient direction to implement priority actions and mitigate against key threats. The approved conservation advice is as follows:

- Approved Conservation Advice for *Egernia rugosa* (Yakka Skink) (DoE, 2014).

6.5.6 PRIORITY RECOVERY AND THREAT ABATEMENT ACTIONS

The species conservation advice lists the following as priority actions:

- Habitat loss, disturbance and modification:
  - Monitor known populations to identify key threats;
  - Identify populations of high conservation priority;
  - Actively discourage the removal of fallen logs, leaf litter and rocks from known and potential habitat sites;
  - Ensure that road widening and maintenance activities and ripping of rabbit warrens in areas where the yakka skink occurs do not adversely impact on known populations; and
  - Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.
- Animal predation or competition:
  - Develop and implement a management plan for the control of foxes and feral cats in the region.
- Fire:
  - Develop and implement a suitable fire management strategy for the habitat of the yakka skink.
- Conservation information:
  - Raise awareness of the yakka skink, and other reptiles, within the local community; and

- Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

6.5.7 REFERENCES

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