Appendix B. Attexo Biodiversity Impact Assessment Report, February 2025.

Biodiversity Impact Assessment for Environmental Authority Amendment Application

Jammat Petroleum Pipeline Licence

Prepared for: Arrow Energy Pty Ltd

Date: 27/02/2025

Document information

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1. Introduction

Arrow Energy Pty Ltd (Arrow) operates the Surat Gas Project (SGP) in the Surat Basin located in southern Queensland. The SGP is planned to contribute to fulfilling a growing demand for natural gas in both domestic and international markets. The Jammat Petroleum Pipeline Lease (PPL) 2047 includes two buried low-pressure High-density PolyEthylene (HDPE) gas pipelines and one HDPE water pipeline. These pipelines transport coal seam gas (CSG) and produced water from the Surat Gas Project (SGP) gathering lines on Petroleum Lease (PL) 253 to a third-party Jammat field compression station (FCS) and water pond on PL278.

Environmental Authority (EA) EA002166 (the Jammat PPL EA) is held by Arrow CSG Australia Pty Ltd (a subsidiary of Arrow) which authorises the carrying out petroleum activities on PPL2047 under the *Environmental Protection Act 1994* (Qld) (EP Act). Under the Jammat PPL EA, Arrow is required to comply with eligibility criteria, standard conditions and varied conditions.

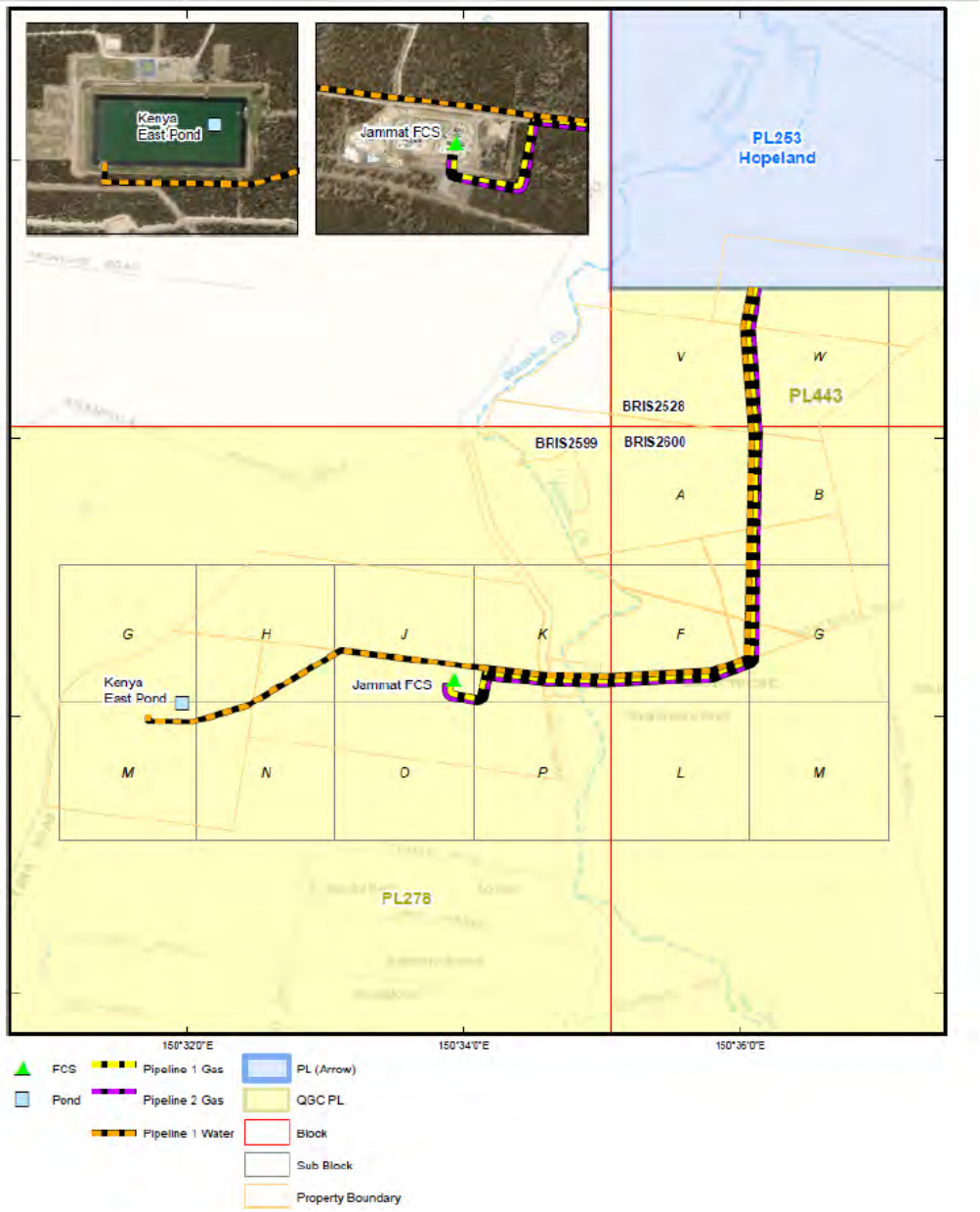
Attexo Group Pty Ltd (Attexo) has been engaged by Arrow to undertake an assessment of biodiversity impacts associated with the development of the Project to support an amendment application to the Jammat PPL EA.

1.1 Project description and key terms

An overview of the configuration of Jammat PPL (the Project) is described below and depicted in **Figure 1.1**:

- The Jammat PPL commences on the south-west corner of PL253.
- Two CSG gas pipelines that cover approximately 9.5 km will extend Arrow's gathering from the boundary of PL253 to the third-party Jammat FCS on PL278.
- A third produced water pipeline will be co-located with the gas line for the first 9.5 km. This pipeline will extend further (to approximately 12.5 km) to connect into the third-party Kenya East Pond on PL278.
- An Inlet Processing Facility (note, this is not included in **Figure 1.1**).

Figure 1.1: Overview of Project Configuration (Source: Arrow, n.d)



The disturbance that was the subject of the original Jammat PPL EA application was preliminary and subject to further detailed design work. The Project footprint assessed in this report identifies disturbance areas required for the construction of the Project, excluding those areas that have already been approved and offset under the EA or EPBC approval (refer **Section 1.4.1**). The proposed EA amendment seeks to authorise impacts associated with the following infrastructure:

- Existing access tracks;
- laydown areas;
- Right of Ways (RoWs) for the construction of gathering lines, access tracks and a water pipeline;
- RoW construction working areas;
- two Inlet Processing Facilities.

The area in which this infrastructure is proposed is referred to as the Project footprint throughout this report, which encompasses an approximate total area of 55.8 ha. The Study area defined for the purposes of this report comprises the Project footprint plus a 500 m buffer (refer to **Figure 1.2)**. Ecological values have been described for the Study area using the methods set out in **Section 2**.

Project Study Area

JAMMAT PETROLEUM PIPELINE

- Highway
- Main Road
- Local Road
- Watercourse
- Project Footprint
- Study Area (500m Buffer)
- PPL Application Area
- PPL Granted Area
- PL Granted

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REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:35,000 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_132[A] | **FIGURE 1.2**

GDA2020 MGA Zone 56

Data Source: World Imagery: Earthstar Geographics
World Topographic Map:
World Hillshade: Esri, USGS

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1.2 Approach to assessment of impacts

1.2.1 Likelihood of occurrence assessment

A Likelihood of Occurrence Assessment (LOO) as part of this report (**Section 2.1.1**) is the basis for determining if State listed threatened species are considered in this biodiversity impact assessment. Only those individual species considered 'known to occur' or 'likely to occur' (refer to **Section 2.1.1** for specific definitions of these terms) are included in **Section 3** and only these species that have mapped habitat in the Project footprint (refer to the discussion of Study area versus Project footprint below) are assessed in accordance with the Significant Residual Impact (SRI) Guidelines (DEHP, 2014).

1.2.2 Study area versus Project footprint

It is important to note that the LOO undertaken was conducted across the 'Study area' (defined as the proposed infrastructure layout or Project footprint plus a 500 metre buffer), while PEMs values are calculated based on the area of *impacted habitat within the Project footprint*.

This approach is standard for linear infrastructure projects where impact areas are often quite narrow and/or fragmented and there are no firm boundaries that would prevent mobile fauna species entering into the Project footprint even where it does not contain significant habitat resources for a particular species. As such, it is possible for a species to be 'known to occur' or 'likely to occur' within the Study area but not have habitat mapped within the Project footprint.

Whilst relevant environmental values were assessed at both the 'Project footprint' and 'Study area' scale, the Impact Assessment (presented in **Section 5**), only summarises impacts within the Project footprint.

1.3 Scope of this report

Arrow has commissioned Attexo to prepare this biodiversity impact assessment to accompany the associated application for an amendment to EA0002166. The scope of this report includes the following matters relevant to the EA application:

- a review of desktop biodiversity information within and surrounding the Project to identify any values relevant to the application
- a review of ecological field survey information within the Study area
- defining where activities in Environmentally Sensitive Areas (ESAs) protected under the EP Act may require a variation to the standard conditions for petroleum pipeline activities
- the calculation of predicted impacts on Prescribed Environmental Matters (PEMs) protected under the *Environmental Offsets Act 2014* (EO Act)
- significant residual impact assessments for conservation significant flora and fauna species identified as "Known to occur" or "Likely to occur" within the Project footprint
- additional Matters of State Environmental Significance (MSES) not already covered under EPBC approvals for the broader SGP, and
- an impact assessment for all trigger values.

1.3.1 Limitations

In undertaking this biodiversity impact assessment, Attexo has relied on ecological assessment reports, spatial data (including conservation significant records, ground-truthed regional ecosystem data and species habitat mapping) and data extracts provided by Arrow Energy in January and February 2025. Any subsequent amendments or additions to this spatial data have not been incorporated into the assessment. Survey effort data has been collated from a range of sources, with information on survey effort at individual spatial locations based on advice provided by Arrow Energy's ecology team.

The RoW for the Project will be co-located with those for other pipeline infrastructure as described in **Section 1.1**. The cumulative width of the overall RoW has been taken into account when considering the impact of the corridor on fauna movement however, only the impacts (i.e. hectares) directly attributable to the Project Footprint have been assessed in this report. Impacts related to RoWs for the other co-located pipelines are to be assessed separately under their respective approval processes.

1.4 Regulatory framework

1.4.1 *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)

The Environmental Impact Statement (EIS) for the broader Surat Gas Project was assessed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2013. Maximum disturbance limits to core habitat for Matters of National Environmental Significance (MNES) listed under the EPBC Act at the time of the approval are conditioned in Table 1 of the EPBC approval (EPBC 2010/5344) for the Petroleum Lease (PL) (i.e. on-tenement) areas of the SGP. As the Jammat PPL is located outside of Arrow's on-tenement boundaries, impacts in PPL (i.e. off-tenement) areas are covered by a separate EPBC approval (EPBC 2018/8223) (**Appendix A**). EPBC 2018/8223 was approved in 2020 and condition 1 sets maximum disturbance limits (65 ha) for the clearing of (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat.

Disturbance to the habitat of MNES species and communities already approved under EPBC 2018/8223 has not been considered in this assessment. However, impacts on MNES are included in the assessment where a species that has been historically recorded in the Study area has been listed as conservation-significant under both the EPBC Act and Queensland *Nature Conservation Act 1992* subsequent to the original approval in 2020.

Specifically, the following MNES species have been included in the assessment:

- brigalow woodland snail (*Adclarkia cameroni*) – listed as 'endangered' in December 2016
- greater glider (*Petauroides volans volans*) – listed as 'endangered' in July 2022
- koala (*Phascolarctos cinereus*) – first listed in April 2012; upgraded to 'endangered' in February 2022
- grey snake (*Hemiaspis damelii*) - listed as 'endangered' in October 2022
- Dunmall's snake (*Furina dunmalli*) – listed as 'vulnerable' in July 2000
- glossy black cockatoo (south-eastern), *Calyptorhynchus lathami lathami* – listed as 'vulnerable' in August 2022
- brown treecreeper (south-eastern) (*Climacteris picumnes victoriae*) – listed as 'vulnerable' in March 2023
- diamond firetail (*Stagonopleura guttata*) – listed as 'vulnerable' in March 2023
- white-throated needletail (*Hirundapus caudactus*) – listed as 'vulnerable' and 'migratory' in July 2019

1.4.2 *Environmental Protection Act 1994* (Queensland)

The primary environmental approval governing the operation of the Jammat PPL at the State level is Environmental Authority (EA) EA0002166 issued under the EP Act. The Jammat PPL EA as currently in force was issued on 25 February 2020 and includes eligibility criteria, standard conditions and variation conditions (**Appendix B**). Authorisation is being sought for additional impacts associated with the Project that cannot be accommodated under the Jammat PPL EA, as described in **Section 1.1**.

The existing Jammat PPL EA was approved on the basis of a concept or 'reference' design, which has now been subject to further engineering design and the application of the avoidance principle in the mitigation hierarchy with additional ecology survey data. Arrow is seeking to amend the Jammat PPL EA to reflect impacts associated with the current design.

The primary conditions protecting biodiversity values of the Jammat PPL area are contained in Schedule A – Authorised Activities of the Jammat PPL EA, including:

- Condition PPSCA 3 (S) and Conditions Variation 1 to Variation 5 prescribe the activities and impacts that authorised to occur in Category A, B and C ESAs and associated primary protection zones.

- Conditions Variation 9 to Variation 15 authorise impacts to PEMs and provide offsetting requirements.

Several amendments are being sought to these conditions to authorise impacts associated with the development of the Project. Details of the proposed amendments are provided in **Section 5.0**

1.4.2.1 Environmentally Sensitive Areas

The definitions of Environmentally Sensitive Areas (ESA) categories set out in Jammat PPL EA have been adopted for the purposes of this report, except for Category C ESAs. This report has adopted definitions of Category C ESAs that have more recently been applied to EAs by DETSI (refer **Section 3.1.1**).

1.4.2.2 Conservation Status of Regional Ecosystems

The Regional Ecosystem Description Database (REDD) (Herbarium, 2024) lists regional ecosystem (RE) types by their biodiversity status (BD status) and the vegetation management class (VM class). The BD status is based on an assessment of the condition of remnant vegetation in addition to the criteria used to determine the class under the *Vegetation Management Act 1999* (VM Act). It is used for a range of planning and management applications including the determination of ESAs that are used for the regulation of the mining and petroleum industry through provisions in the EP Act.

For the purposes of the current assessment:

- ESAs are based on the BD status of a given RE type, with 'endangered' REs mapped as Category B ESAs and 'of concern' by BD status mapped as Category C ESAs, and
- PEMs are based on VM class.

1.4.2.3 Essential Habitat

Under the definitions of the Jammat PPL EA, a Category C ESA an area validated as 'essential habitat' or 'essential regrowth habitat' from ground-truthing surveys in accordance with the VM Act for a species of wildlife listed as endangered or vulnerable wildlife under the *Nature Conservation Act 1992* (Qld) (NC Act). For the purposes of this report, Queensland Government 'essential habitat' mapping has been adopted as the basis for the assessment of impacts to essential habitat. Only essential habitat for critically endangered, endangered and vulnerable wildlife is considered as an ESA in this report.

Similarly, essential habitat only constitutes a PEM where it is for an animal or plant that is listed as critically endangered, endangered, or vulnerable under the NC Act (see Schedule 2 of the Environmental Offsets Regulation 2014 (Qld) (EO Regulation)). An area of essential habitat for a near threatened species only constitutes a PEM for the EO Act where it is being impacted by a development being assessed under the *Planning Act 2016* that triggers consideration of State Code 16 (Clearing of native vegetation) as set out in Schedule 2 of the EO Regulation (refer Section 1.2 of Queensland Environmental Offsets Policy.

Conditions and the definition of Category C ESA within the Jammat PPL EA contain references to 'essential regrowth habitat'. However, 'essential regrowth habitat' is not defined within the Jammat PPL EA.

Essential Habitat in relation to this Project are discussed further in **Section 3.3.7** and **Section 5.1**.

1.4.3 Environmental Offsets Act 2014

Under the Queensland Environmental Offsets Framework, implemented by the *Environmental Offsets Act 2014* (Qld) (EO Act) and associated legislation, an environmental offset is required where a significant residual impact (SRI) occurs to a Matter of State Environmental Significance (MSES). MSES are prescribed in Schedule 2 of the EO Regulation and include:

- flora and fauna species listed as endangered or vulnerable under the NC Act, and habitat for those species;
- special least concern fauna species under the NC Act and their habitats;
- remnant vegetation communities listed as 'endangered' or 'of concern' Regional Ecosystem types under the VM Act;

- essential habitat (as mapped by the Department of Environment, Science and Industry (DESI));
- regulated vegetation that intersects with wetlands and watercourses;
- connectivity values;
- wetlands of high ecological significance;
- protected areas (including nature refuges);
- declared fish habitat areas and waterways providing for fish passage, and
- legally secured offset areas.

It is noted that only prescribed regional ecosystems (REs) in a Category B area on the Regulated Vegetation Management Map (RVMM) constitute an MSES pursuant to Schedule 2, Part 1 and Part 2 of the Environmental Offsets Regulation. MSES within the Study area have been identified through a combination of desktop and field assessments as described in **Section 2**, with MSES values described in **Section 3**.

1.4.3.1 Significant residual impact assessment

Under Section 8 of the EO Act, an SRI is generally an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a PEM that:

- remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site avoidance and mitigation measures for the prescribed activity, and
- is, or will or is likely to be, significant.

SRI assessments for MSES impacted by the Project are presented in **Section 4.5**.

1.4.4 Nature Conservation Act 1992

The NC Act provides for the gazettal of protected areas including nature refuges, prescribes classes of wildlife and sets out restrictions on the taking or harm to native wildlife without a valid permit. Threatened flora and fauna species have been assessed in terms of those with potential to occur in the Study area. Classes of wildlife recognised under the NC Act include:

- Extinct in the Wild;
- Critically endangered;
- Endangered;
- Vulnerable;
- Near Threatened, and
- Special Least Concern.

Essential habitat for a near threatened species does not constitute an ESA under the definitions provided in the Jammat PPL EA, and also does not constitute a PEM under the EO Act. The presence or potential presence of a near threatened species also triggers requirements under the NC Act that are approved and managed separately to the EA.

Habitat for a Special Least Concern fauna species also constitutes a PEM for the purposes of the EO Act and these impacts have been included in the PEMs table (where applicable) and discussed further in **Section 3.3.5.8** and **Section 4.5.3.1** .

1.4.5 Vegetation Management Act 1999

Petroleum activities do not require permits under the VM Act as clearing is regulated through the EA process under the EP Act. Where appropriate, the VM Class of regional ecosystems (REs) is referred to in the assessment. The VM Class is used to define PEMs for the purposes of the EO Act.

1.4.5.1 High value regrowth

Under the VM Act, vegetation communities, which are known in Queensland as REs, are assigned to one of three classes. These classes are known as the VM Class and are:

- Endangered RE – less than 10% of the pre-clearing extent of a particular community remains across a given bioregion; or 10-30% of the pre-clearing extent remains and the remnant area is less than 10,000 ha;
- Of concern RE – 10-30% of the pre-clearing extent of a particular community remains across a given bioregion; or more than 30% of the pre-clearing extent remains and the remnant area is less than 10,000 ha, and
- Least concern RE – more than 30% of the pre-clearing extent of a particular community remains across a given bioregion, and the remnant area is greater than 10,000 ha.

2. Methodology

The ecological values discussed in this biodiversity impact assessment were identified as being relevant to this Project during comprehensive Project Environmental Clearance (PEC) reports undertaken across the Study area. A separate PEC report was prepared by CHEC environmental for each land parcel that the Study area interested.

In addition to these Project specific reports, ecological survey information undertaken as part of the broader Surat Gas Project (SGP), and within the vicinity of the Project, was also used to identify ecological values that could be relevant to the Project. These studies have provided Arrow with a comprehensive understanding of the ecological values, flora and fauna assemblages, characteristic of vegetation communities and habitats in the broader SGP area. This BIA also draws on QGC's ecological survey program within the 'Upstream' and 'Midstream' project areas through CHEC Environmental's ecological survey and assessment of the Project.

The following section summarises the desktop and field-based information relevant to the Project and the processes by which this information was collected.

2.1 Desktop assessment

A comprehensive desktop assessment was undertaken in February 2025 to identify ecological values potentially relevant to the Study area. The intent of this desktop assessment was to identify ESAs and PEMs relevant to the Study area, including threatened and migratory species of conservation significance (MNES) that have been listed since the EPBC approval was granted in 2020 (EPBC 2018/8223). The following desktop resources were reviewed as part of this assessment:

- DCCEEW Species Profile and Threats Database (SPRAT);
- Queensland Government mapping products including certified Regional Ecosystem Mapping (Version 13) and Protected Plants Trigger Mapping;
- Essential habitat mapping;
- Project-specific ground-truthed regional ecosystem (GTRE) and ESA mapping for the Study area;
- Threatened flora and fauna records sourced from historical SGP ecological surveys and available online resources including Atlas of Living Australia (https://www.ala.org.au/) and eBird (https://ebird.org/map);
- Soils and land resource area mapping;
- Wetland values (MNES – high ecological significance wetlands mapping and wetland protection areas);
- Catchment and waterway values (Queensland major watercourses mapping);
- Connectivity values (Brigalow Belt Biodiversity Planning Assessment), and
- Available published ecological information for threatened flora and fauna species where available.

2.1.1 Likelihood of Occurrence Matrix

The Likelihood of Occurrence Matrix (LoOM) was developed by CHEC Environmental (CHEC) to facilitate consistency in habitat assessments by its ecologists. The LoOM, in its current version, considers the likelihood of 34 threatened (Commonwealth and/or State listed) fauna species occurring at a proposed development site. The included species are those with potential to occur within QGC's 'Upstream' and 'Midstream' project areas (and are applicable to Arrow Energy's Surat Gas Project areas), which are detailed in QGC's combined Significant Species Management Plan (SSMP). The LoOM (and SSMP) is regularly reviewed and revised to ensure alignment with changes to Commonwealth and State conservation status listings. The distribution and habitat information contained in the LoOM (and SSMP) were sourced from the latest reliable reference material, including published texts and journals, SPRAT profiles, Atlas of Living Australia maps, Wildlife Online searches, Arrow and QGC GIS records.

The LoOM assessment is a systematic process, where you work across the spreadsheet from left to right for each species, starting with viewing a distribution map, then making selections (where prompted) from lists for 'broad area of occurrence', then 'habitat attributes', occurrence of 'Essential Habitat', 'historical' or 'recent' confirmed records.

Depending on the responses, a determination of 'Unlikely', 'Potential', 'Likely' or 'Known' is provided for the species. The LoOM species habitat criteria have been included in **Appendix C**.

2.2 Field-based assessments

Several ecological surveys have been undertaken within the Study area and in areas immediately adjacent to the Project. A summary of these survey programs has been provided in **Table 2.1**, with a more detailed breakdown of the flora and fauna survey efforts provided in the following sections. Data included in the Project Environmental Clearance (PEC) reports by CHEC ecologists has been provided in **Appendix D**.

Table 2.1: Summary of Ecological Surveys conducted either within the Study area or in the broader vicinity

Survey	Survey Type	Timing	Undertaken by
CHEC PEC Reports	Flora and Fauna	October 2024	CHEC Environmental
Surat Gas Project: Terrestrial Ecology Report	Flora and Fauna	2016-2017	EcoSmart
Surat Gas Project: Off-tenement Terrestrial Ecology Survey Report	Fauna	March 2019	EcoSmart
Surat Ecological Studies	Flora	2017 - present	Arrow

2.2.1 Flora survey effort

Vegetation surveys relevant to the Project were undertaken in 2021 and again in May and October 2024 by CHEC Environmental as part of an ecological survey of the Project footprint and surrounds. The Project Environmental Clearance (PEC) survey reports are provided in **Appendix D**. The surveys were conducted in accordance with a previous version of the *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* (Neldner, et al., 2023).

2.2.2 Fauna survey effort

The habitat types in the Study area are widely distributed across the Brigalow Belt and have been extensively sampled as part of a substantial and sustained fauna survey effort across the broader SGP Project area between 2016 and 2024. Resultantly, fauna assemblages and characteristic microhabitats associated with the broad vegetation communities and habitats are well understood. As the fauna survey effort presented in this report represents a subset of the survey effort for the wider SGP, all sites within 15 km of the Study area have been regarded as relevant and have been included in overall effort.

The primary Project-specific field assessments that inform the description of terrestrial fauna habitats and fauna assemblages in the Study area are derived from CHEC Environmental 2024 fauna surveys (**Appendix D**) and Surat Gas Project Terrestrial Ecology Report (EcoSmart, 2017). Since 2017, these fauna surveys have been supplemented by habitat assessments, Koala Spot Assessment Technique (SAT) surveys and opportunistic fauna observations undertaken by Arrow field ecologists.

2.2.2.1 Main fauna survey effort

In addition to the CHEC Environmental 2024 fauna surveys (**Appendix D**), areas for field survey were identified based on the results of desktop searches and interpretation of aerial photography to select patches of remnant and non-remnant vegetation for targeted fieldwork. As part of the terrestrial fauna surveys conducted by EcoSmart in 2016-2017, the following methodology was applied to select sites for further assessment:

- areas with little or no historic survey effort were identified by overlaying the locations of previous fauna work on pre-existing RE mapping to identify focus areas for the fauna survey;

- Broad Vegetation Group (BVG) mapping prepared by the Queensland Herbarium was used to identify the location and extent of BVGs at the 2 million scale. The contribution of each BVG to the extent of remnant vegetation was calculated and theoretical trap effort distributed accordingly;
- a five-day pilot study was conducted in August 2016 to visually inspect focus areas, identify survey constraints and located possible detailed fauna trap surveys;
- detailed survey sites were selected on the basis of spatial and BVG stratification, taking into consideration landholder access constraints, travel logistics and limitations, notable geomorphological features such as rock outcrops and caves, habitats likely to support specially protected species and vegetation condition (in particular, fire scarring).

Once selected, each site was inspected and approved by traditional owners to ensure trapping activities would not impact upon indigenous cultural values. As no pitfall trapping could occur without prior cultural heritage assessment, trap site locations could not be relocated after the pilot study. The pilot study occurred prior the flora investigations and did not account for any subsequent vegetation mapping changes. Where possible, trap sites were surveyed during both the dry and wet season, though in some cases this was not possible without compromising spatial or BVG representation.

The following survey techniques were adopted in accordance with the with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre, et al., 2022):

- **Trap Sites**: These trap sites consisted of a combination of several trapping techniques that were tailored to the available habitat and the fauna species being targeted including pitfall trapping, Elliot trapping and funnel trapping, typically deployed for four nights in each location. Pitfall trapping involved the installing four 20L buckets along drift fences established in a T configuration. Funnel traps were installed at the end of these drift fences, augmenting the pitfall traps. Elliot traps were established in the vegetation surrounding the pitfall/funnel trap array, located approximately 5 m apart from each other. Trapping sites were visited twice daily, once in the morning and once in the late afternoon. Traps typically deployed for four nights at each location in accordance with the recommended survey effort set out in the Terrestrial Fauna Survey Guidelines (Eyre, et al., 2022):
  - 4 pitfall traps (representing 416 trap nights);
  - 6 funnel traps (representing 624 trap nights), and
  - 10 Elliot traps (representing 1,040 Elliot trap nights).
- **Harp Traps**: Insectivorous micro-bat capture was undertaken using harp traps which were deployed along obvious flyways, which are linear clearings through vegetation such as tracks and creek lines. Harp traps were typically conducted in different locations to the other terrestrial fauna trapping methods.
- **Camera Traps**: Remote sensor cameras were used to survey small to large terrestrial vertebrates for four nights at each location. Cameras were baited by smearing quantities of peanut butter and macadamia oil on the ground within the detection zone.
- **Ultrasonic Bat Call Detection**: Ultrasonic calls of micro-bats were recorded using Anabat devices that were set to record from dawn until dusk. The deployment locations were selected based on the likelihood of high bat activity, such as along flyways or over water bodies.
- **Bird Surveys**: In addition to being undertaken at each trap site, opportunistic bird surveys were also conducted within other areas of suitable habitat throughout the consolidated survey program. Each bird survey was conducted for between 20 – 30 minutes and typically before 9am.
- **Diurnal Search**: Active diurnal searches involved two observers meandering through suitable fauna habitat for 30 minutes rolling rocks and logs, searching debris, inspecting trees for scratches and searching for scats or feeding remains.
- **Koala SAT Surveys**: The Spot Assessment Technique (SAT) was adopted as the most appropriate survey technique at the time of these surveys in accordance with *The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus* (Phillips & Callaghan, 2011). This survey technique involved searching for Koala scats around the base of 30 suitable food trees at each survey site.
- **Spotlighting**: Spotlighting surveys were conducted by two observers (on foot) who would walking through suitable and spotlight for arboreal and terrestrial mammal, reptile and amphibian species. Spotlighting surveys

were typically conducted for periods of 60 minutes over two nights at each site with animals being detected by eye shine, call or direct observation.

- **Habitat Assessments**: In addition to the direct survey methods used to detect fauna species, habitat assessments were also conducted. The focus of these assessments was to collect sufficient microhabitat information to inform the development of habitat mapping rules that have subsequently been adopted across the broader SGP.

A summary of these fauna survey efforts undertaken as part of the main fauna survey effort has been provided in **Table 2.2** and the location of these survey efforts in relation to the Study area has been presented in **Figure 2.1**.

Table 2.2: Summary of main survey effort (EcoSmart, 2017)

Survey method	Main Survey Effort (EcoSmart 2017) number of sites and survey effort)		
	October 2016	March 2017	Total Survey Effort
Pitfall trap sites	5 sites (80 trap nights)	-	5 sites (80 trap nights)
Funnel trap sites	5 sites (120 trap nights)	-	5 sites (120 trap nights)
Elliot trap sites	5 sites (200 trap nights)	-	5 sites (200 trap nights)
Harp trap sites	3 sites (12 trap nights)	-	3 sites (12 trap nights)
Camera trap sites	4 sites (16 trap nights)	-	4 sites (16 trap nights)
Anabat	4 sites (8 trap nights)	-	4 sites (8 trap nights)
Active searches	4 sites (2 person hours)	2 sites (1 person hour)	6 sites (3 person hours)
Bird surveys	4 sites (1.3 person hours)	3 sites (1 person hour)	7 sites (2.3 person hours)
Spotlighting	4 sites (16 person hours)	-	4 sites (16 person hours)

2.2.2.2 Supplementary fauna survey efforts

In addition to the main survey efforts undertaken by EcoSmart during the 2016-2017 survey period, several other supplementary fauna survey programs have also been undertaken in the vicinity of the Project and were identified as being relevant to this BIA report. The most recent Project specific fauna survey is by CHEC Environmental in 2024. A summary of these nearby supplementary survey efforts has been provided in **Table 2.3** and shown on **Figure 2.1**.

Table 2.3: Supplementary fauna survey effort

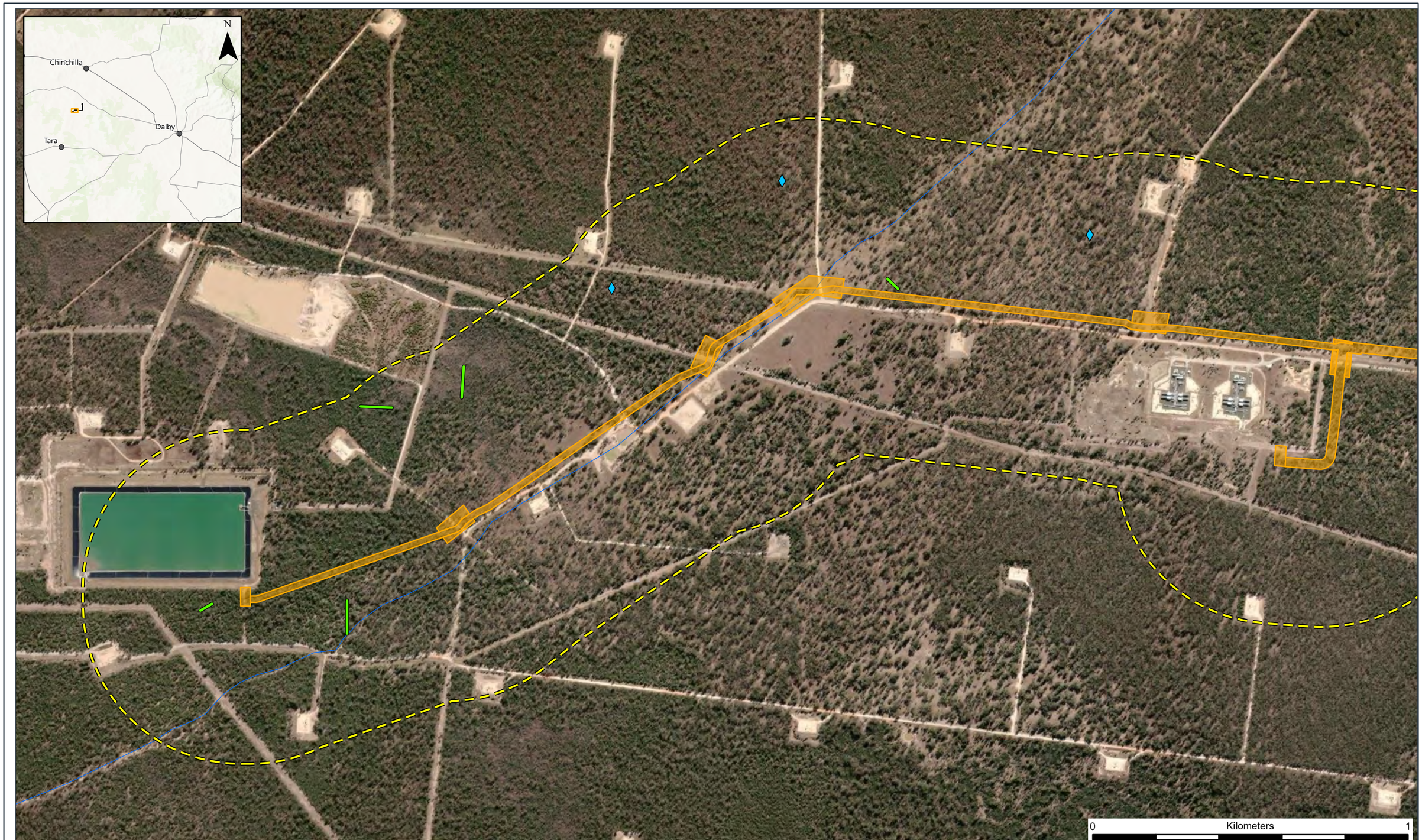
Survey method	2011-2023 Supplementary Surveys	2024 Supplementary Surveys	Total Supplementary Surveys
Active searches	5 sites (2.5 person hours)	-	5 sites (2.5 person hours)
Koala SAT surveys	96 sites	106 sites	213 sites
Habitat Assessment	97 sites	113 sites	200 sites

2.2.2.3 Survey for cryptic species

For the purposes of this assessment, a species is considered 'cryptic' if it is unlikely to be detected using standard survey techniques (trapping, searching or spotlighting). Of the fauna species considered 'likely' or 'possibly occurring' within the Study area, the following difficult to detect using these survey methods:

- Brigalow Woodland Snail, *Adclarkia cameroni*;
- Dunmall's Snake, *Furina dunmalli, and*
- Grey Snake, *Hemiaspis damelii*.

Both snake species are subterranean by nature (i.e. they spend most of their time underground) and are recognised as difficult to detect in relevant conservation guidelines. Similarly, the brigalow woodland snail required moist environments (typically along watercourses) where there is sufficient coarse woody debris to provide shaded and moist microhabitats. These species are typically associated with Brigalow and/or riparian habitats which are limited in extent within the Study area. Whilst no specific surveys have focused on the detection of these species, the microhabitat features noted within each of the PEC reports has allowed for the development of relatively reliable habitat mapping that has been used to inform this impact assessment.



Fauna Survey Efforts (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Diurnal Search
- Habitat Asessement
- Habitat Asessement
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_133[A]

FIGURE 2.1

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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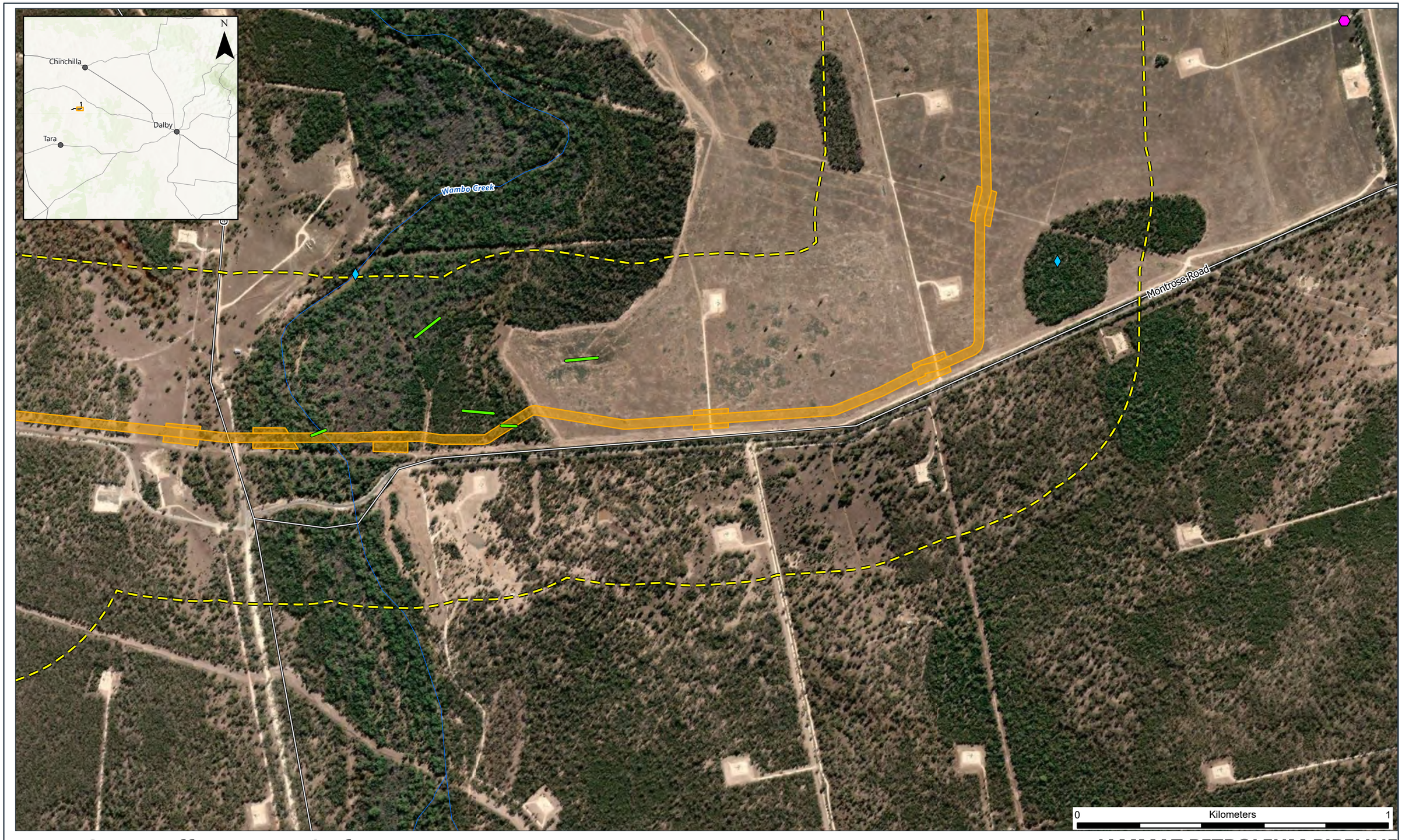

Fauna Survey Efforts (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Diurnal Search
- Habitat Asessement
- Habitat Asessement
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_133[A]

FIGURE 2.1

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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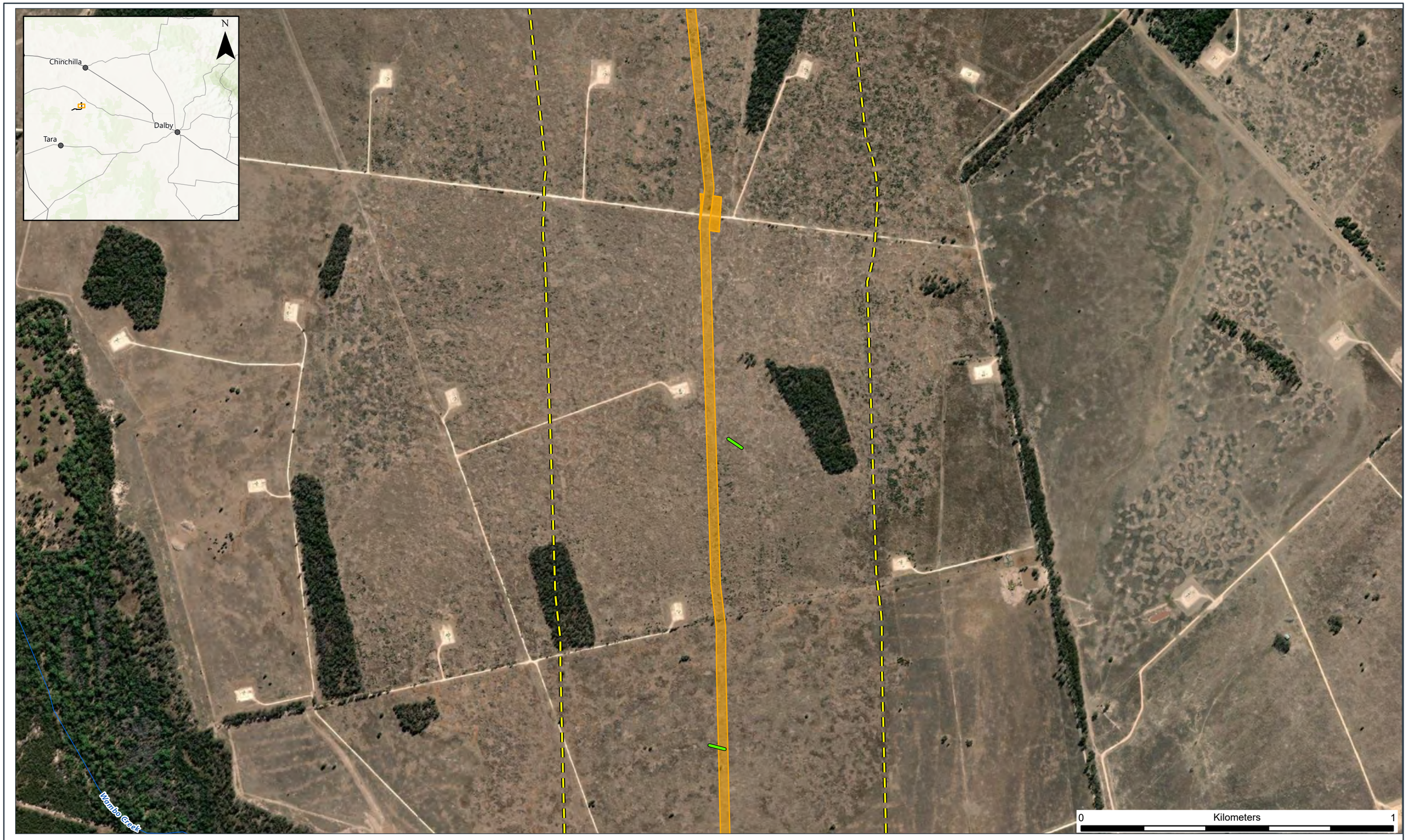

Fauna Survey Efforts (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Diurnal Search
- Habitat Asesement
- Habitat Asessement
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_133[A] | **FIGURE 2.1**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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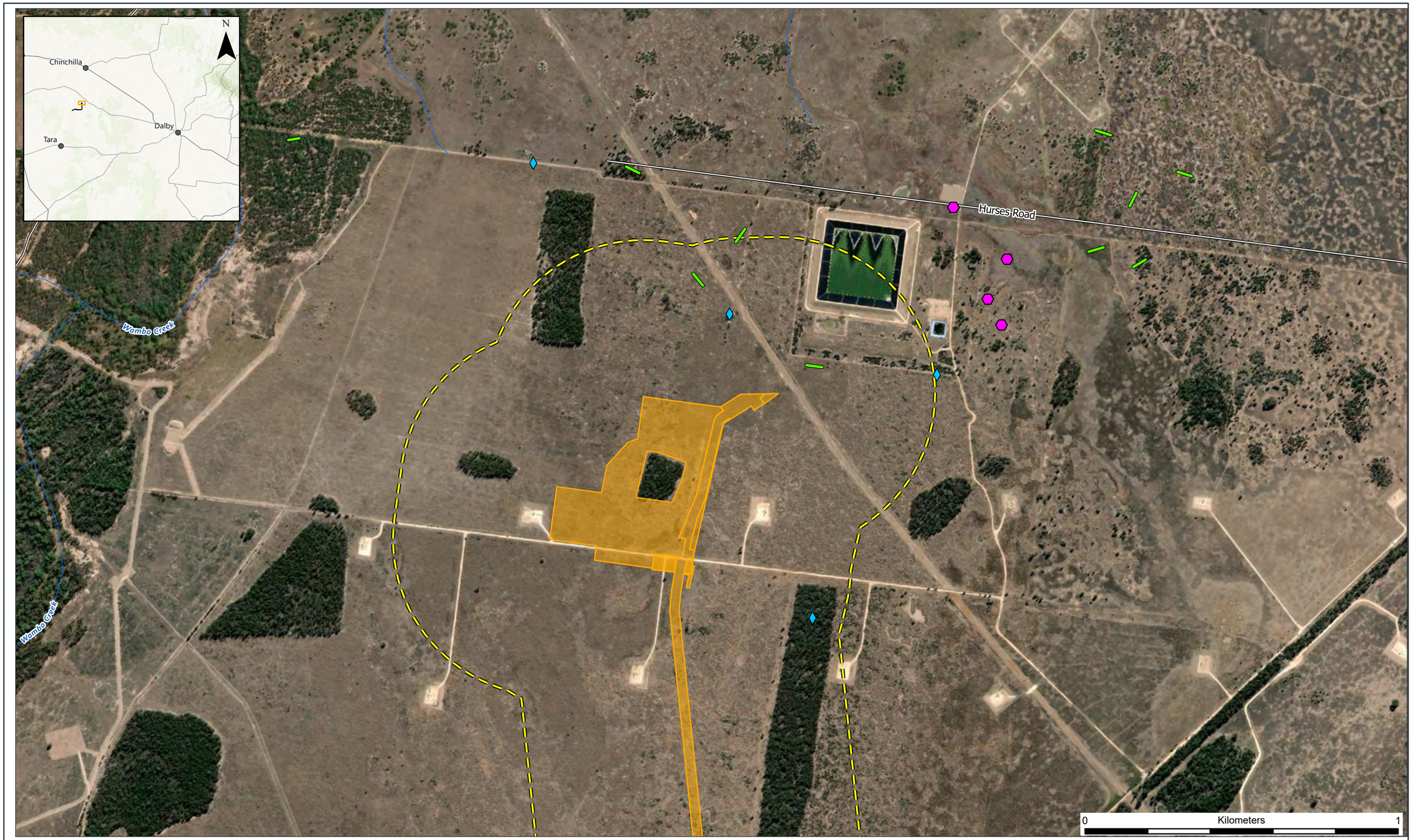

Fauna Survey Efforts (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

- Diurnal Search
- Habitat Asessement
- Habitat Asessement
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_133[A] | **FIGURE 2.1**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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3. Description of ecological values

3.1 Description of environmental values - general

The Project is located approximately 15.5 km to the west of Kogan in the Inglewood Sandstones subregion of the Brigalow Belt bioregion. The Study area contains both cleared grazing land and dry eucalypt woodlands dominated by a mixture of narrow-leaved ironbark (*Eucalyptus crebra*), poplar box (*E. populnea*), gum-topped box (*E. moluccana*) and white cypress pine (*Callitris glaucophylla*).

Melonhole gilgai on clay plains are present in the cleared grazing land (east of Wambo Creek) along the eastern section of the Project alignment. Small patches of brigalow (*Acacia harpophylla*) also occur on the clay plains. A narrow riparian open woodland dominated by forest red gum(*E. tereticornis*) is associated with Wambo Creek and occurs to the east of Clynes Road.

A State-significant Terrestrial biodiversity corridor is mapped in an east west alignment over the southern portion of the Study area (refer to **Figure 3.1**).

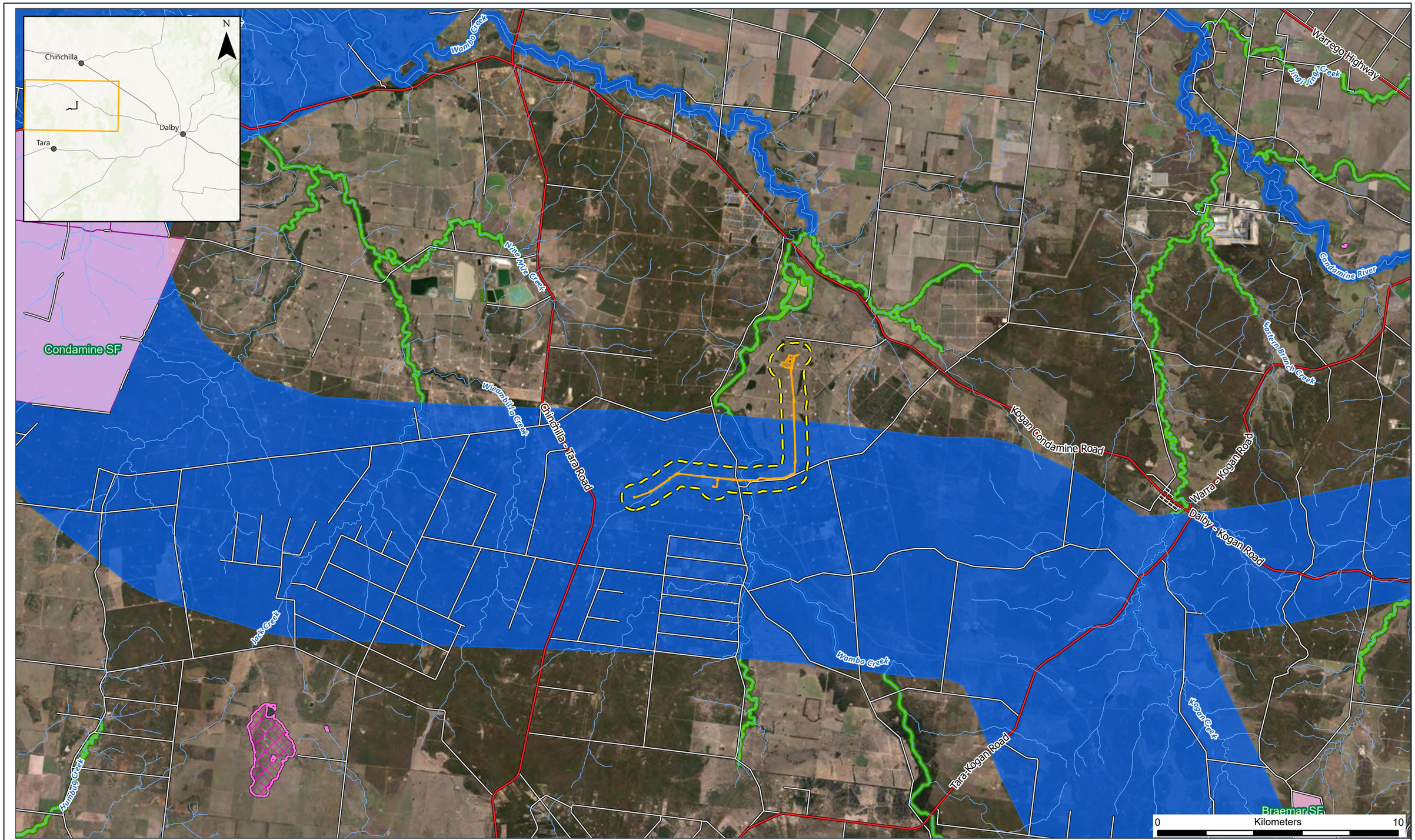
3.1.1 Environmentally Sensitive Areas

A summary of the ESAs as defined in the *Environmental Protection Regulation 2019* (EP Reg) (for Category A & B ESAs), and recent definitions of Category C ESAs used by DETSI that are relevant to the Project have been provided in **Table 3.1** and shown on **Figure 3.2**, **Figure 3.3** and **Figure 3.4**. Considering the location of the Project, ESAs relating to marine areas have been excluded from this assessment.

Table 3.1: Jammat Environmentally Sensitive Areas

ESA Category	ESA Type	Occurrence in Study Area
Category A	A National Park, Conservation Park, Special Wildlife Reserve, or a Forest Reserve.	None
	The Wet Tropics Area under the *Wet Tropics World Heritage Protection and Management Act 1993*.	None
Category B	A coordinated conservation area, an area of critical habitat for major intersect identified under a conservation plan or an area subject to an interim conservation order.	None
	An area subject to the 'Convention on the Conservation of Migratory Species of Wild Animals', the 'Convention on Wetlands of International Importance, especially as Waterfowl Habitat' or the 'Convention Concerning the Protection of the World Cultural and Natural Heritage'.	None
	Under the *Queensland Heritage Act 1992*, a place of cultural heritage significance or a Queensland Heritage place, unless there is an exemption certificate issued under the Act.	None
	An area recorded in the Aboriginal Cultural Heritage Register established under the *Aboriginal Cultural Heritage Act 2003*, section 46, other than the area known as the 'Stanbroke Pastoral Development Holding', leased under the *Land Act 1994*.	None
	A feature Protection Area, State Forest Park or Scientific area under the *Forestry Act 1959*.	None

ESA Category	ESA Type	Occurrence in Study Area
	A declared fish habitat area under the *Fisheries Act 1994*.	None
	An 'Endangered Regional Ecosystem' identified in the REDD database (by Biodiversity Status)	There is an endangered RE in the Study area (RE 11.4.3). This RE is discussed further in **Section 3.2.1.1** and mapped in **Figure 3.6**.
Category C	Nature refuges as defined in the conservation agreement for that refuge under the *Nature Conservation Act 1992* Guideline Streamlined model conditions for petroleum activities.	None
	State forests or timber reserves as defined under the *Forestry Act 1959*	None
	Regional parks (previously known as resource reserves) under the *Nature Conservation Act 1992*	None
	An area validated as from ground-truthing surveys as 'essential habitat' on the Queensland Government essential habitat map in accordance with section 20AC of the *Vegetation Management Act 1999* for a species of wildlife listed as critically endangered, endangered, vulnerable under the *Nature Conservation Act 1992*	Essential habitat for one fauna species has been identified within the Study area. These areas are discussed further in **Section 3.3.7** and mapped in **Figure 3.13**.
	An area validated from ground-truthing surveys as 'protected wildlife habitat' that is category A, B or C on the remnant vegetation management map, in accordance with section 20A of the *Vegetation Management Act 1992*, for a species of wildlife listed as critically endangered, endangered or vulnerable under the *Nature Conservation Act 1992*.	Protected wildlife habitat for threatened species assessed in this report is presented in **Section 3.3.5** and mapped in **Figure 3.4.**
	'Of concern regional ecosystems' that are remnant vegetation and identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions.	One 'Of concern regional ecosystems' (RE 11.3.25) occurs in the Study area. This RE is discussed in **Section 3.2.1.1** and **Section 4.2.1** and mapped in **Figure 3.13**.



Ecological Context

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- State Biodiversity Corridor
- Regional Biodiversity Corridor
- MSES High Ecological Significance Wetlands

Protected Areas and Forests of Queensland

- State Forest

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FIGURE 3.1

GDA2020 MGA Zone 56

Data Source: World Imagery: Earthstar Geographics
World Topographic Map:
World Hillshade: Esri, USGS

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Environmentally Sensitive Areas (Category B) (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

Watercourse
Highway
Main Road
Local Road
Project Footprint
Study Area (500m Buffer)

Category B ESA:
Category B ESA
Category B ESA (200m Buffer)
Category B ESA (300m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_135[A] | **FIGURE 3.2**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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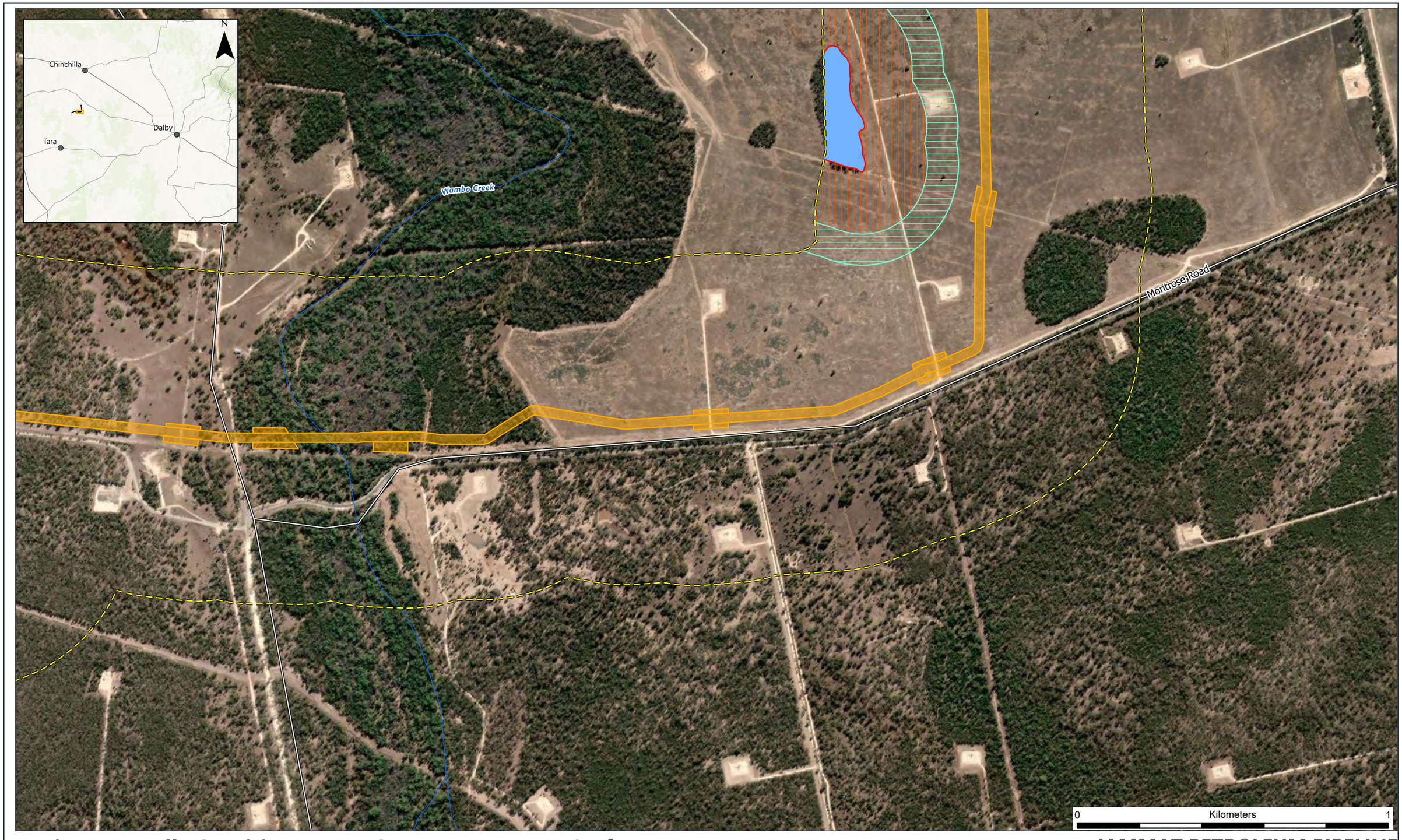

Environmentally Sensitive Areas (Category B) (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Category B ESA:

- Category B ESA
- Category B ESA (200m Buffer)
- Category B ESA (300m Buffer)

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FIGURE 3.2

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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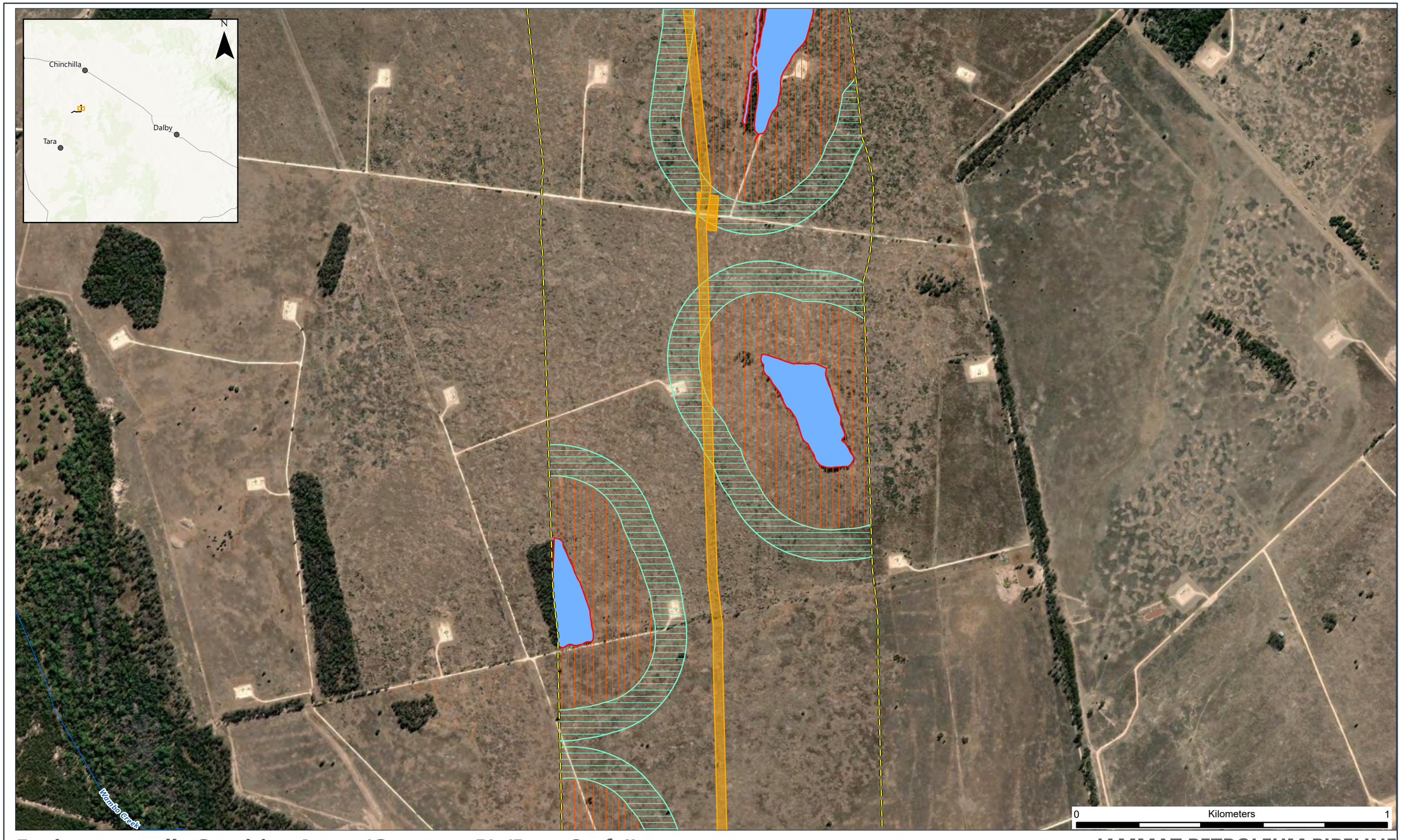

Environmentally Sensitive Areas (Category B) (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

Watercourse
Highway
Main Road
Local Road
Project Footprint
Study Area (500m Buffer)

Category B ESA:
Category B ESA
Category B ESA (200m Buffer)
Category B ESA (300m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_135[A]

FIGURE 3.2

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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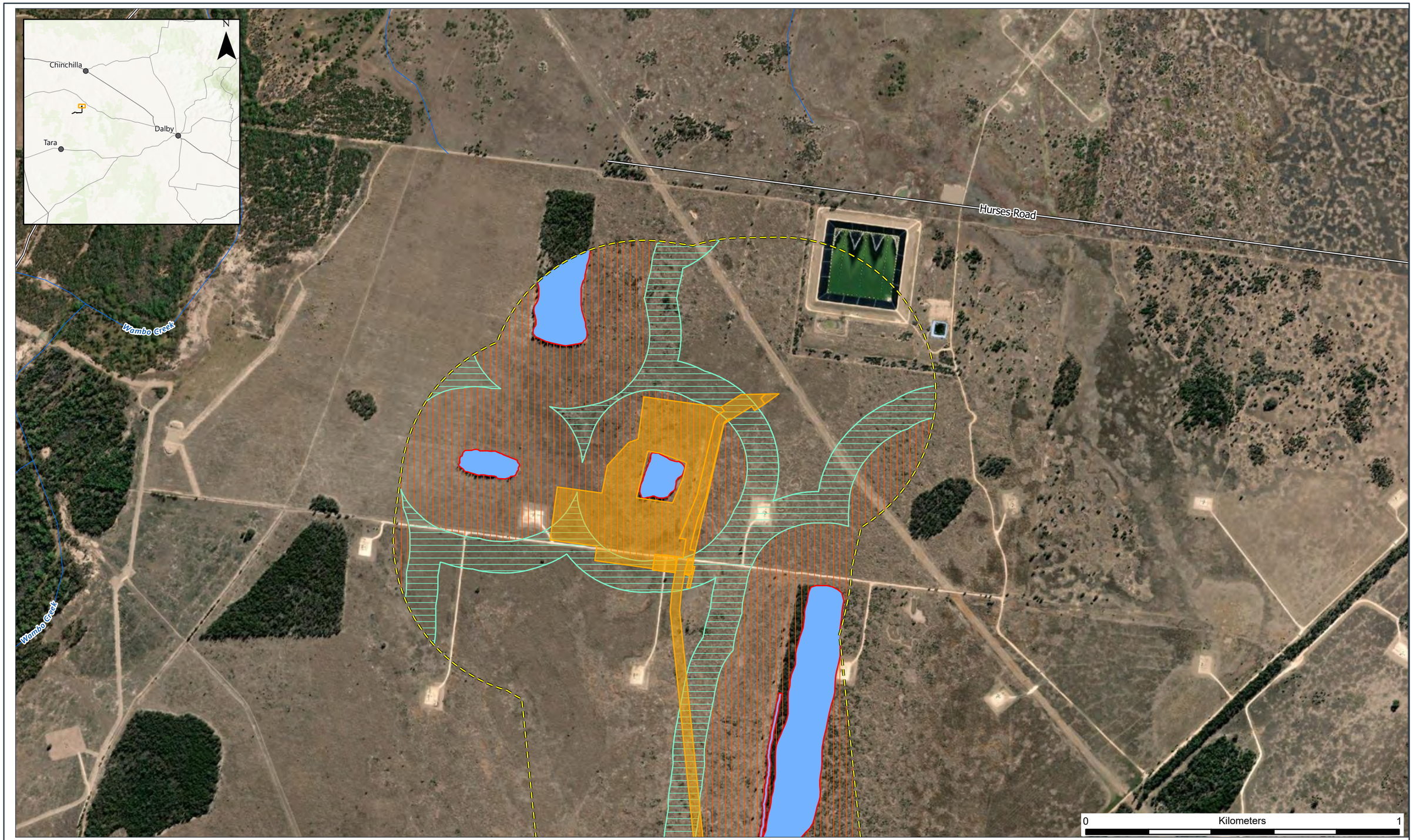

Environmentally Sensitive Areas (Category B) (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Category B ESA:

- Category B ESA
- Category B ESA (200m Buffer)
- Category B ESA (300m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_135[A]

FIGURE 3.2

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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Environmentally Sensitive Areas (Category C) (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

Watercourse
Highway
Main Road
Local Road
Project Footprint
Study Area (500m Buffer)

Category C ESA :
Essential Habitat
State Forest
Of Concern RE
State Forest (200m Buffer)
Of Concern RE (200m Buffer)
Essential Habitat (200m Buffer)

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FIGURE 3.3

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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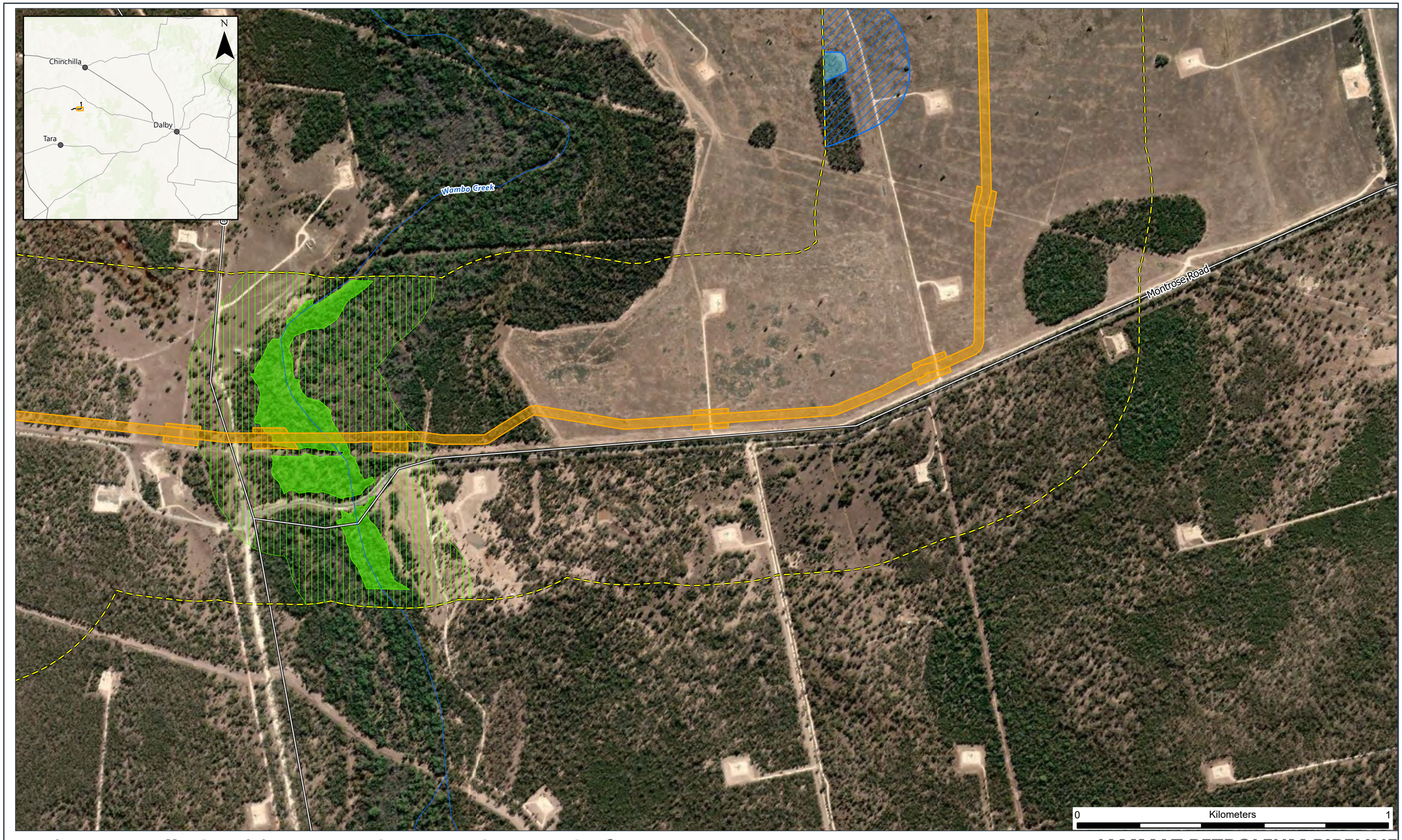

Environmentally Sensitive Areas (Category C) (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Category C ESA :

- Essential Habitat
- State Forest
- Of Concern RE
- State Forest (200m Buffer)
- Of Concern RE (200m Buffer)
- Essential Habitat (200m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_136[A]

FIGURE 3.3

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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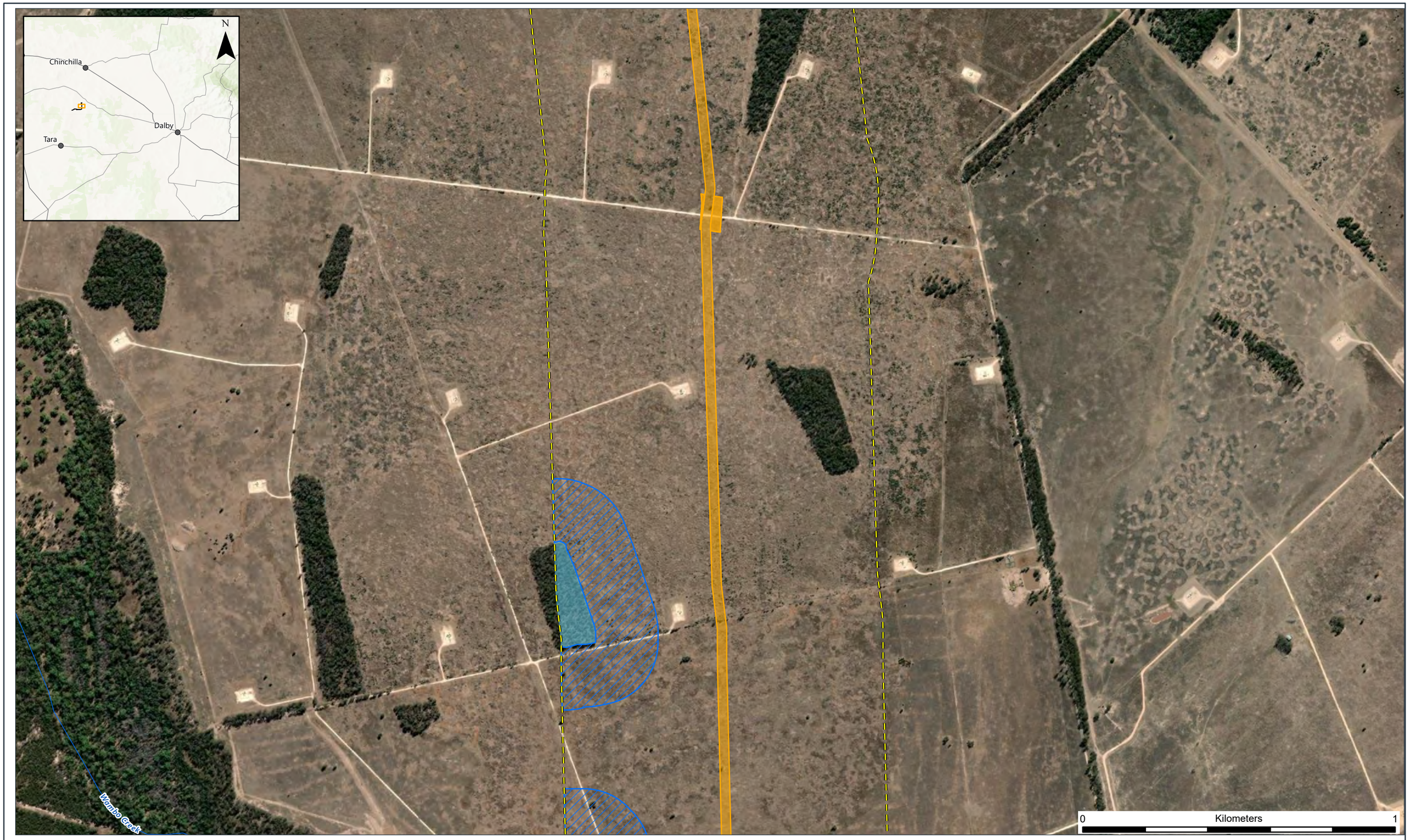

Environmentally Sensitive Areas (Category C) (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Category C ESA :

- Essential Habitat
- State Forest
- Of Concern RE
- State Forest (200m Buffer)
- Of Concern RE (200m Buffer)
- Essential Habitat (200m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_136[A]

FIGURE 3.3

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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Environmentally Sensitive Areas (Category C) (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

Watercourse
Highway
Main Road
Local Road
Project Footprint
Study Area (500m Buffer)

Category C ESA :
Essential Habitat
State Forest
Of Concern RE

State Forest (200m Buffer)
Of Concern RE (200m Buffer)
Essential Habitat (200m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_136[A] | **FIGURE 3.3**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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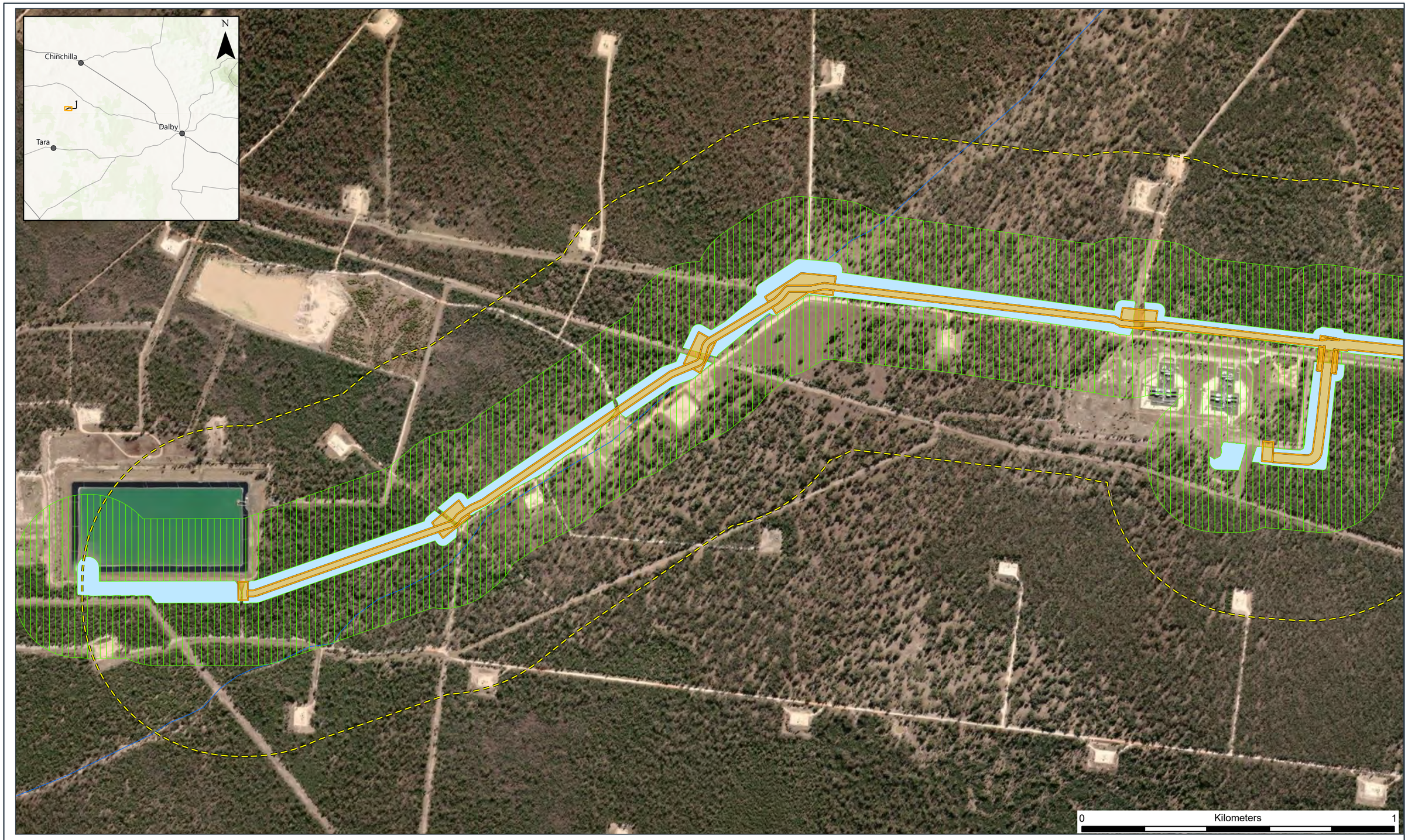

Environmentally Sensitive Areas (Category C) – Protected Wildlife Habitat (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Highway
- Main Road
- Local Road
- Watercourse
- Project Footprint
- Study Area (500m Buffer)
- Category C ESA Protected Wildlife Mapping
- Category C ESA Protected Wildlife Mapping (200m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_137[A] | **FIGURE 3.4**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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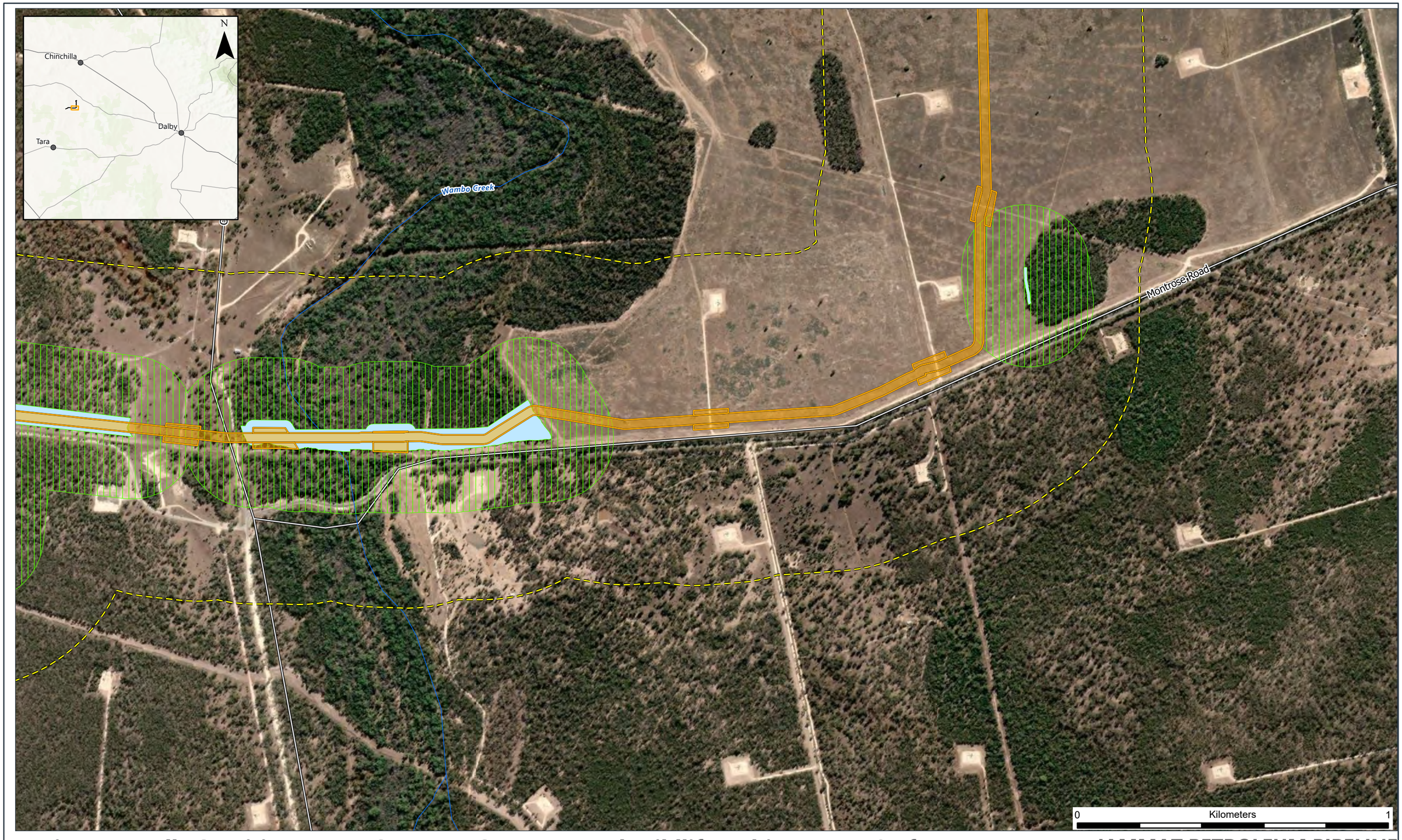

Environmentally Sensitive Areas (Category C) – Protected Wildlife Habitat (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Highway
- Main Road
- Local Road
- Watercourse
- Project Footprint
- Study Area (500m Buffer)
- Category C ESA Protected Wildlife Mapping
- Category C ESA Protected Wildlife Mapping (200m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_137[A]

FIGURE 3.4

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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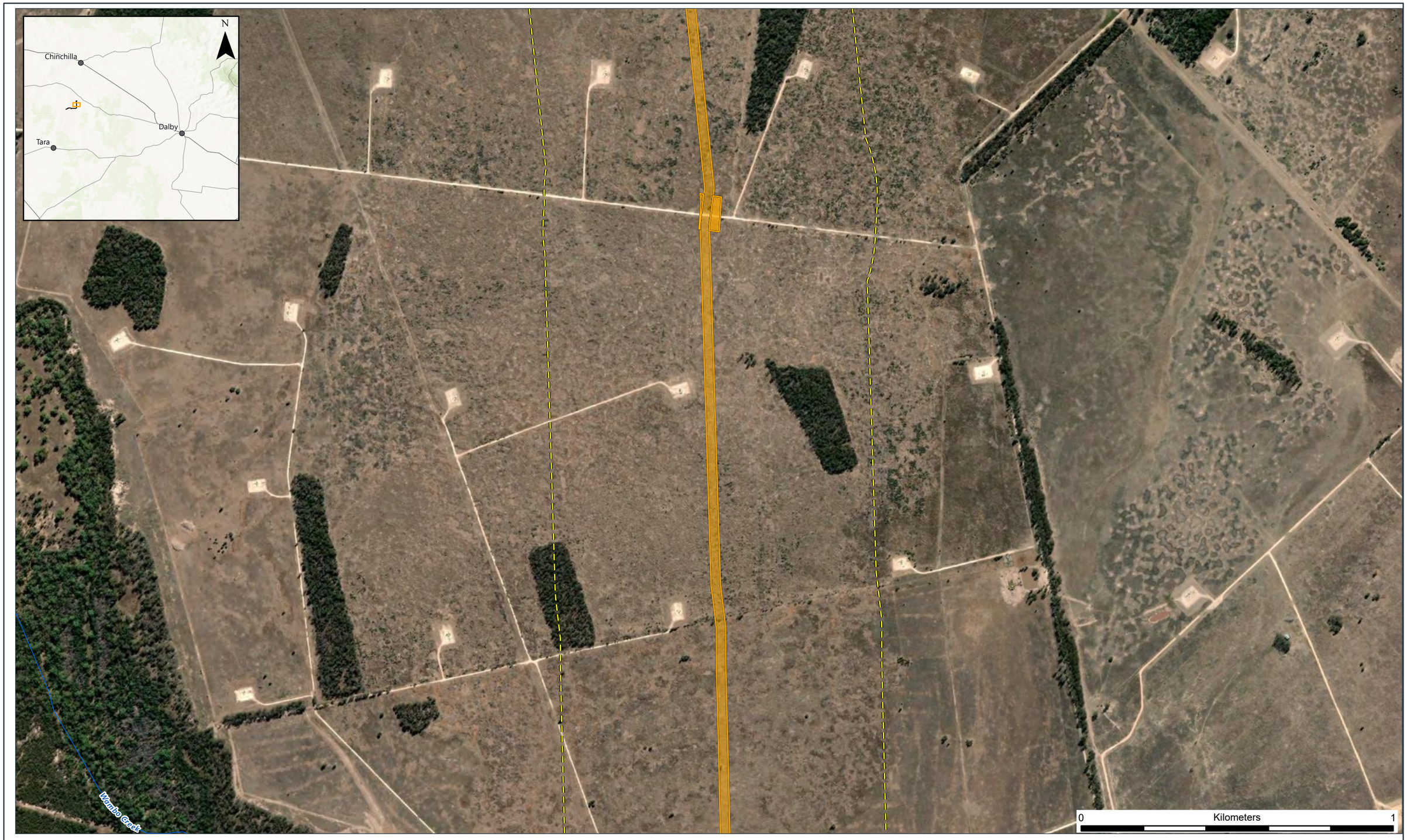

Environmentally Sensitive Areas (Category C) – Protected Wildlife Habitat (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Highway
- Main Road
- Local Road
- Watercourse
- Project Footprint
- Study Area (500m Buffer)
- Category C ESA Protected Wildlife Mapping
- Category C ESA Protected Wildlife Mapping (200m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_137[A] | **FIGURE 3.4**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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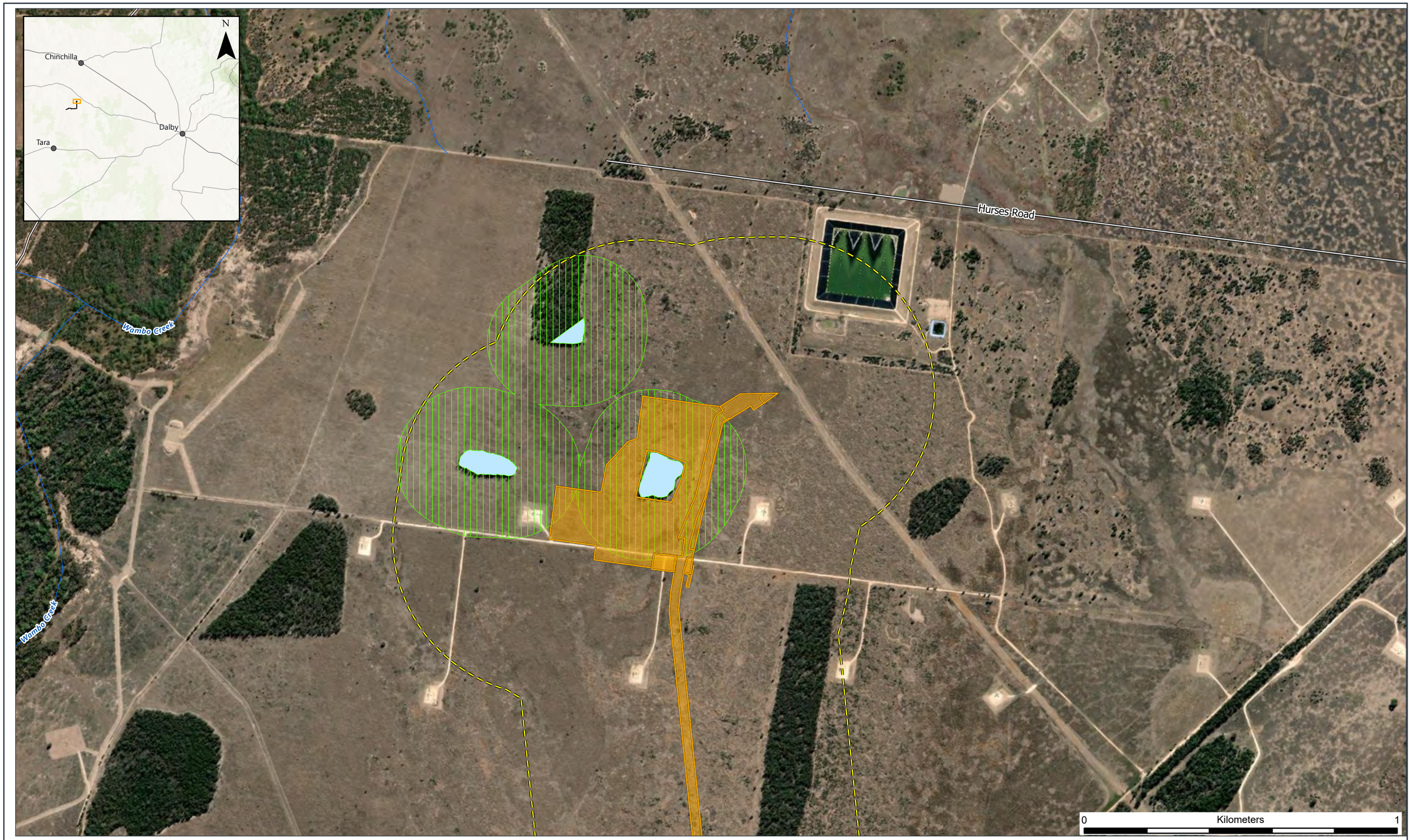

Environmentally Sensitive Areas (Category C) – Protected Wildlife Habitat (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

- Highway
- Main Road
- Local Road
- Watercourse
- Project Footprint
- Study Area (500m Buffer)
- Category C ESA Protected Wildlife Mapping
- Category C ESA Protected Wildlife Mapping (200m Buffer)

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_137[A]

FIGURE 3.4

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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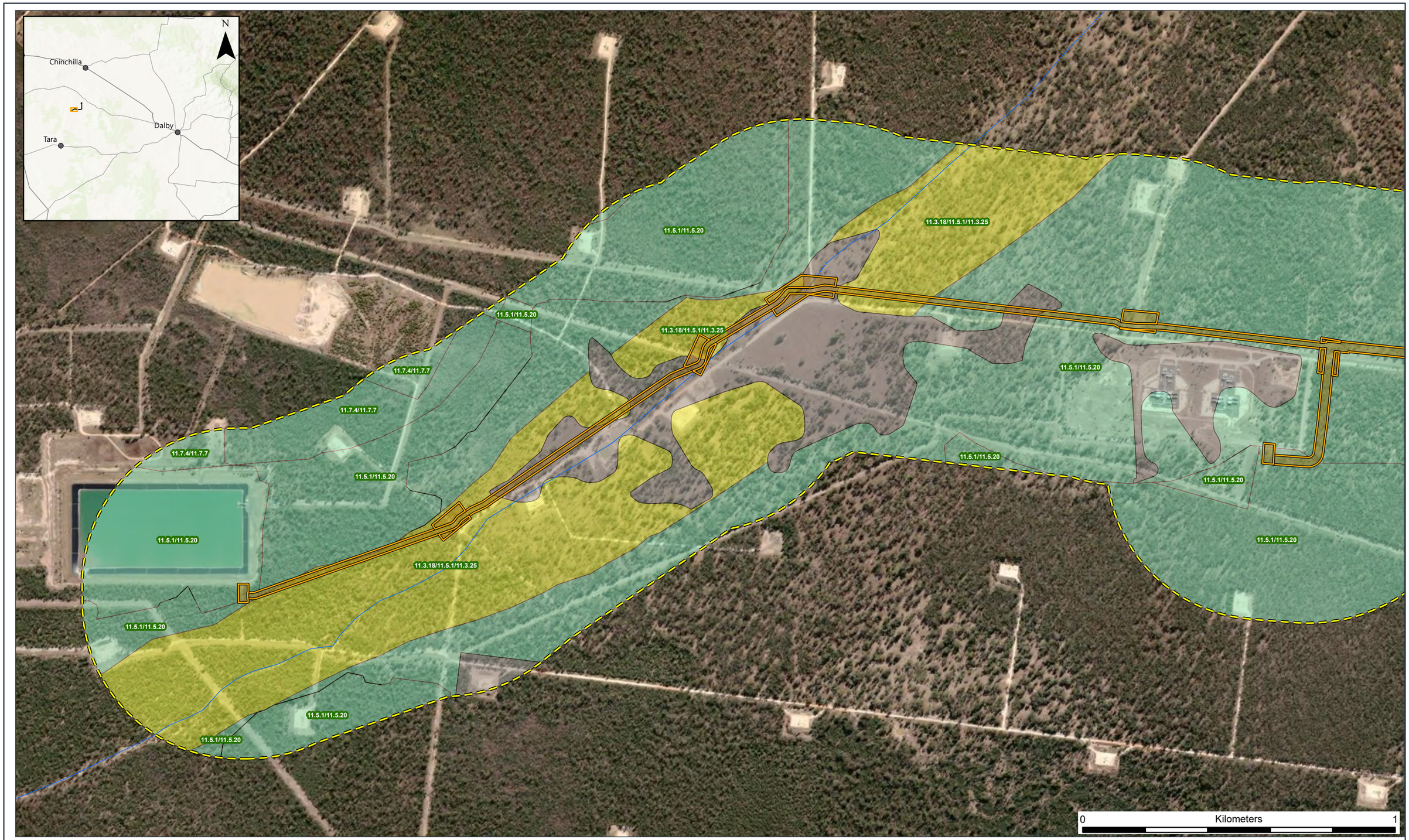
3.2 Description of environmental values – terrestrial flora

3.2.1 Vegetation communities

Current vegetation mapping prepared by the DoR identifies nine REs (comprising remnant vegetation communities) in the Study area (**Figure 3.5**). Descriptions and total areas of these mapped REs have been provided in **Table 3.2** and include two REs classified as 'Endangered' and seven REs classified as 'Least concern'.

Table 3.2: State Regional Ecosystem mapping by VM Act Status

Land zone	RE Code	Description	Occurrence in Study area (ha)
Least Concern (Remnant)			
3 – Quaternary alluvial plains	11.3.18	*Eucalyptus populnea*, *Callitris glaucophylla*, *Allocasuarina luehmannii* shrubby woodland on alluvium	69.6
	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	34.8
5 – Cainozoic sandy plains and plateaus	11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces	300.4
	11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones. Duplex soils with sandy surfaces.	60.6
	11.5.20	*Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland to open forest on Cainozoic sand plains.	98.9
7 – Cainozoic duricrusts	11.7.4	*Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust	10.5
	11.7.7	*Eucalyptus fibrosa subsp. nubilis* +/- *Corymbia* spp. +/- *Eucalyptus* spp. woodland on Cainozoic lateritic duricrust	7.0
Endangered (remnant)			
4 – Tertiary-early Quaternary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	4.2
9 – Fined grained sedimentary rocks	11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks	19.3
Subtotal (remnant)			605.3
Non-remnant			815.5
Total			**1420.9**



State RE Mapping (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

State Regional Ecosystem Mapping (Biodiversity Status):

- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water

Attexo

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FIGURE 3.5

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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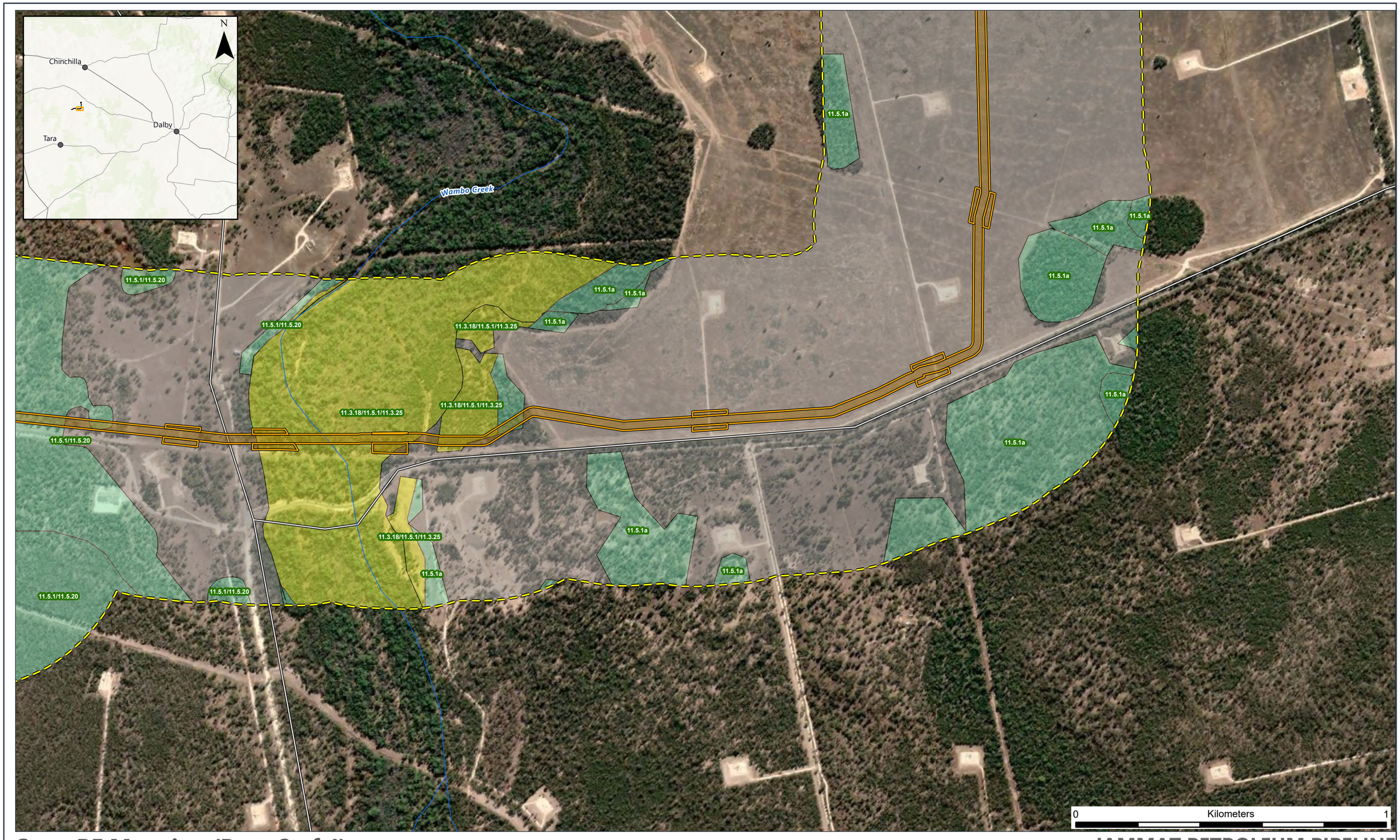

State RE Mapping (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

State Regional Ecosystem Mapping (Biodiversity Status):

- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_138[A] | **FIGURE 3.5**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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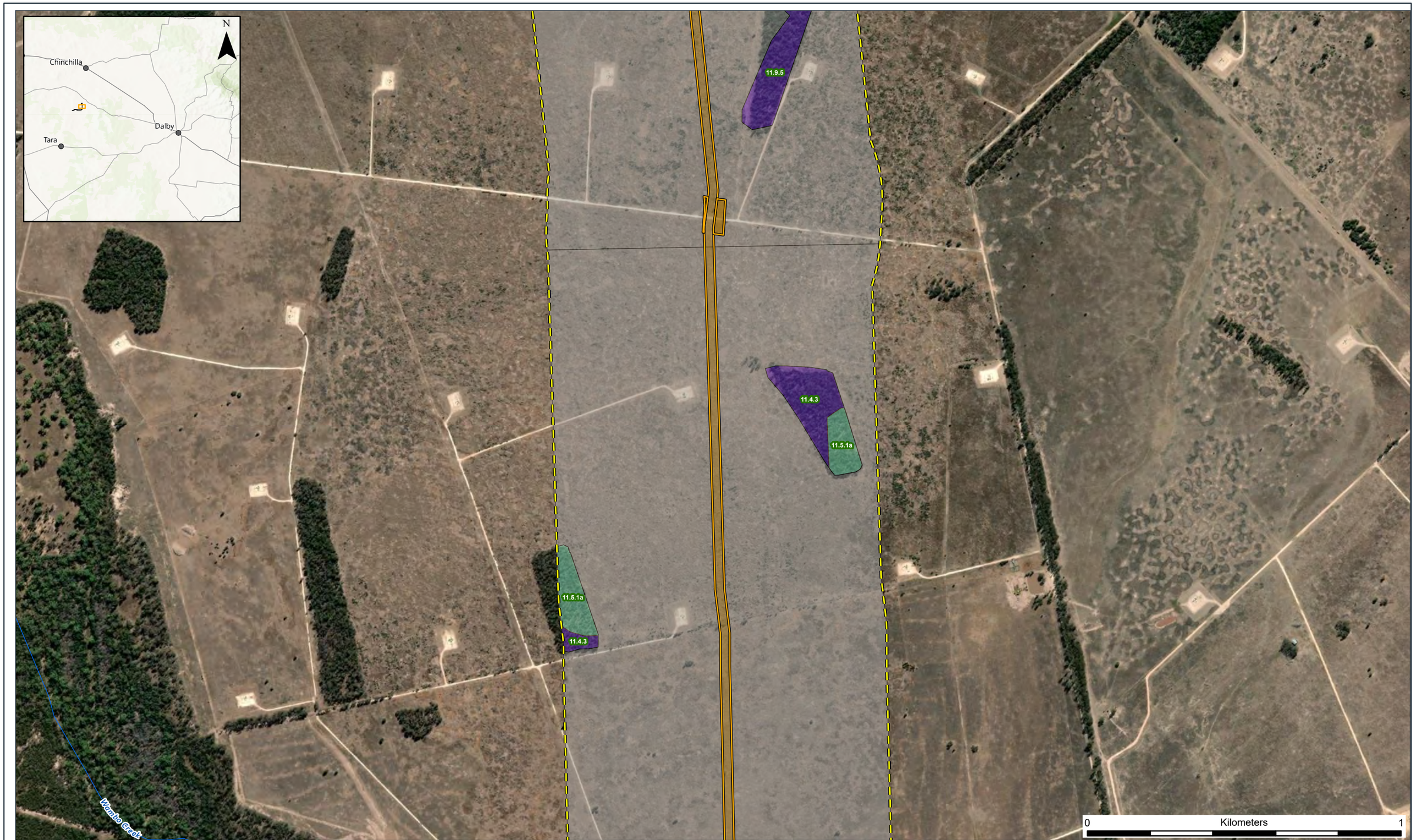

State RE Mapping (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

State Regional Ecosystem Mapping (Biodiversity Status):

- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_138[A]

FIGURE 3.5

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
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World Hillshade: Esri, USGS

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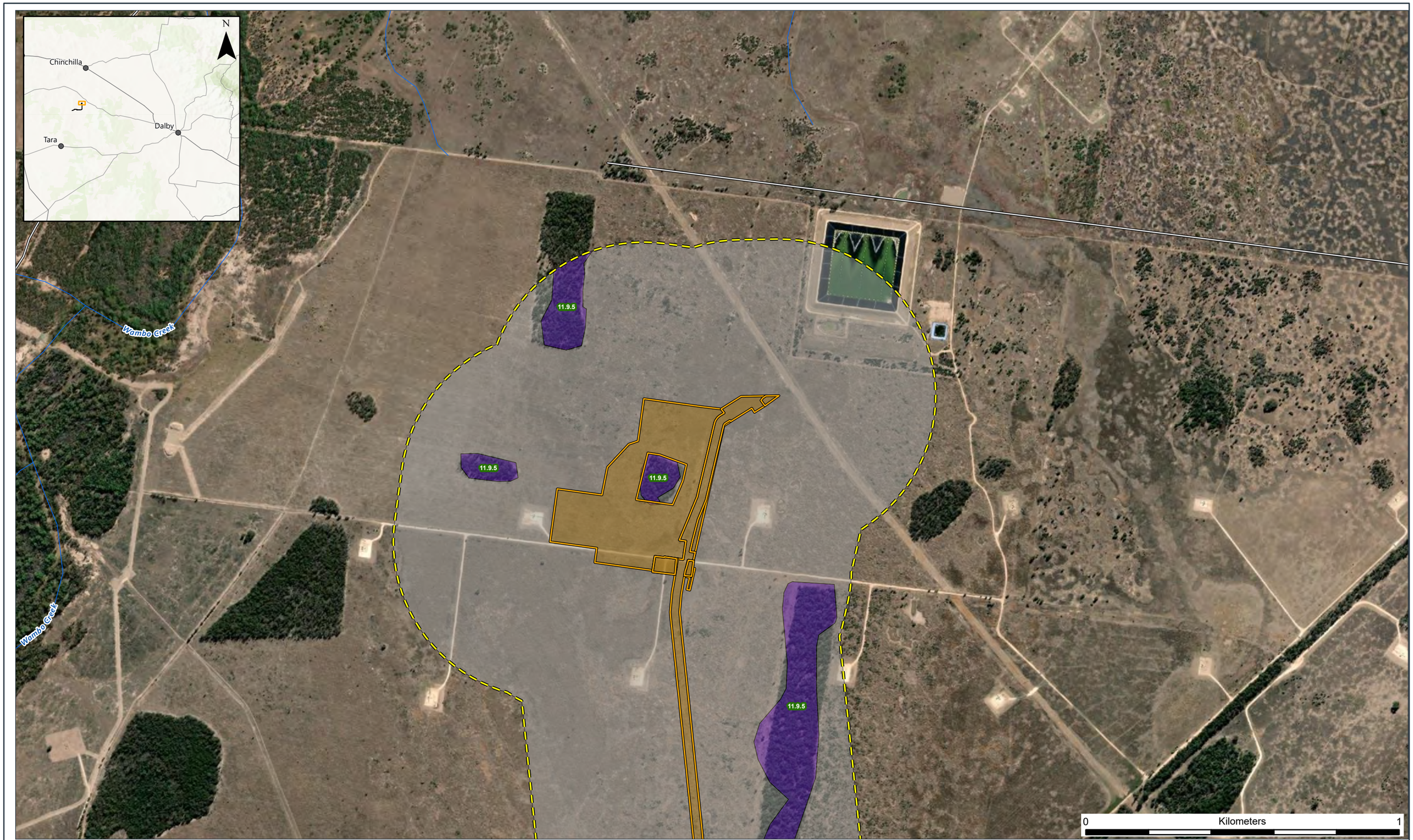

State RE Mapping (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

State Regional Ecosystem Mapping (Biodiversity Status):

- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_138[A]

FIGURE 3.5

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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3.2.1.1 Field-verified Regional Ecosystems

GTRE mapping prepared for the Study area has been based on the consolidated survey efforts undertaken across the Project footprint by CHEC Environmental and Arrow Ecologists from 2021 and 2024. These surveys are discussed in **Section 2.2** and the GTRE mapping (by Biodiversity Status) has been shown on **Figure 3.6**.

Of the nine (9), REs originally mapped by the DoR for the Study area, seven were confirmed to be present within the Study area (**Table 3.3**). One RE 11.5.4 was not mapped by DoR and two REs which were mapped under DoR but were not found in the Study area during ecological surveys including, RE 11.9.5 (Endangered) and RE 11.9.7 (Of Concern). In total seven REs were confirmed, with six REs classified as 'Least Concern', one RE classified as 'Endangered', and five REs classified as regrowth vegetation.

Table 3.3: Ground-truthed Regional Ecosystems by Biodiversity Status

Land zone	RE Code	Description	Occurrence in Study area (ha)
Least Concern (Remnant)			
3 – Quaternary alluvial plains	11.3.18	*Eucalyptus populnea*, Callitris *glaucophylla*, *Allocasuarina luehmannii* shrubby woodland on alluvium.	22.5
5 – Cainozoic sandy plains and plateaus	11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces.	115.1
	11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones. Duplex soils with sandy surfaces.	23.9
	11.5.4	*Eucalyptus chloroclada*, *Callitris glaucophylla*, *Angophora leiocarpa* woodland. Occasional canopy species may include *A. floribunda* and *E. crebra* or *E. rhombica*. A low tree layer is usually present that includes species such as *Allocasuarina luehmannii*, *A. inophloia* and *Callitris endlicheri*. Occurs on Cainozoic plains with deep sandy soils.	24.0
	11.5.20	*Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains.	289.1
Of Concern (Remnant)			
3 – Quaternary alluvial plains	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines.	18.7
Endangered (Remnant)			
4 – Tertiary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	31.7
Subtotal remnant			525.0
Least Concern (Regrowth vegetation)			
5 – Cainozoic sandy plains and plateaus	11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces.	24.3

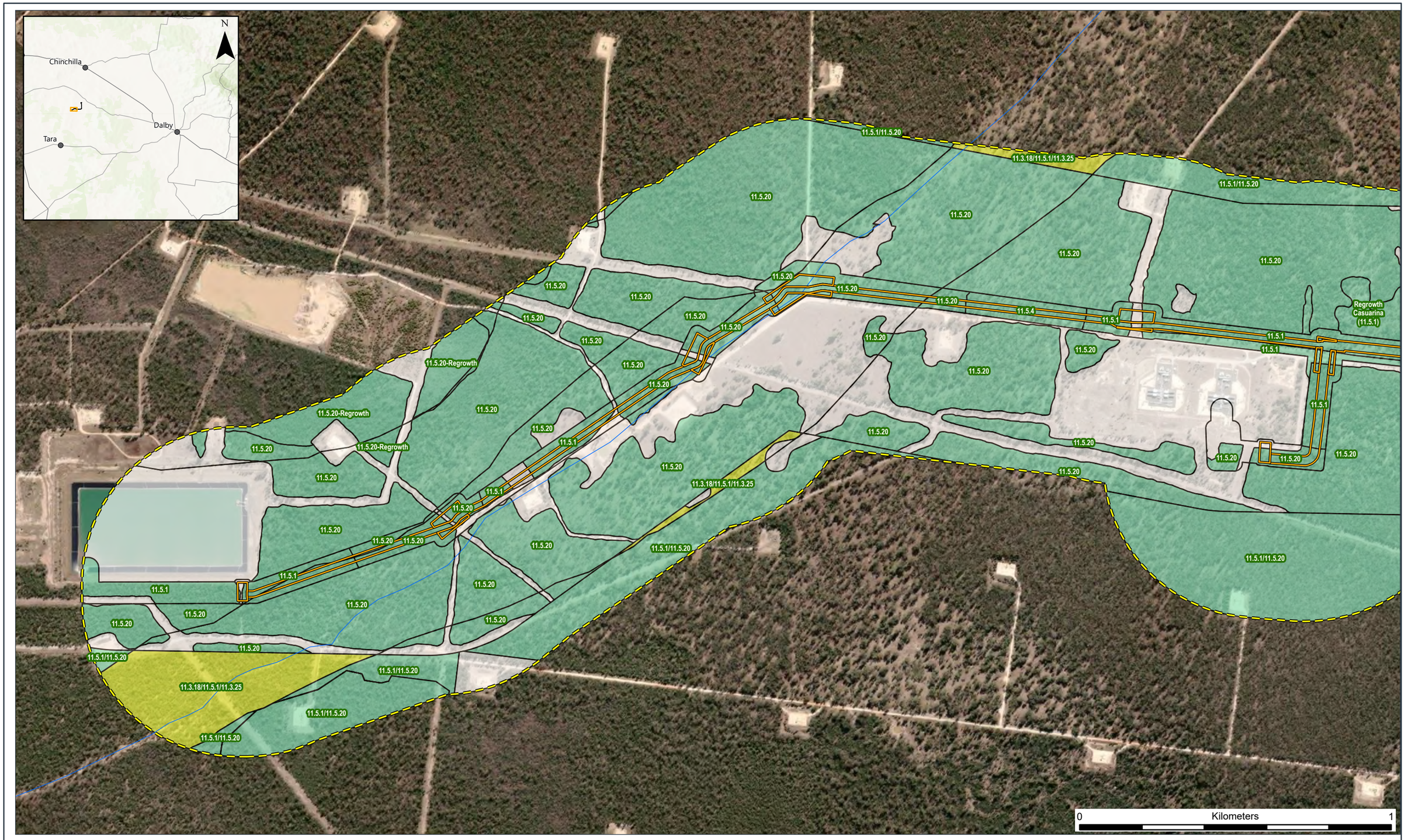
Land zone	RE Code	Description	Occurrence in Study area (ha)
	11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones. Duplex soils with sandy surfaces.	25.7
	11.5.4	*Eucalyptus chloroclada*, *Callitris glaucophylla*, *Angophora leiocarpa* woodland. Occasional canopy species may include *A. floribunda* and *E. crebra* or *E. rhombica*. A low tree layer is usually present that includes species such as *Allocasuarina luehmannii*, *A. inophloia* and *Callitris endlicheri*. Occurs on Cainozoic plains with deep sandy soils.	2.4
	11.5.20	*Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains.	11.4
Endangered (Regrowth vegetation)			
4 – Tertiary to early Quaternary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains.	0.2
Other regrowth vegetation			
Undifferentiated regrowth			0.5
Subtotal Regrowth vegetation			64.4
Non-remnant			33.9
Cleared			724.7
Pasture/grazing			71.2
Derived grassland			2.6
Total			**1421.8**

3.2.2 Conservation-significant flora

Ecological surveys of the Study area have been undertaken by CHEC Environmental in October 2024. No conservation significant flora species were identified. Refer to **Appendix D** for the PEC reports for the October 2024 ecological surveys. A map showing the location of all conservation significant flora records in the vicinity of the Study area is provided in **Figure 3.7**.

3.2.3 Protected plants trigger map

There are no 'high risk' areas shown on the Protected Plants Flora Survey Trigger Map within the Study area.



Ground-truthed Regional Ecosystem Mapping (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Ground-Truthed Regional Ecosystem (Biodiversity Status):

- Endangered
- Of Concern
- No concern at present
- Non-remnant

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FIGURE 3.6

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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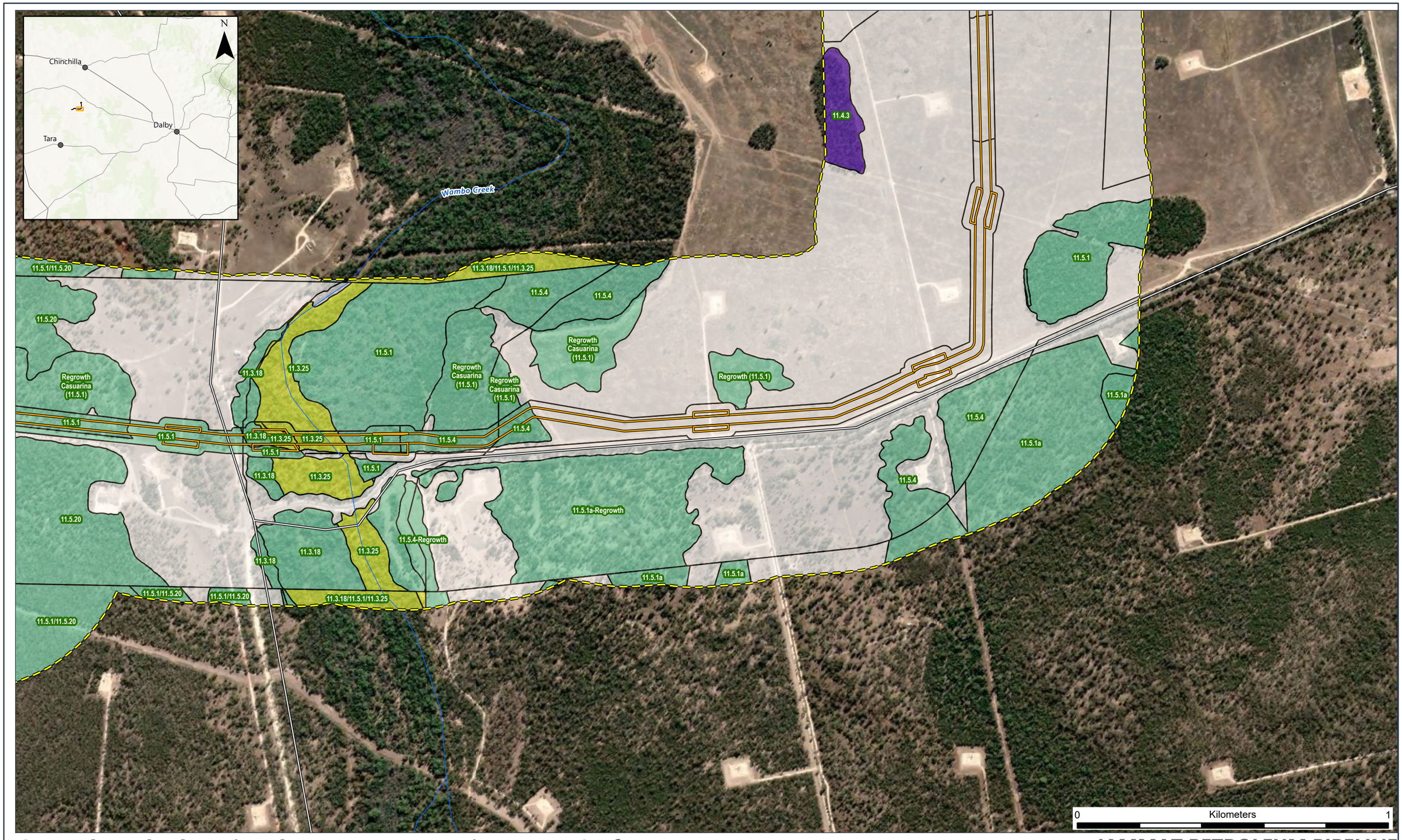

Ground-truthed Regional Ecosystem Mapping (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Ground-Truthed Regional Ecosystem (Biodiversity Status):

- Endangered
- Of Concern
- No concern at present
- Non-remnant

Attexo

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FIGURE 3.6

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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Ground-truthed Regional Ecosystem Mapping (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)

Ground-Truthed Regional Ecosystem (Biodiversity Status):

- Endangered
- Of Concern
- No concern at present
- Non-remnant

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_139[A]

FIGURE 3.6

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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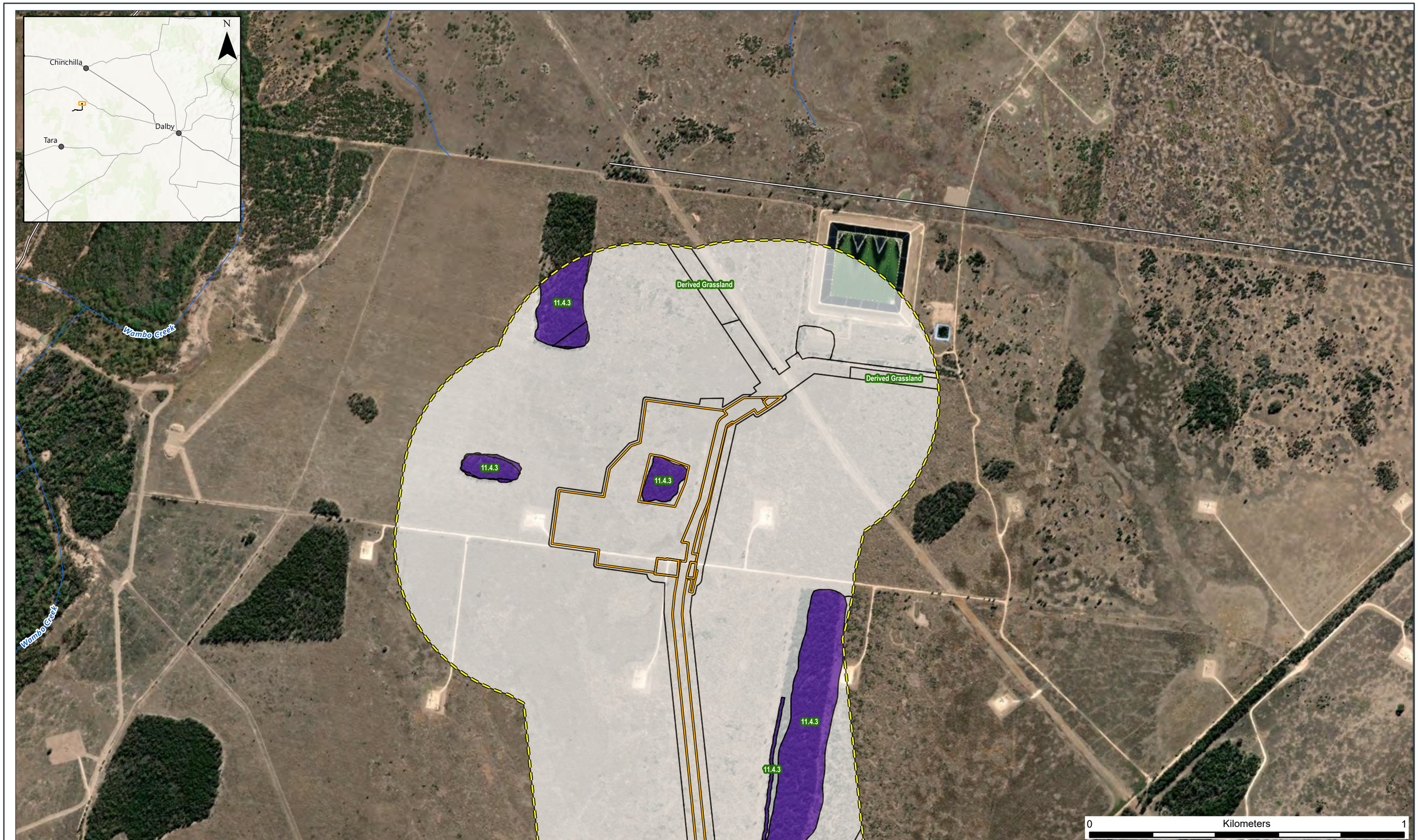

Ground-truthed Regional Ecosystem Mapping (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

Watercourse
Highway
Main Road
Local Road
Project Footprint
Study Area (500m Buffer)

Ground-Truthed Regional Ecosystem (Biodiversity Status):
Endangered
Of Concern
No concern at present
Non-remnant

Attexo

REVIEWED: JC **DRAWN:** JT **SCALE (A3):** 1:11,500 **DATE:** 17/02/2025 **DWG No:** ARR-002_139[A]

FIGURE 3.6

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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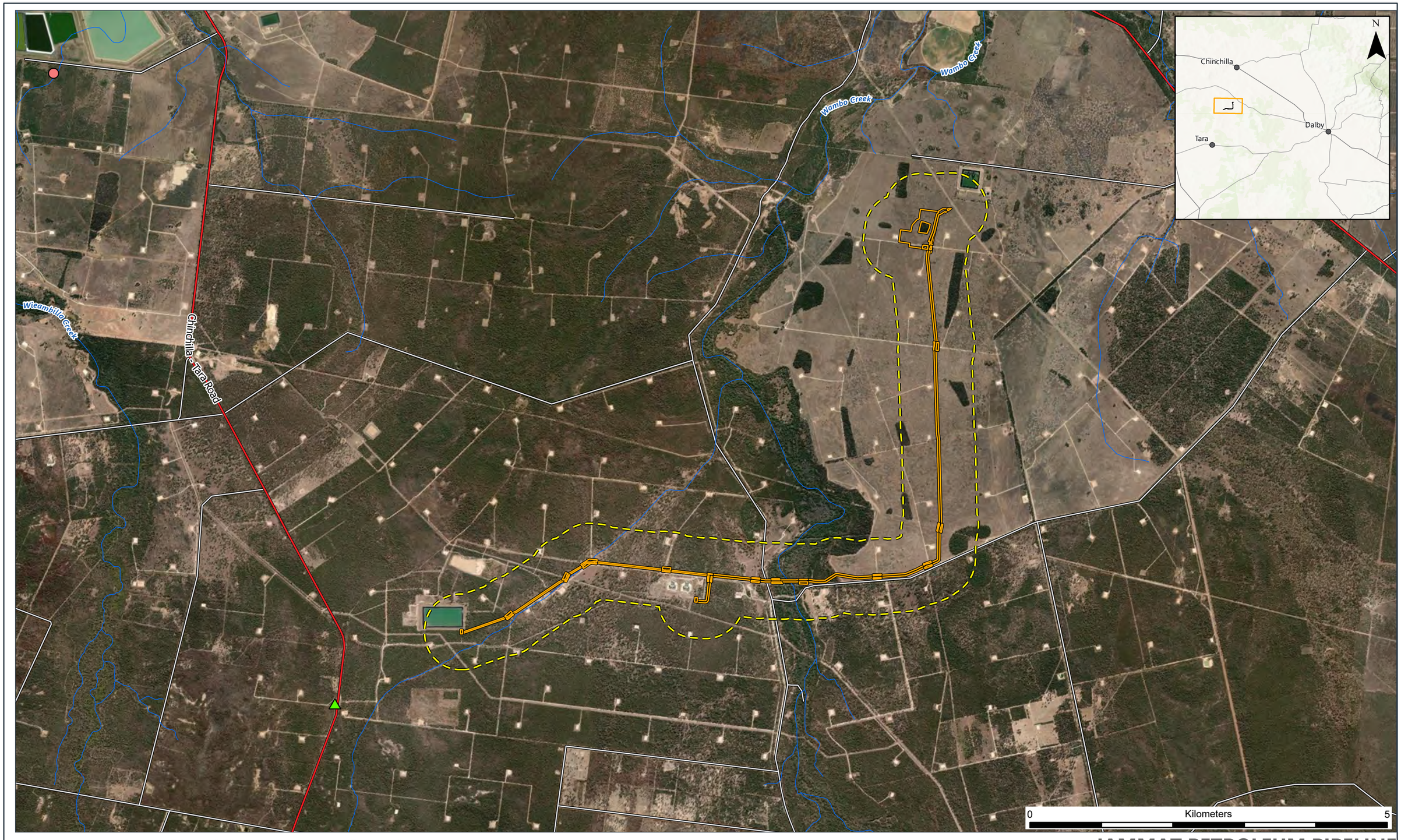

Conservation-Significant Flora Species Records

JAMMAT PETROLEUM PIPELINE

- Kogan Waxflower Record
- Rutidosis lanata Record
- Project Footprint
- Study Area (500m Buffer)
- Watercourse
- Highway
- Main Road
- Local Road

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:50,000 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_146[A] | **FIGURE 3.7**

GDA2020 MGA Zone 56

Data Source: World Imagery: Earthstar Geographics
World Topographic Map:
World Hillshade: Esri, USGS

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3.3 Description of environmental values – terrestrial fauna

3.3.1 Habitat types and condition

The Study area is dominated by eucalypt woodland habitats on depositional plains and low ridges west of Wambo Creek and gilgaied clay plains with isolated patches of Brigalow to the east. These eucalypt vegetation communities are found on soils of low fertility, with REs associated with land zone 5 forming the largest and most continuous tracts of vegetation within both the Study area and broader SGP. Most of these areas have been impacted by logging activities (either broadscale or selective). The northern portion of the Study area has been almost completely cleared to support pastoral activities, however several discrete patches of brigalow vegetation (RE 11.4.3) have been retained within these areas. Additionally, the Project is located within an area of existing CSG infrastructure.

The vegetation communities that have been ground-truthed across the Study area (**Figure 3.6**) represent the following broad habitat types:

- Eucalypt woodlands to open forests: Several eucalypt communities have been identified within the Study area, including RE 11.5.1, RE 11.5.1a, RE 11.5.4 and RE 11.5.20. This habitat type represents approximately 36.3% of the total Study area (**Plate 1**). Of these communities RE 11.5.20 and RE 11.5.1 are the most abundant communities and are dominated by grey box (*Eucalyptus moluccana*), narrow-leaved ironbark (*E. crebra*) and poplar box (*E. populnea*). Regrowth patches of these communities have also been incorporated into this habitat type.
- Riparian woodlands: Two eucalypt woodland communities were identified along mapped watercourses within the Study area, including RE 11.3.18 and RE 11.3.25. This habitat type represents approximately 2.9% of the total Study area (**Plate 2**). These communities are dominated by forest red gum (*E. tereticornis*) and poplar box. No regrowth communities were identified within the Study area.
- Acacia woodlands: Several isolated patches of RE 11.4.3 dominated by brigalow (*Acacia harpophylla*) have also been identified within the study area. These patches represent approximately 2.2% of the total Study area (**Plate 3**) and are restricted to the eastern northern portion of the Project.
- Cleared and/or non-remnant: The remaining areas within the Study area have been described as cleared and/or non-remnant. This habitat type represents approximately 58.5% of the total Study area (**Plate 4**). Whilst these areas contain no little to no vegetation, they do contain large areas of highly disturbed gilgai.

Plate 1: Example of the eucalypt woodland to open forest habitat type

Plate 2: Example riparian woodlands habitat type

Plate 3: Example Acacia woodland habitat type

Plate 4: Example cleared and/or non-remnant habitat type (with gilgai)

3.3.2 Watercourses

Major watercourses are important landscape elements which act as significant migratory and dispersal pathways for many fauna species, contain important habitat resources (including food, water, sheltering, roosting and nesting sites) as well as provide refugia during periods of drought. Unlike other parts of the Brigalow Belt bioregion where waterways often provide the only remaining landscape connectivity, the Study area retains a significant amount of native vegetation and landscape connectivity. Despite this, the major creek system (Wambo Creek) identified within the Study area does represent habitat that are often less impacted by historical clearing and are more likely to contain large trees due to their position in the landscape (**Plate 5**).

The drainage in the Study area generally flows in a northernly direction, eventually draining into the Condamine River. Whilst Wambo Creek is the only major creek system in the Study area, there are also several tributaries of Sixteen Mile Creek that occur in the eastern portion of the Study area. Whilst the portion of Wambo Creek that intersects with the Project area is a stream order 4 watercourse, it is also ephemeral and only likely to contain water following substantial rainfall events. This watercourse is buffered by riparian vegetation (RE 11.3.25). Refer to the water feature checklist for Kenya East, 37DY81 in **Appendix D**. This watercourse is also mapped as a State significant terrestrial biodiversity corridor as shown in **Figure 3.1**.

Plate 5: Wambo Creek looking downstream of main channel from centre of RoW

3.3.3 Wetlands

Whilst there are no wetlands of high ecological significance mapped within the Study area.

3.3.4 State Forests

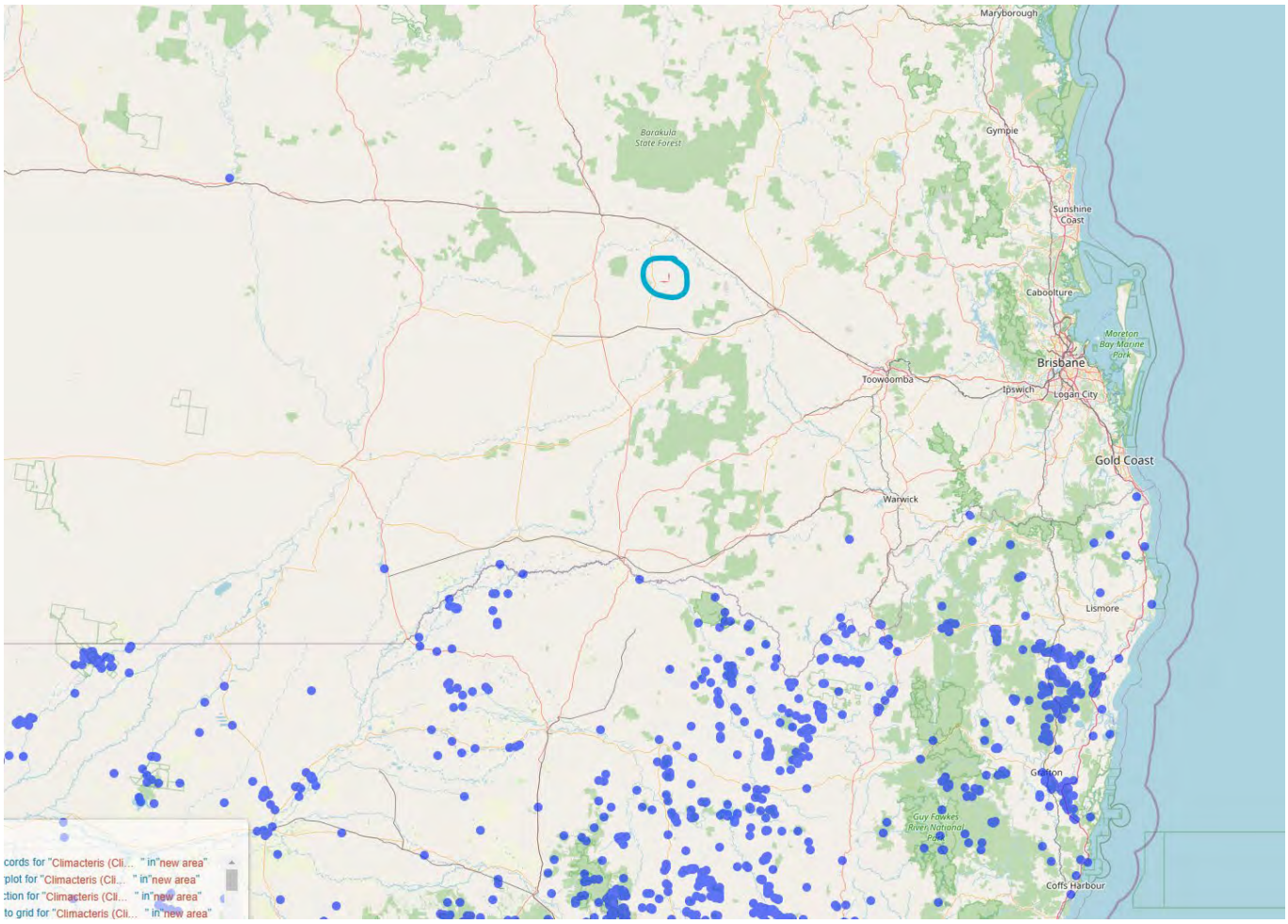
There are no state forests in the Study area.

3.3.5 Conservation-significant fauna

Of the 34 species initially considered as part of the LoOM assessment as potentially occurring within the Study area, 10 species were ultimately identified as 'known to occur' or 'likely to occur' based on the proximity to nearby records and the availability of suitable microhabitat features within the Study area (refer to **Appendix D** for the individual PEC reports). The records of known or likely to occur species are shown on **Figure 3.8**. Whilst the short-beaked echidna (*Tachyglossus aculeatus*) was not considered during these PEC assessments, Arrow have included this species in this preliminary shortlist based on their experience with similar Projects in the region.

Following a more detailed review of the review of (recently listed – March 2023) brown treecreeper (south-eastern) (*Climacteris picumnes victoriae*) and in undertaking an SRI assessment it was determined that the listed subspecies of brown treecreeper, *Climacteris picumnes victoriae,* is **Unlikely to Occur** in the Study area. The justification for this update is provided below:

- the Study area is located outside the distribution of this subspecies (refer to the map below with records of the listed subspecies). The south-eastern subspecies is the only one listed under the EPBC Act or NC Act and its distribution appears to be confined to the Queensland-Ner South Wales border (with the exception of a few extraneous and disjunct records). In contrast there are records of other brown treecreeper subspecies throughout Queensland and within the Study area (1 record was observed within the Study area).



Map 1: Records for the listed subspecies of brown treecreeper, *Climacteris picumnes victoriae*

The 'known to occur' and 'likely to occur' species have been summarised in **Table 3.4**, with nearby records and habitat mapping for this species been shown on **Figure 3.9**, **Figure 3.10**, **Figure 3.11** and **Figure 3.12**. For the purposes of this report, whilst microhabitat data collected from the surrounding areas was used to make these determinations, habitat for these 'known to occur' and 'likely to occur' species has been mapped within the disturbance footprint and surrounds. Species that were assessed as 'unlikely to occur' or 'potentially occurring' within the Study area have not been considered further in this report and are not a PEM (under the EO Act) for the project. The following sections provide a broad overview of the ecology for these species.

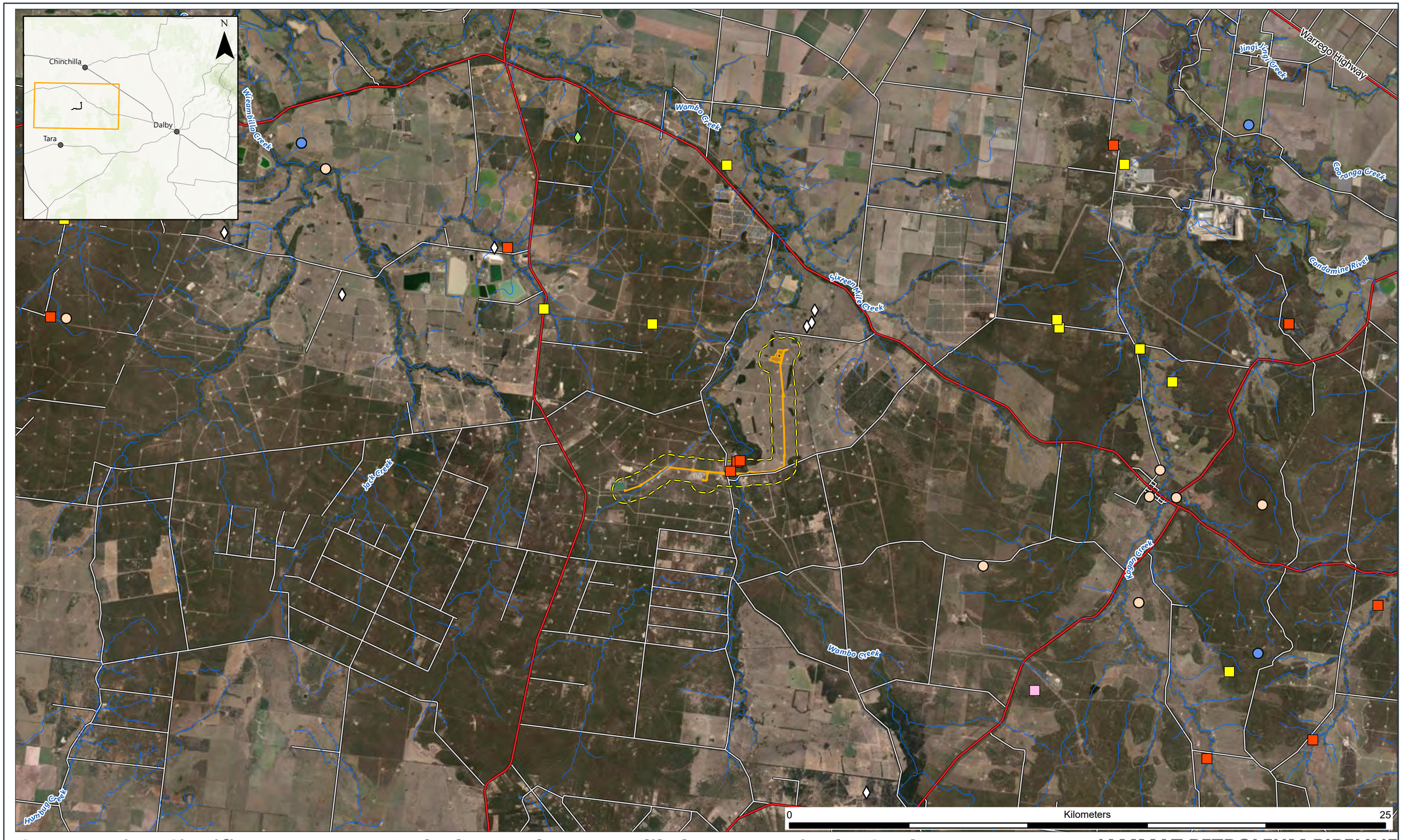
Table 3.4: Summary of fauna species known or likely to occur in the Study area

Fauna Species	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
Bird Species			
diamond firetail (*Stagonopleura guttata*)	V	V	**Likely to Occur**. Nearby historical record was identified approximately 7 km to north-east (QGC 2019). Study area intersects patch of suitable habitat for this species.
glossy black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*)	V	V	**Likely to Occur**. Potential foraging resources (*Casuarina spp*) and large hollow bearing trees were observed within the Study area.

Fauna Species	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
white-throated needletail (*Hirundapus caudacutus*)	V, Mi, Ma	V	**Likely to Occur**. As this is a flyover species, the entire Study area was identified as suitable habitat for this species.
Invertebrate Species			
brigalow woodland snail (*Adclarkia cameroni*)	E	E	**Likely to Occur**. Microhabitat features for this species including decaying logs, woody debris, leaf litter, and dense overstory cover of shrubs and trees were observed within the Study area. These could provide suitable feeding and breeding habitat for this species.
Mammal Species			
Greater Glider (southern and central) (*Petauroides volans*)	E	E	**Likely to Occur**. Diverse and abundant food resources identified for this species within riparian vegetation along Wambo Creek.
Koala (*Phascolarctos cinereus*)	E	E	**Likely to Occur**. Suitable riparian vegetation (dominated by *Eucalyptus tereticornis*) was identified along Wambo Creek. This large tract of intact vegetation is located within 1 km of a permanent water source.
Short-beaked echidna (*Tachyglossus aculeatus*)	-	SLC	**Likely to Occur**. Short-beaked echidnas can utilise a wide range of habitat types (BHA, 2024) and are well known from the border SGP Project area.
Reptile Species			
Dunmall's snake (*Furina dunmalli*)	V	V	**Likely to Occur**. Microhabitat features for this species including soil cracks, woody debris, leaf litter, and dense overstory cover of shrubs and trees were observed within the Study area.
Grey Snake (*Hemiaspis damelii*)	E	E	**Likely to Occur**. Microhabitat features for this species including, heavy clay soils with cracks in gilgai (within <1 km of permanent water), woody debris, leaf litter and dense overstory cover of shrubs and trees were observed within the Study area.
Golden-tailed Gecko (*Strophurus taenicauda*)	-	NT	**Known to Occur**. Recent (>20 years) historical records have been identified near to the Study area. Suitable habitat (trees with loose/peeling bark) was common throughout the Study area.

[1] EPBC Act Status: E = Endangered, V = Vulnerable, Mi = Migratory, Ma = Marine

[2] NC Act Status: E = Endangered, V = Vulnerable, NT = Near Threatened, SLC = Special Least Concern



Conservation-Significant Fauna Records that are known or likely to occur in the Study area

JAMMAT PETROLEUM PIPELINE

- Brigalow Woodland Snail Records
- Dunmall's Snake Records
- Grey Snake Records
- Greater Glider Records
- Koala Records
- Short-Beaked Echidna Records
- Diamond Firetail Records
- Glossy Black-cockatoo Records
- Project Footprint
- Study Area (500m Buffer)
- Watercourse
- Highway
- Main Road
- Local Road

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:150,000 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_145[A]

FIGURE 3.8

GDA2020 MGA Zone 56

Data Source: World Imagery: Earthstar Geographics
World Topographic Map:
World Hillshade: Esri, USGS

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3.3.5.1 Diamond Firetail (*Stagonopleura guttata*)

Diamond firetails occur on the south-east mainland of Australia from south-east Queensland to Eyre Peninsula, South Australia, and about 300 km inland from the sea (DCCEEW, 2023). Their range once extended to north Queensland inland from Cardwell, but they now occur only in the very south of the state. They have also disappeared from many of the more settled parts of New South Wales, Australian Capital Territory and Victoria, and birds in South Australia appear to have been separated into three isolated subpopulations.

This species occurs in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees (DCCEEW, 2023). They typically prefer areas with relatively low tree density, few large logs, and little litter cover but high grass cover. They occur in flocks of between 5 to 50 and occasionally more. Whilst they are thought to be sedentary, some populations move locally. They predominantly feed at ground level, on ripe and partly ripe grass seeds, herb seeds, green leaves and on insects. The nearest (dated) record to the Project is approximately 36 km to the south-east (ALA 2024).

Most of the eucalypt woodland communities mapped within the Study area have been identified as suitable habitat for this species. Suitable habitat for this species has been shown on **Figure 3.9**.

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

South-eastern glossy black-cockatoos widespread and can be found from Mitchell, Queensland, through eastern New South Wales to East Gippsland, Victoria (DCCEEW, 2022). Their distribution is continuous through the forested parts of the Great Dividing Range but becomes more scattered inland, to as far west as the Riverina in New South Wales.

Typically encountered in small family parties, Glossy Black-cockatoos are dietary specialists feeding exclusively on the seeds of *Allocasuarina* and less frequently *Casuarina* spp. Favoured species include *A. torulosa*, *A. littoralis*, *A. distyla*, *A. diminuta*, *A. gymnanthera* and *A. verticillata*. Birds show a preference for productive trees (e.g. higher seed/cone weight ratio), notwithstanding the influence of other factors such as distance from water or breeding hollows. Stands of *Allocasuarina* are not, therefore, of uniform value and the loss of individual stands or trees can have disproportionate impacts. Although an *Allocasuarina* species, *A. luehmannii*, has small seeds and is infrequently used (DCCEEW, 2022). The nearest historical record of this species to the Study area is approximately 9.5 km to the south-east (ALA 1983).

Within the Study area, suitable habitat for this species has been mapped within patches of RE 11.4.3 containing belah (Casuarina cristata) and is shown on **Figure 3.9**.

3.3.5.3 White-throated Needletail (*Hirundapus caudacutus*)

The White-throated Needletail is widespread in eastern and south-eastern Australia where it has been recorded in all coastal regions of QLD and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally into the adjacent inland plains (TSSC, 2019). The breeding distribution of this species is fragmentated, with two subspecies occurring in different parts of Asia. The nominate subspecies (*H.c. nudipes*) breeds from south-western China to northern Pakistan and is largely resident. Individuals found in Australia all belong to the *H.c. caudacutus* subspecies which are non-breeding migrants to Australia.

In Australia, the White-throated Needletail is mostly aerial, from heights of less than 1 m to up to more than 1,000 m (TSSC, 2019). They are known to forage over most habitat types however, they are most often recorded above wooded areas including open forest and rainforest. They have also been recorded foraging above farmland, cleared pasture, plantations and remnant vegetation at the edge of paddocks. Whilst this species spends most of their time on the wing, they are known to roost in trees amongst dense foliage in the canopy or in hollows. During the non-breeding season in Australia, this species has been recorded eating a wide variety of insects. The nearest historical record was identified approximately 3 km to the north-west (Arrow 2018).

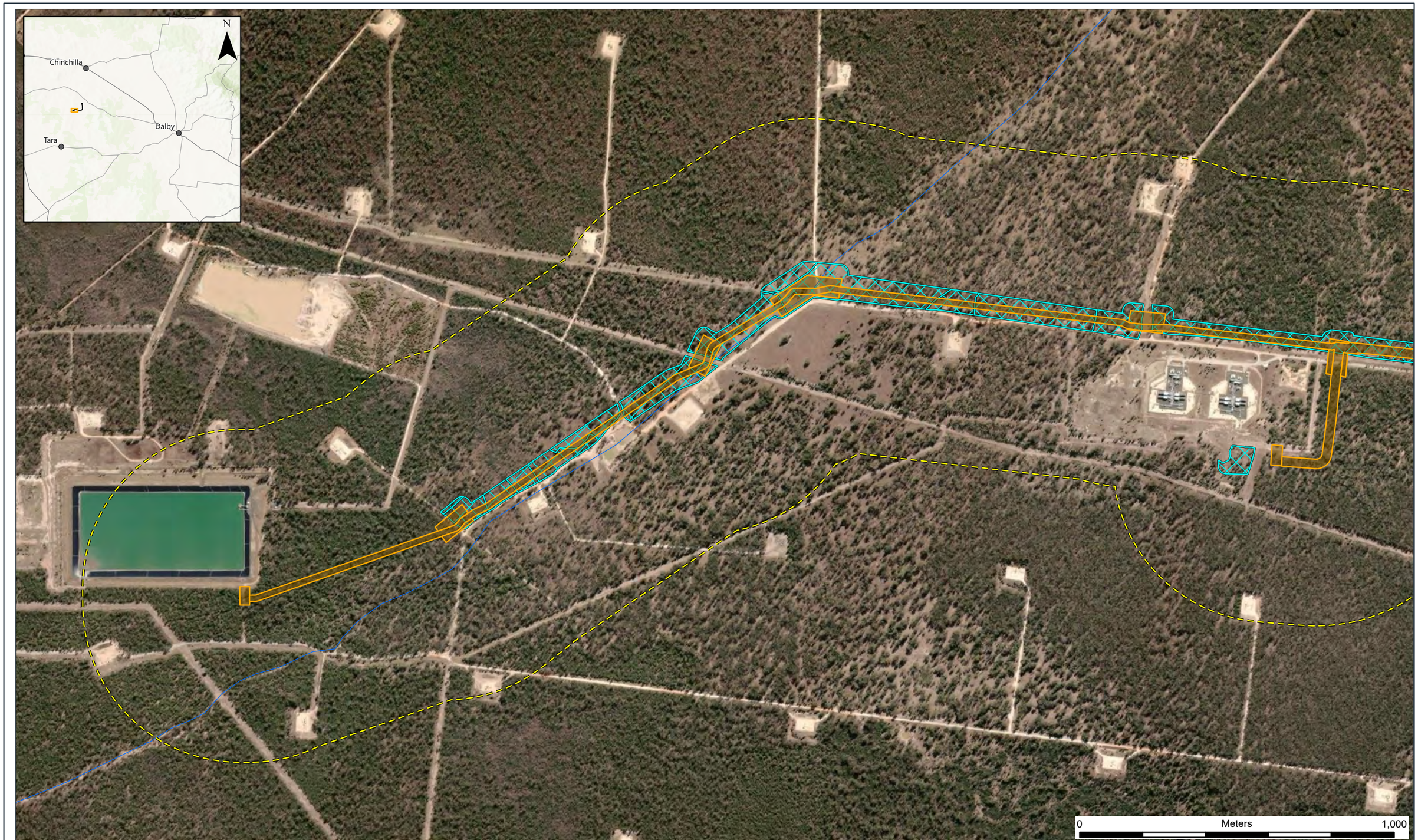
Most of the Study area has been identified as suitable habitat for this species, and as such habitat has not been mapping for this species.

3.3.5.4 Brigalow Woodland Snail (*Adclarkia cameroni*)

The Brigalow Woodland Snail is part of the family *Camaenidae* and is a medium-sized species characterised by a somewhat flattened shell, with rounded and tightly coiled whorls, the last of which is flared (TSSC, 2016a). This species is endemic to southeast Queensland, where it occurs in a small number of remnant and scattered *Acacia harpophylla* and eucalypt woodland patches (commonly along road verges and riparian corridors) along the Condamine River floodplain, especially in the area around Dalby and Chinchilla (TSSC, 2016b).

The current distribution of this species is severely fragmentated. The Brigalow communities within the Condamine River floodplain (located to the north of the Study area) that were once contiguous throughout the species' historical distribution have been extensively cleared to support agricultural and pastoral activities (TSSC, 2016a). The current distribution of this species along the floodplain (from approximately 17 km south of Dalby to around Miles), reflects this broad scale clearing (TSSC, 2016b). The nearest recorded individual to the Study area is located approximately 1 km to the north-east (Arrow 2012).

Suitable habitat for this species has been mapped within patches of RE 11.4.3 as shown on **Figure 3.10**.



Conservation-Significant Fauna Records (Birds) (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Diamond Firetail Records
- Glossy Black-cockatoo Records
- Watercourse
- Highway
- Main Road
- Local Road
- Study Area (500m Buffer)
- Project Footprint
- Diamond Firetail Habitat
- Glossy Black Cockatoo Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_141[A]

FIGURE 3.9

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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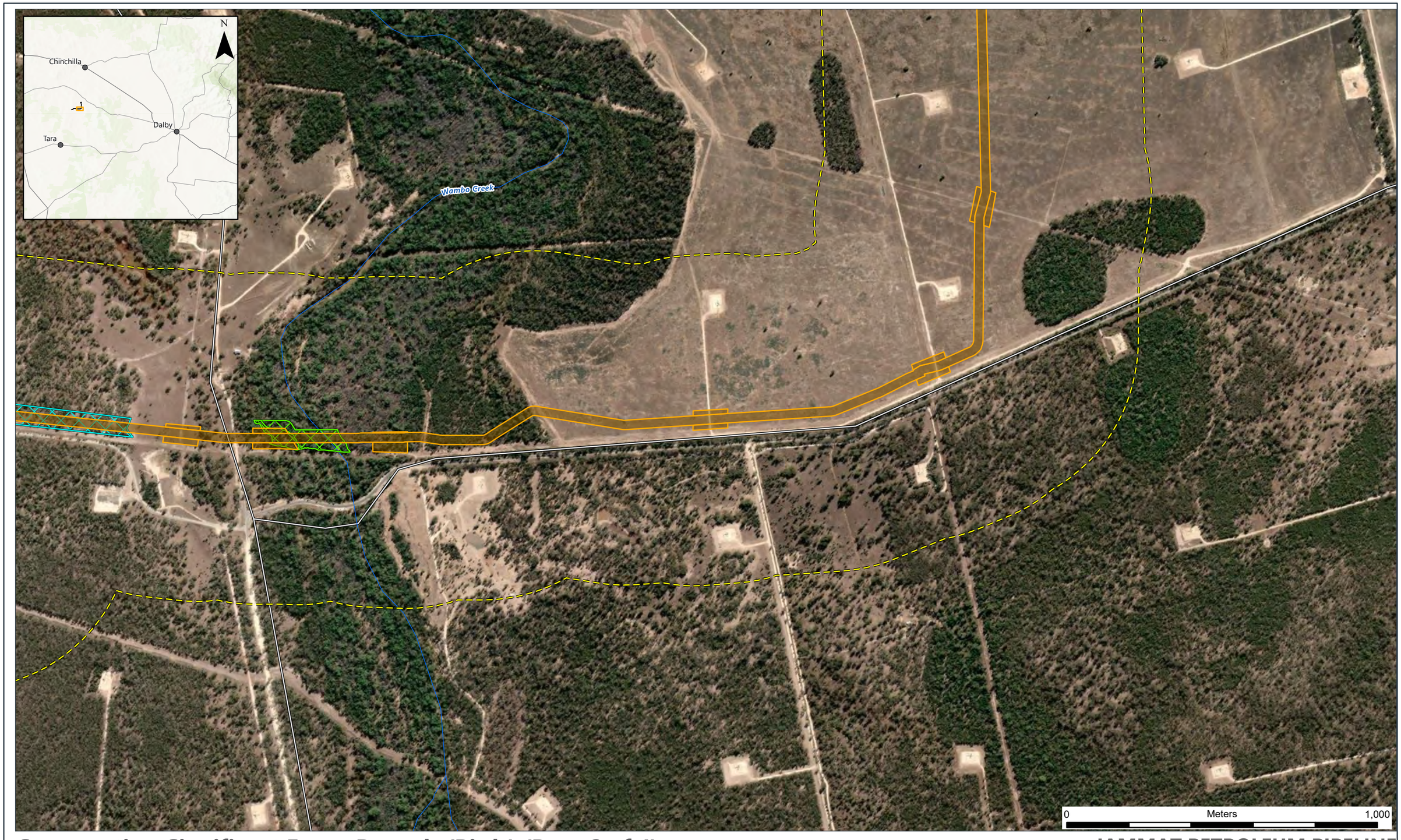

Conservation-Significant Fauna Records (Birds) (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Diamond Firetail Records
- Glossy Black-cockatoo Records
- Watercourse
- Highway
- Main Road
- Local Road
- Study Area (500m Buffer)
- Project Footprint
- Diamond Firetail Habitat
- Glossy Black Cockatoo Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_141[A]

FIGURE 3.9

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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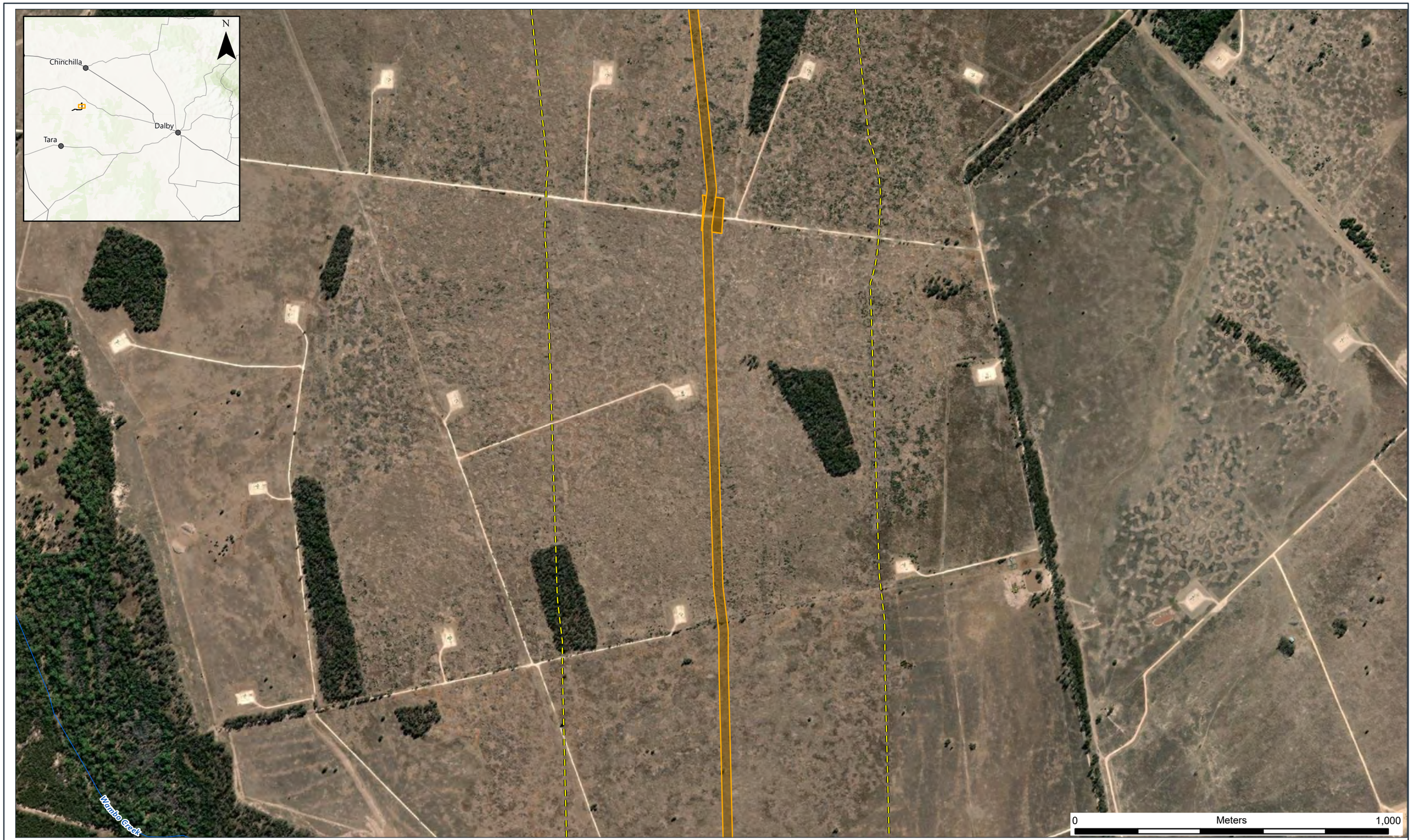

Conservation-Significant Fauna Records (Birds) (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Diamond Firetail Records
- Glossy Black-cockatoo Records
- Watercourse
- Highway
- Main Road
- Local Road
- Study Area (500m Buffer)
- Project Footprint
- Diamond Firetail Habitat
- Glossy Black Cockatoo Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_141[A]

FIGURE 3.9

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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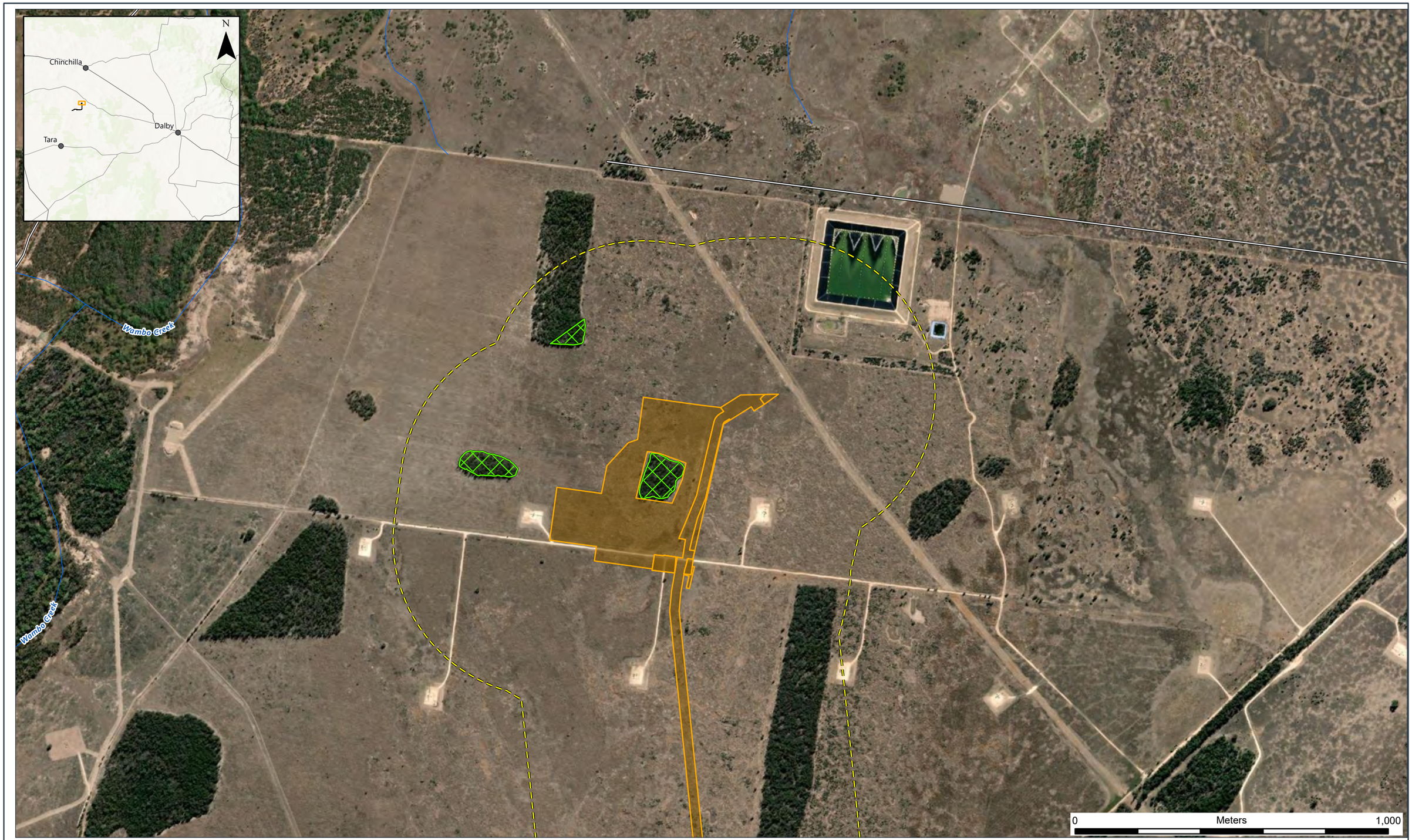

Conservation-Significant Fauna Records (Birds) (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

- Diamond Firetail Records
- Glossy Black-cockatoo Records
- Watercourse
- Highway
- Main Road
- Local Road
- Study Area (500m Buffer)
- Project Footprint
- Diamond Firetail Habitat
- Glossy Black Cockatoo Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_141[A] | **FIGURE 3.9**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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Conservation-Significant Fauna Records (Invertebrates) (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Brigalow Woodland Snail Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Brigalow Woodland Snail Habiat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_142[A]

FIGURE 3.10

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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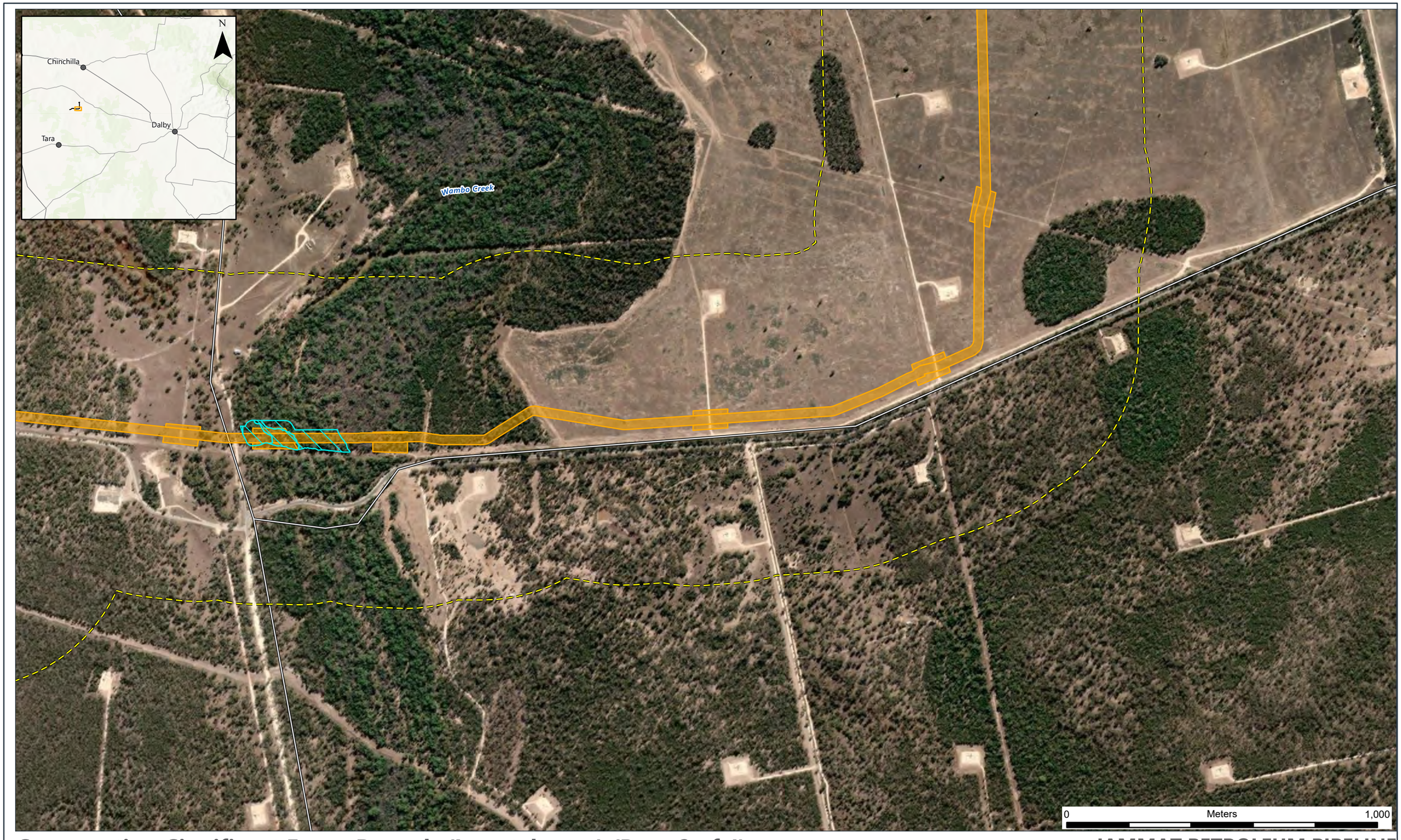

Conservation-Significant Fauna Records (Invertebrates) (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Brigalow Woodland Snail Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Brigalow Woodland Snail Habiat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_142[A] | **FIGURE 3.10**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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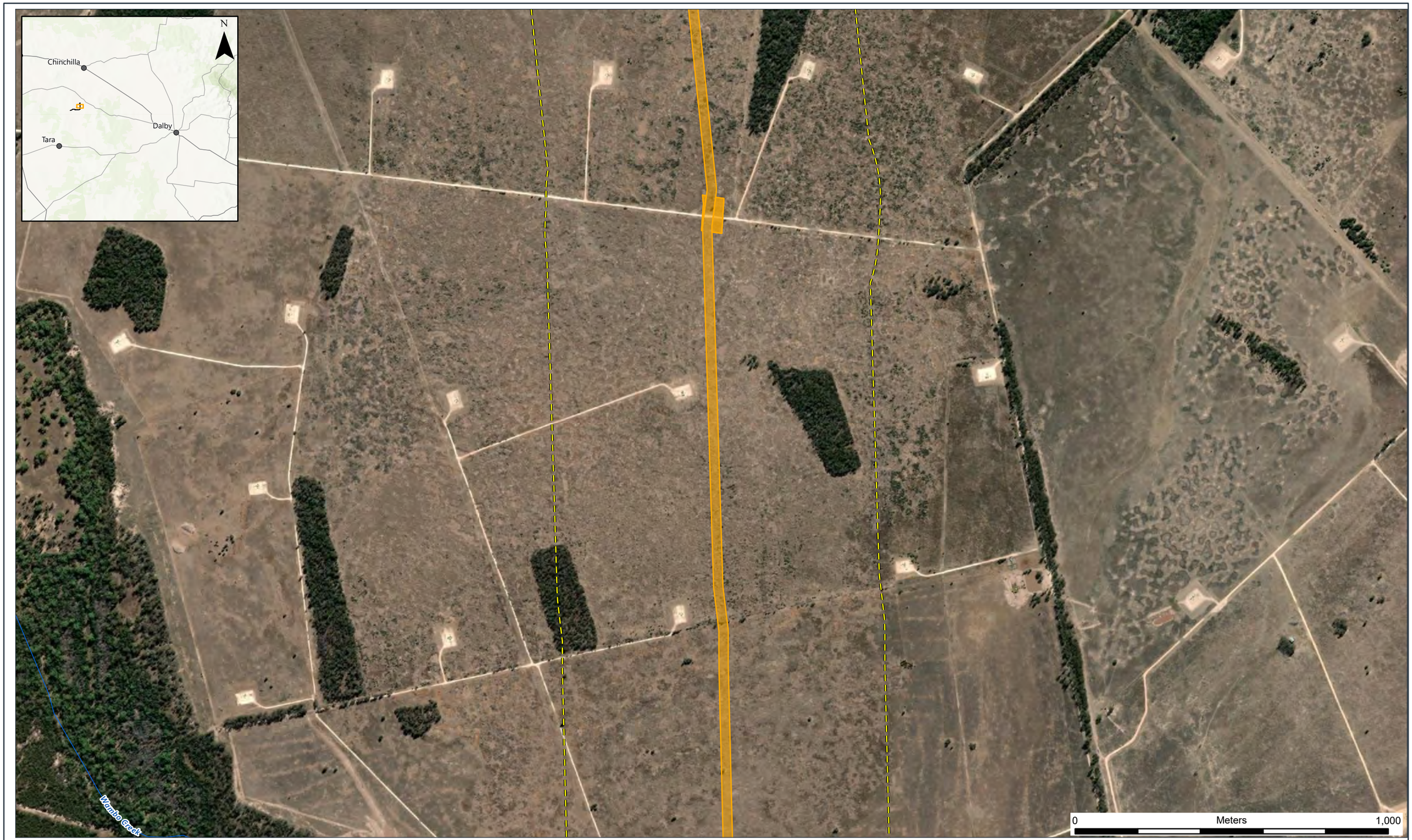

Conservation-Significant Fauna Records (Invertebrates) (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Brigalow Woodland Snail Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Brigalow Woodland Snail Habiat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_142[A]

FIGURE 3.10

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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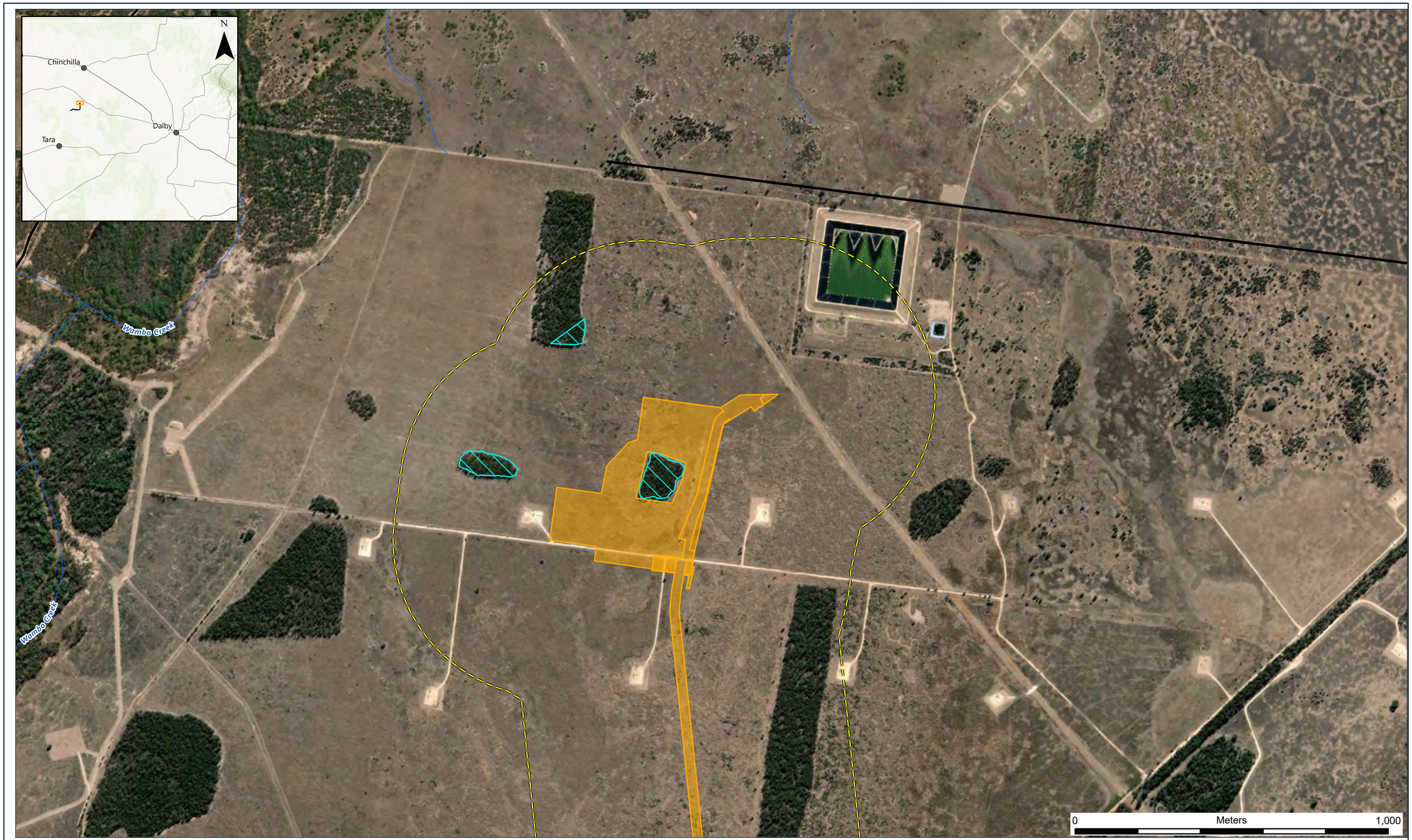

Conservation-Significant Fauna Records (Invertebrates) (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

- Brigalow Woodland Snail Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Brigalow Woodland Snail Habiat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 27/02/2025 | **DWG No:** ARR-002_142[A] | **FIGURE 3.10**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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3.3.5.5 Greater Glider (*Petauroides volans*)

The Greater Glider (southern and central) is the largest gliding possum in eastern Australia where it has a broad distribution from around Proserpine in Queensland, south through New South Wales and the Australian Capital Territory, to Wombat State Forest in central Victoria (DCCEEW, 2022b). This species occurs at elevational ranges from 0 – 1200 m ASL. This subspecies distribution appears to be restricted in the Australian Capital Territory, where the species is only known from the Lower Cotter Catchment and Namadgi National Park.

The Greater Glider is an arboreal nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundant hollows (DCCEEW, 2022b). During the day this species shelters in tree hollows, with a particular preference for large hollows (diameter M10 cm) in large, old trees. Whilst both live and dead trees can be used for denning, the species prefers live hollow-bearing trees when adequate numbers are available. Multiple dens can be used by the same individual across their home range, which, in Queensland, can range between 4-20. Whilst no greater gliders have been observed within the Study area, historical records in the surrounding landscape suggest that local populations may be present. The nearest record of this species is approximately 14 km to the south-east (Arrow 2011).

Within the Study area, suitable habitat for this species has been identified along the riparian corridor of Wambo Creek as shown on **Figure 3.11**.

3.3.5.6 Koala (*Phascolarctos cinereus*)

Koalas are widespread across Queensland, occurring in patchy and often low-density populations across the different bioregions where they inhabit moist coastal forests, southern and central western sub-humid woodlands, and a number of eucalypt woodlands adjacent to waterbodies in the semi-arid western parts of the state (DAWE, 2022a).

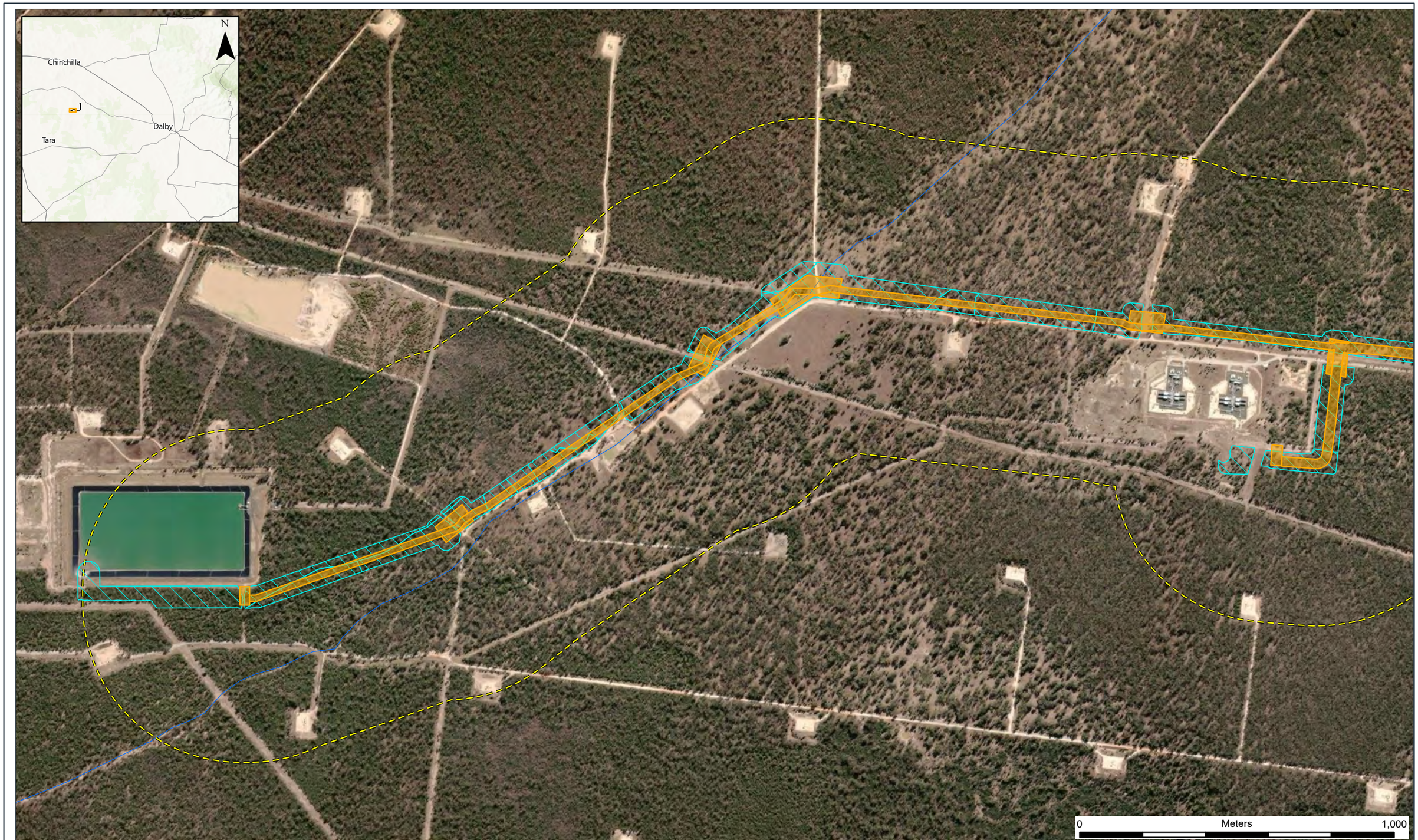
Closer to the western extent of their distribution, Koalas are often associated with watercourses, though they are not restricted to them (DAWE, 2022a). They are not strongly territorial and home ranges will overlap. Home ranges vary in size from 1-2 ha in optimum habitat up to 135 ha in semi-arid regions. Koalas are surprisingly mobile and able to move large distances across artificial (cleared) land. There are no limitations on patch size, and they are also often seen in regrowth vegetation. The abundance of records in non-remnant habitats likely reflect these behaviours with individuals able to utilise isolated trees in an otherwise unsuitable landscape.

Koalas feed on eucalypt trees but show dietary preference based on geographical region and the types of tree species present. In the Brigalow Belt, Koalas have at least 24 species of *Eucalyptus* on which they preferentially forage (Australian National University, 2021). Of these tree species, the following have been recorded in the broader SGP: *Corymbia tessellaris*, *C. citriodora*, *Eucalyptus camaldulensis*, *E. chloroclada*, *E. coolabah*, *E. crebra*, *E. exserta*, *E. fibrosa*, *E. melanophloia*, *E. moluccana*, *E. ochrophloia*, *E. populnea* and *E. tereticornis*. Numerous historical koala records have beenidentified within the Study area, the most recent of which was recorded in 2018 (Arrow).

Within the Study area, most remnant and regrowth eucalypt woodlands have been identified as suitable habitat for this species. Habitat mapping for this species has been shown on **Figure 3.11**.

3.3.5.7 Short-beaked Echidna, *(Tachyglossus aculeatus*)

The short-beaked echidna can be found across most of Australia, where they live in forests and woodlands, heaths, grasslands and arid environments (BHA, 2024). Considering the broad range of habitats that the Echidna could occupy, they could occur anywhere across the Study area. For the purposes of this assessment, habitat has been mapped by buffering known records by 1 km as set out in the *Method for mapping matters of state environmental significance, Version 7* (DESI, 2024). Whilst several records of the short-beaked echidna have been identified in the surrounding landscape, the nearest record is approximately 5 km to the north-west (ALA 2008). Following the guidance outlined in (DESI, 2024), there is no mapped habitat for the short-beaked echidna within the Study area.



Conservation-Significant Fauna Records (Mammals) (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Greater Glider Records
- Koala Records
- Short-Beaked Echidna Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Koala Habitat
- Greater Glider Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_143[A] | **FIGURE 3.11**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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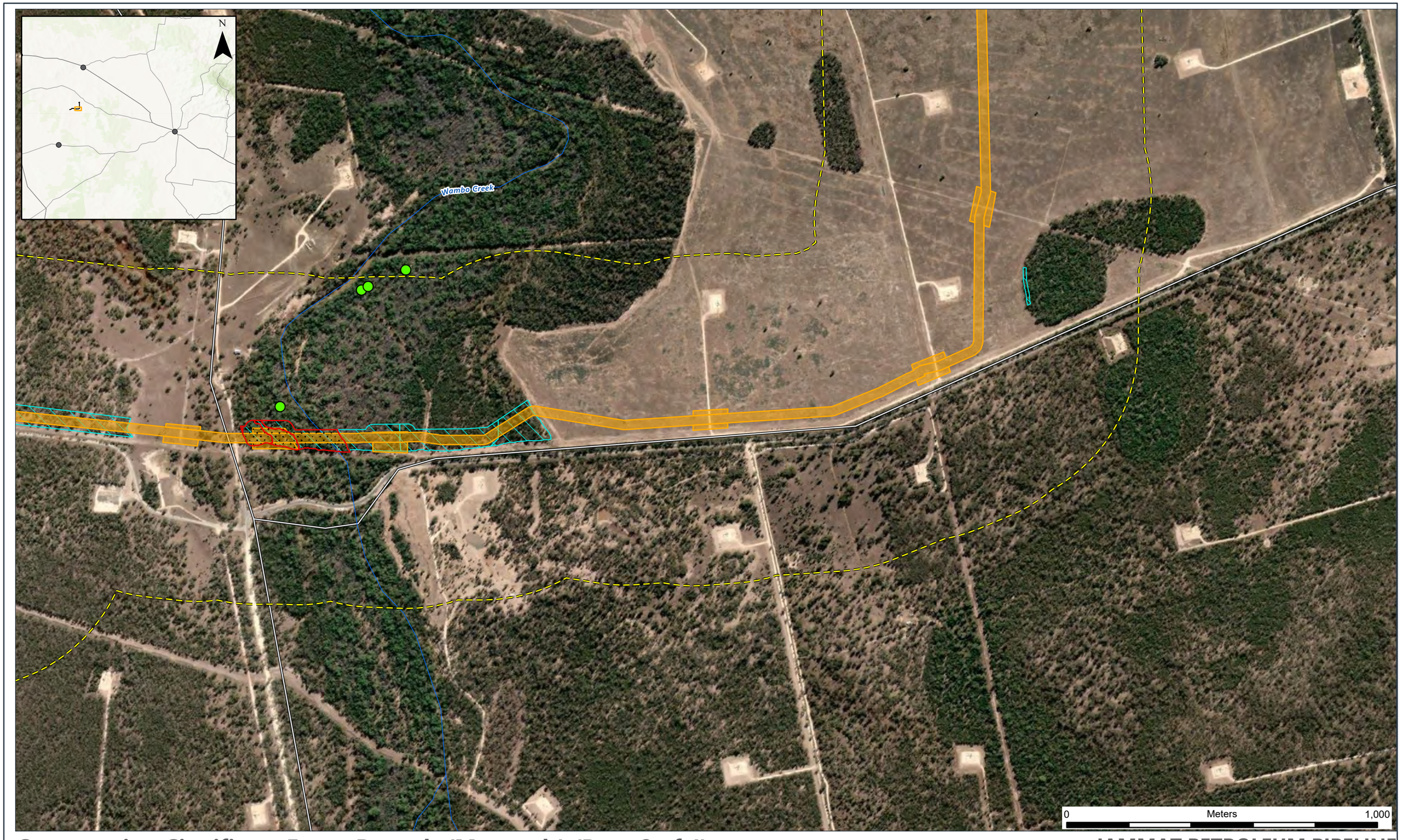

Conservation-Significant Fauna Records (Mammals) (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Greater Glider Records
- Koala Records
- Short-Beaked Echidna Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Koala Habitat
- Greater Glider Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_143[A]

FIGURE 3.11

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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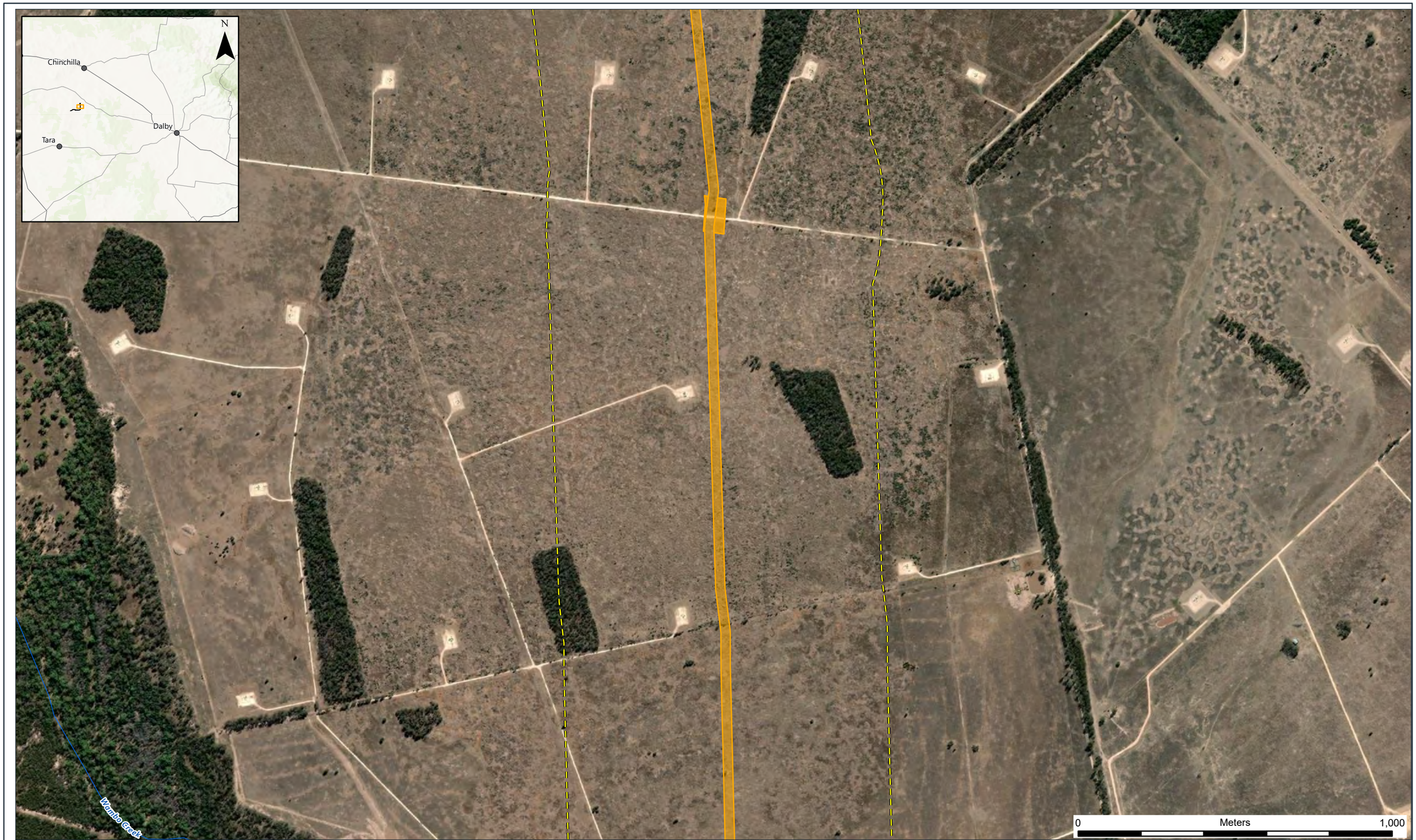

Conservation-Significant Fauna Records (Mammals) (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Greater Glider Records
- Koala Records
- Short-Beaked Echidna Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Koala Habitat
- Greater Glider Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_143[A]

FIGURE 3.11

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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Conservation-Significant Fauna Records (Mammals) (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

- Greater Glider Records
- Koala Records
- Short-Beaked Echidna Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Koala Habitat
- Greater Glider Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_143[A] | **FIGURE 3.11**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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3.3.5.8 Dunmall's snake (*Furina dunmalli*)

Dunmall's snake is found in central and south-central Queensland and may potentially extend into inland north-eastern New South Wales (DOE, 2014). In Queensland, its range extends from Yeppoon and the Expedition Range in the north, to Oakey, Glenmorgan and Inglewood in the south. Most locality records are from between 200-500 m in elevation.

This species is typically found in open forest, particularly brigalow (*Acacia harpophylla*) forests and woodlands growing on floodplains of deep-cracking black clay and clay loam soils. Very little is known about this species although it is thought to be uncommon within its limited range (DOE, 2014). Captive specimens indicate that it is a nocturnal species, sheltering under fallen timber and in deep soil cracks and other cavities. Its diet consists primarily of small skinks and geckos. The nearest Dunmall's snake record to the Study area is approximately 13 km to the north-west (ALA 2000).

Within the Study area, suitable habitat for this species was identified within patches of mapped RE 11.4.3. Suitable habitat for this species has been shown on **Figure 3.12**.

3.3.5.9 Grey Snake (*Hemiaspis damelii*)

Grey snakes potentially occur from southern, inland New South Wales to south-eastern Queensland (Cogger, 2018), however the conservation advice indicates that the occurrence in New South Wales is represented by heavily fragmented, isolated areas, rather than continuous distribution as indicated by the Cogger distribution map (DCCEEW, 2022a). In Queensland, grey snake distribution is more widespread, with a concentration of records of the species along the Macintyre and Condamine Rivers and associated floodplains of the southern Brigalow Belt from Goondiwindi and Dalby west to Glenmorgan on the Darling Downs and western Lockyer Valley. The species has been recorded at two locations within the Study area in the western portion of the Project, with suitable habitat modelled in multiple locations, associated mostly with water features along the length of the Study area.

Grey snakes occur in dry sclerophyll forests and woodlands throughout their range and are normally found under cover during the day but are only partly nocturnal (Cogger, 2018). In Queensland, habitat is specifically in Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*) woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments. Logs, rocks and soil cracks provide important cover requirements for the species. Primary prey for this species is frogs, thus the floodplains and ephemeral water features that support the prey are important habitat for Grey Snake. The nearest grey snake record to the Study area is approximately 1 km to the north-east (Arrow 2012).

Suitable habitat for this species has been mapped within patches of RE 11.4.3 as shown on **Figure 3.12**.

3.3.6 Near Threatened fauna species

Whilst the Golden-tailed Gecko (*Strophurus taenicauda*) has been described as likely to occur within the Study area, habitat for near threatened species does not constitute an ESA, nor is it a PEM under the EO Act. The presence or potential presence of a near threatened species triggers requirements under the NC Act that are approved and managed separately to the EA. Therefore, the occurrence or potential occurrence of near threatened species or their habitat does not trigger any requirement to amend the EA however, the presence of these species is noted.

3.3.7 Essential habitat mapping

Mapped Essential habitat occurs within the Study area for the following species (refer to **Figure 3.13**):

- Pale imperial hairstreak, *Jalmenus eubulus*
- Golden-tailed Gecko, *Strophurus taenicauda*.

As only essential habitat for critically endangered, endangered and vulnerable wildlife is considered as an ESA in this report, no further assessment is made of essential habitat mapping for Golden-tailed Gecko (refer **Section 1.4.2.3**).

Conservation-Significant Fauna Records (Reptiles) (Page 1 of 4)

JAMMAT PETROLEUM PIPELINE

- Dunmall's Snake Records
- Grey Snake Records
- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Grey Snake and Dunmall's Snake Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:11,500 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_144[A] | **FIGURE 3.12**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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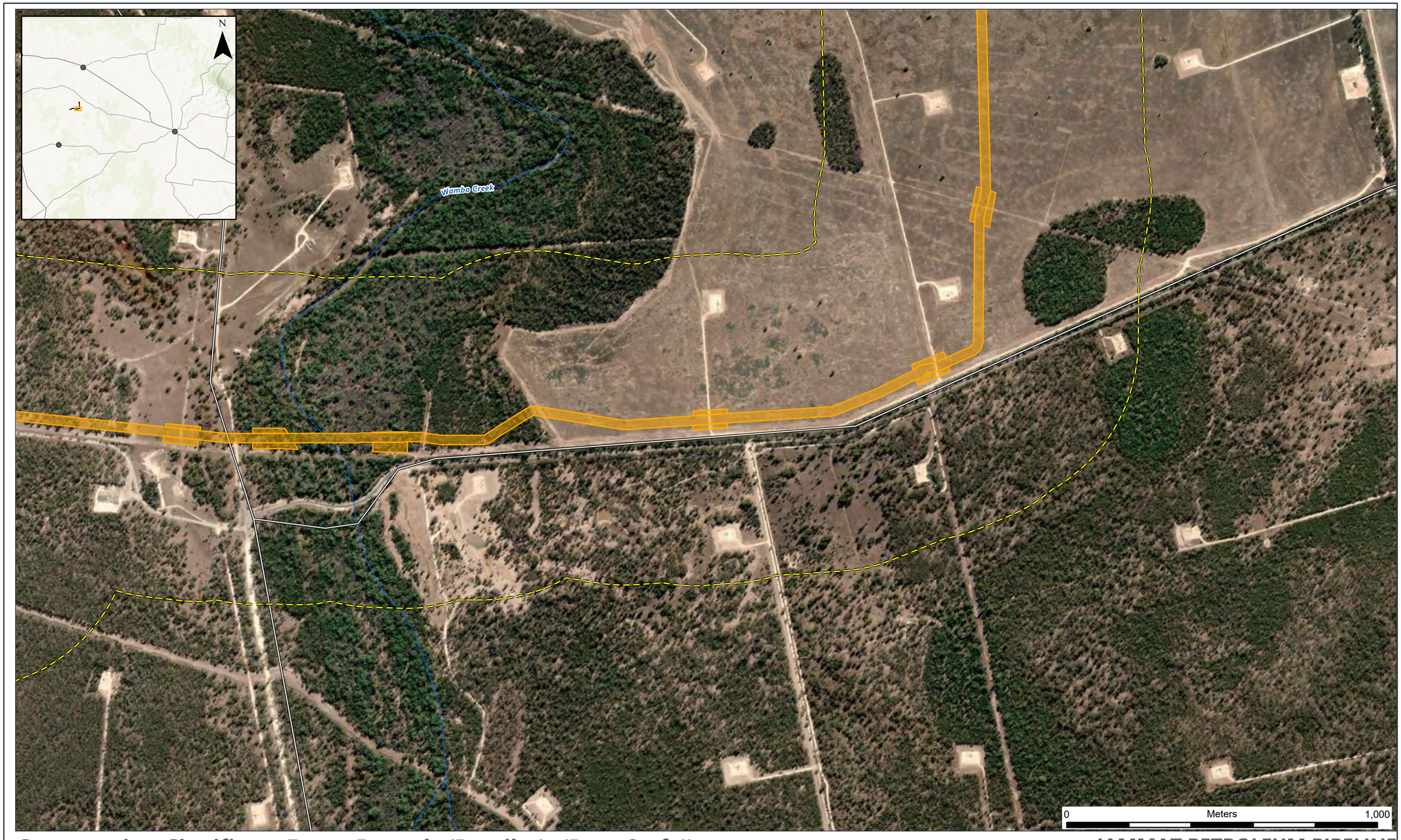

Conservation-Significant Fauna Records (Reptiles) (Page 2 of 4)

JAMMAT PETROLEUM PIPELINE

- Dunmall's Snake Records
- Grey Snake Records
- Watercourse
- Highway
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- Study Area (500m Buffer)
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FIGURE 3.12

GDA2020 MGA Zone 56

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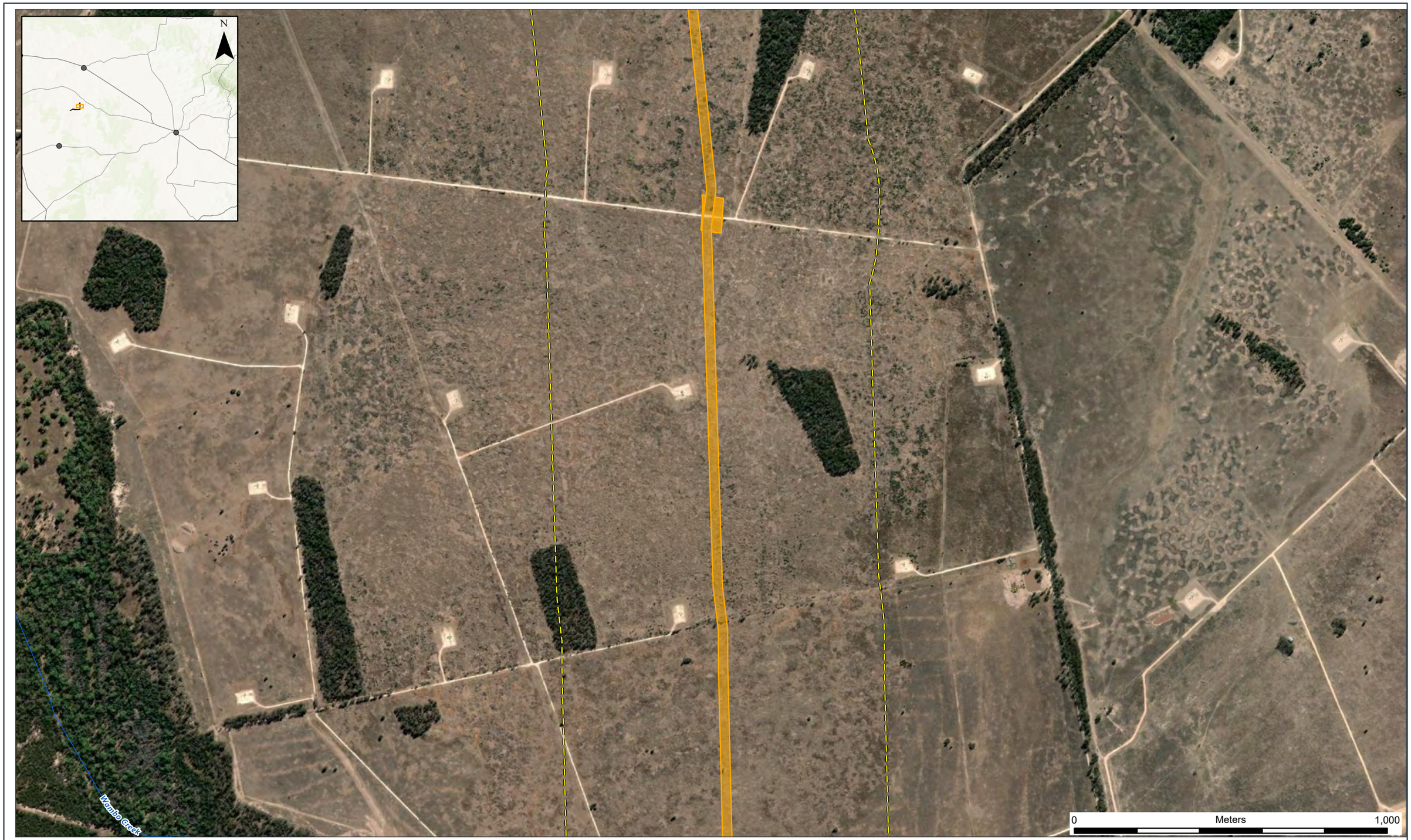

Conservation-Significant Fauna Records (Reptiles) (Page 3 of 4)

JAMMAT PETROLEUM PIPELINE

- Dunmall's Snake Records
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FIGURE 3.12

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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Conservation-Significant Fauna Records (Reptiles) (Page 4 of 4)

JAMMAT PETROLEUM PIPELINE

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FIGURE 3.12

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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Essential Habitat Mapping

JAMMAT PETROLEUM PIPELINE

- Watercourse
- Highway
- Main Road
- Local Road
- Project Footprint
- Study Area (500m Buffer)
- Mapped Essential Habitat

Attexo

REVIEWED: JC | **DRAWN:** JT | **SCALE (A3):** 1:35,000 | **DATE:** 17/02/2025 | **DWG No:** ARR-002_145[A]

FIGURE 3.12

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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4. Impact assessment

4.1 Planning and design

Coal seam gas developments apply an iterative process in terms of locating pipeline infrastructure to manage competing constraints associated with the RoW and location of surface infrastructure, including ecological values, landholder preferences, geological features, existing infrastructure, and access tracks. Planning and management of surface activities and ground disturbance is undertaken utilising a set of hierarchical management principles to avoid, minimise and mitigate impacts to environmental values. These principles are:

- Avoid: Arrow Energy's first preference is to avoid PEMs, threatened ecological communities and the habitat of PEMs listed threatened species
- Minimise: where other competing constraints or the scale / location of PEMs communities or species habitat dictate that avoidance is not possible (e.g. where there is riparian vegetation that need to be crossed or large areas of suitable habitat for wide ranging species such as the Koala, Greater Glider or Painted Honeyeater), Arrow Energy's will preferentially locate infrastructure in a manner that minimises the impact to these values (e.g. cross the riparian vegetation at the narrowest or most degraded part or where practicable on the edge of suitable habitat for listed species so as not to bisect good quality habitat)
- Mitigate: implement mitigation measures to further minimise the direct and indirect impacts on ecological values
- Remediate and rehabilitate: actively remediate and rehabilitate impacted areas to promote and maintain long term recovery
- Offset: Arrow Energy will offset unavoidable significant residual impacts to PEMs.

Project development has also considered the hierarchical management principles for primary and secondary protection zones of Category B and C ESAs as set out in conditions of the Jammat PPL EA (refer **Section 5**).

Proposed Project impacts have been compared against the standard criteria, standard conditions, and variation conditions within the Jammat PPL EA to identify any impacts that are not consistent with approved conditions. These matters are discussed further in **Section 5**.

4.1.1 Co-location

The proposed pipeline alignment has been designed using the management hierarchy as described above. The pipeline is co-located adjacent to existing linear infrastructure as much as possible to avoid fragmenting vegetated areas which also allows for a narrower RoW during construction due to being able to use the existing tracks or RoWs for access. Many of the construction workspaces and activities such as laydowns, access tracks and extra workspaces use gas field infrastructure or have been located in areas previously disturbed as part of the development of the gas field and are already approved under existing EAs.

Refinement of the Jammat alignment and design has minimised the Project's impact by co-locating with other pipelines and in or adjacent to previously disturbed areas. This has resulted in a comparatively small construction footprint for a pipeline project of this size.

4.1.2 Waterway crossing methodologies

A range of pipeline construction methods are available for watercourse crossings, including standard 'open cut' trenching, watercourse flow diversion and trenchless technology. A brief description of each and the associated advantages and disadvantages is provided below:

- Standard 'open cut' trenching involves in-stream construction of a trench using excavators or backhoes to stockpile trench spoil away from the streambed. The prefabricated pipe is placed across the waterway, lowered in and the trench and backfilled immediately. This method is often applied in dry or shallow low flow watercourses but may also be applied in sensitive watercourses where rapid construction is the best means of minimising environmental impacts.

- Watercourse flow diversion techniques involve construction of temporary dams up and downstream of a crossing and the diversion of water around the crossing site to create a dry construction area between the dams. This method is generally applied at crossings where water flow is required to be maintained for ecological, social or engineering reasons.
- Trenchless options, such as horizontal directional drilling (HDD) can cause less disruption to the surface environment and can be a viable alternative where there are significant surface constraints that exclude standard open cut trenching as a construction methodology. However, the cost of HDD is significantly higher compared to standard trenching and there are technical constraints and environmental risks (e.g. HDD failure, accidental release of drilling muds where geology is uncohesive, etc) that also need to be considered. A cleared area equivalent to the length of the HDD is also required to 'string' the pipe length (i.e. welding together all sections of the pipe that are then pulled through the HDD). Other technical considerations include are not limited to, ground conditions and depth of channels.

All crossings for the Project are proposed to be standard 'open cut' with a bed level access track where required. Refer to **Section 4.5.5** for an assessment of impacts to fish passage.

4.2 Overview of impacts

4.2.1 Vegetation clearing

The most significant impact associated with the construction of the Jammat Project is the direct loss vegetation through clearing of the RoW, which includes impacts on 17.9 ha of remnant vegetation and 0.2 ha of regrowth vegetation. Given the highly vegetated nature of much of the eastern end of Study area, clearing of remnant vegetation and associated habitat is an unavoidable aspect of the Project development. Despite this however, most of the clearing proposed is in widespread, least concern vegetation types (predominantly RE 11.5.1 and 11.5.20). **Table 4.1** summarises the total area of remnant and regrowth vegetation proposed to be disturbed by the Project.

Table 4.1: Vegetation clearing for the pipeline footprint by RE type

RE Type	VM Act Class	Biodiversity Status	Impact area (ha)
Remnant			
11.3.18	Least concern	No concern at present	0.3
11.3.25	Least concern	Of concern	0.9
11.5.1	Least concern	No concern at present	8.6
11.5.20	Least concern	No concern at present	5.8
11.5.4	Least concern	No concern at present	2.2
Subtotal (remnant)			**17.9**
Regrowth			
Undifferentiated			0.2
Subtotal (regrowth)			**0.2**
Cleared	-	-	0.7
Non-remnant	-	-	37.0
Total Clearing			**55.7**

4.2.2 Habitat fragmentation and landscape connectivity

Habitat fragmentation occurs when continuous areas of habitat are subdivided into several smaller, separate components. This term encompasses two interrelated components: habitat loss (i.e. a reduction in the amount of habitat) and fragmentation (i.e. the breaking apart of habitat which increases 'edge effects'). The impacts of habitat fragmentation are also scale-dependent and may differ depending on the species or community under consideration. For example, loss of small areas of habitat that do not present a significant barrier to movement by highly mobile species (e.g. birds of prey) may represent a much greater barrier to dispersal of less mobile or far-ranging species (e.g. amphibians or small reptiles). Habitat fragmentation and landscape connectivity impacts are assessed for individual species in **Section 4.5**.

To help determine whether the development of the Project will result in a SRI on connectivity (a recognised PEM under the EO Act), the Landscape Fragmentation and Connectivity (LFC) Tool was used. This tool performs a desktop assessment of development impacts on connectivity areas containing remnant vegetation to determine whether these developments are likely to result in a significant impact to regional and local vegetation connectivity. The analysis of the LFC on connectivity areas from the Project were identified as not significant, based on DETSI RE mapping and significant, based on Arrow's GTRE mapping. Therefore, the impact on connectivity areas has been determined to be 17.9 ha. The LFC outputs have been attached in **Appendix E**.

Loss of connectivity at the patch scale largely depends on the species under consideration; impacts associated with linear infrastructure corridors and waterway crossings are considered in further detail for individual threatened species (refer **Section 4.5**).

4.2.3 Impacts to hollow-bearing trees

The Greater Glider and Glossy Black-cockatoo are two species assessed as known or likely to occur in the Study area which can be described as hollow-dependant species.

The pipeline route / alignment has been designed to minimises impact to vegetation where possible and there is particular emphasis on minimising impacts to riparian vegetation through RoW minimisation and locating any temporary workspaces outside of these areas.

The importance of riparian vegetation along the major creek systems in the Study area is discussed in **Section 3.3.2** and do represent habitats that are often less impacted by historical clearing and are more likely to contain large trees due to their position in the landscape.

Habitat trees with notes on their size and hollows has been captured during the ecological survey with 31 habitat trees identified within the Project footprint. Based on the PEC report (**Appendix C - 37DY81**) of the riparian vegetation associated with Wambo Creek there are 14 large mature trees that contain hollows within remnant RE 11.3.25. This data allows the identification of Glossy Black-cockatoo habitat which requires large hollows suitable for nesting and the Greater Glider requiring large trees >30 cm DBH for foraging and > 50 cm DBH for denning (Eyre et al. 2022).

During construction hollow bearing trees, beyond the essential clearing footprint, identified from ecological survey data are flagged for retention and exclusion zones established to avoid potential impacts. Where required, clearing of hollows will be undertaken in accordance with the Arrow Energy Species Management Program (SMP) (Doc. No. ORG-ARW-HSM-PLA-00070) which authorises activities if it will impact on breeding places of protected animals, which includes relocation of hollows if breeding fauna are observed.

4.2.4 Indirect impacts

Indirect impacts on ecological values that may arise during the construction and ongoing operation of the Project include:

- Edge effects resulting from the creation of smaller patches of vegetation with a greater edge to surface ratio, including increased exposure to weed invasion, light and wind penetration (which can alter microclimate features) potentially resulting changes in community structure and composition over time;

- Dust generation during construction, which has the potential to smother plants, reducing photosynthesis and resulting in decreased vegetation health and condition;
- Increased noise from the vegetation clearing operations, the operation of machinery and vehicle traffic which may affect the behaviour of wildlife (typically limited to the construction period);
- Increased lighting during construction and operation, with the potential to disrupt the behaviour of nocturnal species, and
- Mortality resulting from vehicle collision.

Indirect impacts on the ecological values of the Project will be managed in accordance with Arrow's existing Environmental Management Framework.

4.3 Impacts on State Forests

There will be no impacts to State Forests.

4.4 Impacts on terrestrial flora values

4.4.1 Impacts on conservation significant flora species

No conservation significant flora species were identified during field surveys and will not be impacted by the Project.

4.4.2 Endangered REs by VM Class

No 'Endangered' REs by VM Status will be impacted by the Project. There is 31.7 ha of Endangered RE 11.4.3 within the study area that has been avoided.

4.4.3 Of Concern REs by VM Class

No 'Of concern' REs by VM Status were found to occur in the Study area. Impacts on RE 11.3.25 (listed as 'Of concern' by BD status) will be captured as an impact under the Environmentally Sensitive Area PEM as they qualify as a Category C ESA (refer to **Section 3.1.1**).

4.4.4 Impacts on watercourse vegetation

As part of the ecological survey the high banks of watercourses associated with the Project were mapped. The Project footprint will impact 0.5 ha of RE 11.3.25 watercourse vegetation associated with the Wambo Creek crossing.

4.5 Impacts on terrestrial fauna values

The Project will have an impact on protected wildlife habitat for the species identified as 'known to occur' or 'likely to occur' as discussed in **Section 3.3.5.3** . Habitat mapping for these species have been provided in **Figure 3.9**, **Figure 3.10**, **Figure 3.11** and **Figure 3.12**, and a summary of the Projects' impacts on habitat for these species has been provided in **Table 4.2**. Whilst the Project will impact suitable habitat for the Golden-tailed Gecko (as mapped by Arrow), this species is listed as Near Threatened and does not constitute a PEM under the EO Act and has been excluded from this summary table.

Table 4.2: Summary of the Project impacts on protected wildlife habitat

Species	Area of impact (ha)
Habitat for animals listed as endangered wildlife under the NC Act	
Brigalow Woodland Snail, *Adclarkia cameroni*	1.3
Koala, *Phascolarctos cinereus*[1]	16.1

Species	Area of impact (ha)
Greater Glider (southern and central), *Petauroides volans volans*	1.3
Grey Snake, *Hemiaspis damelii*	0
Habitat for animals listed as vulnerable wildlife under the NC Act	
Glossy Black-cockatoo (south-eastern), *Calyptorhynchus lathami lathami*	0.9
Diamond Firetail, *Stagonopleura guttata*	9.3
White-throated Needletail, *Hirundapus caudacutus*	0
Dunmall's Snake , *Furina dunmalli*	0
Habitat for animals listed as special least concern wildlife under the NC Act	
Tachyglossus aculeatus, Short-beaked Echidna	0

[1]MNES species that have impacts approved under EPBC Approval (EPBC 2018/8223)

SRI Assessments have been undertaken for these species in accordance with the *Significant Residual Impact Guidelines* (SRI Guidelines) (DEHP, 2014) for endangered, vulnerable and special least concern wildlife habitat and have been provided in the following sections. Only those species that are assessed to have a likely SRI are considered to be a PEM and subsequently included in **Table 5.2**.

The SRI Guidelines provide an explanation of some key terms used in these impact assessments, which include:

- Habitat: is the area occupied, or periodically or occasionally occupied, by any species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by the species during the different stages of their life cycles.
- Long-term decrease: and decline in a local population that is greater than which could be apparent without the action being present.
- Population: defined as an occurrence of the species in a particular area. In relation to endangered, vulnerable and special least concern species, occurrences include but are not limited to:
  - A geographically distinct regional population, or collection of local populations; or
  - A population, or collection of local populations, that occurs within a particular bioregion.

4.5.1 Impacts on habitat for endangered fauna species

4.5.1.1 Brigalow Woodland Snail (*Adclarkia cameroni*)

Construction of the Project will result in the direct loss of 1.3 ha of potentially suitable habitat for the brigalow woodland snail. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Brigalow Woodland Snail has been provided in **Table 4.3**. The distribution of potentially suitable habitat for this species is presented in **Figure 3.10**.

Table 4.3: Significant Residual Impact Assessment for the Endangered Brigalow Woodland Snail

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a population?	**Unlikely** Our limited understanding of brigalow woodland snail ecology makes determining population dynamics difficult. Whilst no historical records have been identified within the Study area, an adjacent record has been identified approximately 1 km to the north-east of the Project (Arrow, 2012). This species has been described from and is known to occur along the Condamine River floodplain which is located to the north of the Project. Numerous additional historical records have been identified within 25 km of the Project (ALA 2007). The occurrence of these records and the proximity of the Project to known populations suggests that a local population may occur within suitable brigalow habitat that has been identified within the Project area. Despite the occurrence of approximately 1.3 ha of suitable habitat, no local populations have been identified within the Study area, or within the portion of Wambo Creek that intersects with the Project area. This species has extremely limited dispersal capabilities and the construction of the Project is therefore considered unlikely to lead to a long-term decrease in the size of a population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the brigalow woodland snail is approximately 27,924 km^2 (TSSC, 2016b). The Project will require the removal of approximately 1.3 ha of suitable habitat for the brigalow woodland snail. Considering that the Project is located well within the known distribution of the Brigalow Woodland Snail and this region has already experienced localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** The current distribution of the Brigalow Woodland Snail is already highly fragmented (TSSC, 2016b). Suitable habitat for this species along the Condamine River floodplain that was once contiguous, have been extensively cleared for agriculture and farming. For the purposes of this assessment, it has been assumed that each known record represents an isolated sub-population of the Brigalow Woodland Snail, as it is very unlikely that there is movement between these records. To facilitate the construction of the Project, approximately 1.3 ha of suitable habitat will be permanently removed, rendering it unsuitable as habitat for this species. Whilst suitable habitat for this species has been identified along Wambo Creek, the surrounding landscape is highly fragmentated, and unlikely to provide additional dispersal opportunities. It is therefore considered unlikely that the removal this suitable habitat will contribute to the fragmentation experienced by local populations.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Population genetic studies are currently listed as one of the key research priorities for the Brigalow Woodland Snail suggesting that very little is known about the genetics of this species (TSSC, 2016b). For the purposes of this assessment, it has been assumed that each known record represents an isolated (potentially genetically distinct) sub-population of the Brigalow Woodland Snail, as it is very unlikely that there is movement between these records. Whilst the construction of the Project will result in the direct loss of 1.3 ha of suitable habitat for this species, no local records have been observed within this suitable habitat, or along the section of Wambo Creek that intersects within the Project area. Furthermore, the surrounding landscape is already highly fragmentated, suggesting that dispersal outside of this riparian corridor is unlikely. It is therefore considered unlikely that the construction of the Project will result in genetically distinct populations forming as a result of habitat isolation.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Several invasive species have been identified as conservation and management priorities for the Brigalow Woodland Snail, including Buffel Grass (*Cenchrus ciliaris*), Feral Pigs (*Sus scrofa*) as well as introduced rat and mice species (TSSC, 2016b). The occurrence of these pest and weed species has been well documented in the region surrounding the Project area. To help manage pest species across the Project, Arrow have developed an overarching pest management strategy and developed a Biosecurity Procedure for the broader SGP. This procedure will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. This is supported by the Vehicle, Machinery, Equipment and Loads Hygiene Procedure to minimise the spread of Buffel Grass and other invasive species listed under the *Biosecurity Act 2014*. It is therefore considered unlikely that the Project will result in invasive species being established.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as threatening processes for the Brigalow Woodland Snail. It is considered unlikely that the construction and ongoing operation of the Project will introduce any that could cause potential populations to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The Conservation Advice for the Brigalow Woodland Snail (TSSC, 2016b), lists preventing clearing of brigalow habitat and in other areas where this species may occur within its range, retaining a buffer of native vegetation and leaf litter around records of the species and controlling Buffel Grass infestations as priority conservation and recovery objectives. Arrow have developed a WMP that has general vehicle hygiene requirements that will be followed during the construction and operational phases of the Project to help manage the spread or Buffel Grass. Despite this however, the Project will require the removal of 1.3 ha of suitable habitat for this species (riparian vegetation along Wambo Creek) which is likely to interfere with the recovery of this species, especially considering the Projects' location within the known distribution of the brigalow woodland snail.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** It is assumed that each known record, or group of records, represents an isolated sub-population of the Brigalow Woodland Snail, as it is very unlikely that there is movement between these records. Additionally, the areas identified as suitable habitat for brigalow woodland snail are regional ecosystems containing *Acacia harpophylla* (brigalow) which is a key requirement for the species, as described in the Conservation Advice (TSSC, 2016b). Given the limited understanding of this species' ecology, including breeding, feeding, and dispersal requirements, it is difficult to define ecologically significant locations for Brigalow Woodland Snail. Considering the absence of any local records of the Brigalow Woodland Snail within the study area however, it is unlikely that the Project will disrupt any ecologically significant locations for this species.
It is considered **Likely** that the Project will have a significant residual impact on the Brigalow Woodland Snail.	

4.5.1.2 Greater Glider (central and southern) (*Petauroides volans sensu lato*)

Construction of the Project will result in the direct loss of 1.3 ha of potentially suitable habitat for the Greater Glider. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Greater Glider has been provided in **Table 4.4**. Suitable habitat mapping for this species has been provided in **Figure 3.11**.

Table 4.4: Significant Residual Impact Assessment for the Endangered Greater Glider

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a population?	**Unlikely** Whilst no greater gliders have been observed within the Study area, historical records in the surrounding landscape suggest that local populations may be present. This species has a broad distribution through eastern Australia with local populations occurring along the Condamine River floodplain approximately 40 km to the north-west (ALA 1999), to the south of Kogan approximately 14 km to the south-east (Arrow 2011) and within Barakula State Forest approximately 65 km to the north (ALA 2000). This species is largely restricted to eucalypt forests and woodlands, preferably taller montane moist eucalypt forests which provide suitable denning and foraging habitat (DCCEEW, 2022b). Whilst the northern portion of the Study area is located within predominantly cleared pastoral land, the southern portion of the Study area contains suitable habitat for this species. Whilst construction and ongoing operation of the Project will require the removal of 1.3 ha of suitable habitat, no residential populations have been identified. It is therefore considered unlikely that the Project will lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the Greater Glider is approximately 752,962 km^2 (DCCEEW, 2022b). Considering that the Project is situated well within the known distribution of the Greater Glider and this region is already experiencing localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikley** Greater Gliders are known to be sensitive to habitat fragmentation. Although they have small home ranges, their low reproductive rate and sensitivity to disturbance means they tend to become locally extinct in small and fragmented habitat patches (Eyre, et al., 2022). Greater Gliders typically move through woodland and forest habitat by gliding from tree-to-tree without coming to ground. They are capable of maximum glide angle of between 31 to 40 degrees from horizontal (Eyre, et al., 2022). Therefore, if trees are less than 30 m high, Greater Gliders are unlikely to cross clearings greater than 50 m, and if trees were less than 20 m high, the animals would be unlikely to cross clearings > 30 m. The disturbance footprint of the Project will require the clearing of a ~30 m wide corridor, which should not affect the dispersal capabilities of any potentially occurring local greater glider populations. Additionally, tree hollows will be retained wherever possible to limit the Project's impacts on habitat for this species. Additionally, to further reduce the effects of habitat fragmentation, the Project has been collocated

SRI Criteria	Project Response
	with existing CSG infrastructure wherever possible, however the surrounding landscape is already highly fragmentated. Despite this however, the construction of the Project will result in new areas of disturbance that will contribute to the fragmentated nature of the surrounding landscape. Whilst no local greater glider populations have been identified, the abundance of suitable habitat and occurrence of records in the broader landscape, suggests that a local population could occur. Considering the nature of the proposed infrastructure, it is unlikely that the construction and ongoing operation of the project will contribute significantly to the habitat fragmentation already present in the surrounding landscape.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** The Greater Glider has been split into two genetically distinct populations: a southern & central population (*Petauroides volans volans* in Queensland) and a northern population (*P. v. minor*). The central & southern population and northern population are geographically distinct with the former occurring from Proserpine southwards throughout south-eastern Australia, and the latter occurring from Mt Windsor Tableland to Townsville (DCCEEW, 2022b). The Project is located well within the known distribution of the southern & central subspecies. Considering the nature of the proposed infrastructure, it is unlikely that the construction and ongoing operation of the project will contribute significantly to the habitat fragmentation which could result in the formation of genetically distinct populations.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Predation by Feral Cats (*Felis catus*) and European Red Foxes (*Vulpes vulpes*) are listed as potential threatening processes for the Greater Glider (DCCEEW, 2022b). It is considered unlikely that the construction and ongoing operation of the Project will result in these species becoming established in the area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a Biosecurity Procedure for the broader SGP. This procedure will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as threatening processes for the Greater Glider. It is considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause the population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The conservation advice for the Greater Glider (DCCEEW, 2022b) lists protecting areas of suitable habitat, restoring habitat and connectivity and minimising prescribed burning as priority conservation and recovery objectives. The implementation of bushfire mitigation strategies across the Project will be undertaken in accordance with those already established for the broader SGP. These have been designed to account for both underground and above-ground

SRI Criteria	Project Response
	infrastructure so that bushfire risks are appropriately mitigated for the construction and operational phases of the Project. Despite this however, the Project will require the removal of 1.3 ha of potentially suitable habitat for the Greater Glider, which could interfere with the recovery of this species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** Habitat mapping based on RE associations alone (without accounting for tree size and hollow availability) is likely to overestimate the extent of preferrable habitat for the greater glider in the Study area. Observations made within these areas of suitable habitat have confirmed the presence of numerous hollow bearing trees which are a critical microhabitat feature required by this species. Approximately 14 large mature trees containing hollows were identified, which supports the habitat mapping for this species. Despite this however, no locally occurring records of the greater glider have been identified within the Project area suggesting that the construction and ongoing operation of the Project is unlikely to affect any current ecologically significant locations.
It is considered **likely** that the Project will have a significant residual impact on the Greater Glider.	

4.5.1.3 Koala (*Phascolarctos cinereus*)

Construction of the Project will result in the direct loss of 16.1 ha of potentially suitable habitat for the Koala. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Koala has been provided in **Table 4.5**. Suitable habitat mapping for this species can be found in **Figure 3.11**.

Table 4.5: Significant Residual Impact Assessment for the Endangered Koala

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** Numerous records of a local koala population have been identified within the Study area, the most recent was recorded in 2018 (Arrow). The presence of these records, and historical records in the broader landscape indicates the strong presence of a local population. Koalas are reported to utilise more than 400 different tree species for their food and habitat requirements (DAWE, 2022) resulting in all vegetated areas being mapped as potential habitat for this species. To facilitate the construction and ongoing operation of the Project, 16.1 ha of suitable habitat for the koala will be removed Unlike other forms of infrastructure focussed on a single site, the impacts of linear infrastructure on habitat are somewhat dispersed meaning that areas of suitable habitat remain in any given location along the corridor. Clearing will therefore be dispersed over the full length of the Project footprint with abundant suitable habitat remaining beyond the Project footprint. Considering that an abundance of suitable habitat will remain unaffected in the surrounding landscape, it is unlikely that the construction and ongoing operation of the Project will lead to a long-term decrease in the size of the local koala population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the Koala is approximately 1,665,850 km^2 (DAWE, 2022a). Whilst the Project will require the removal of approximately 16.1 ha of suitable habitat for this species, this impact only represents a fraction of the total habitat available to this species within the broader landscape. Considering that the Project is situated well within the known distribution of the Koala and this region is already experiencing localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** Whilst koalas are known to be sensitive to habitat loss resulting from land clearing (DAWE, 2022) they are capable of dispersing between areas of suitable habitat distance. In addition to regular movements across the ground between trees within their own home ranges, koalas, particularly subadult males but also females, are known to disperse across distances of 1 to 3 km but sometimes over 10 km (Melzer 1995; White 1999; Dique et al. 2003a; Matthews et al. 2016). Establishment of the overall RoW for the Project and other co-located pipelines will result in the creation of a corridor which is approximately 70 m wide. This distance is navigable by individual Koalas and is not likely to fragment the local population.
Are impacts to suitable habitat likely to result in	**Unlikely**

SRI Criteria	Project Response
genetically distinct populations forming as a result of habitat isolation?	Conservation advice for the Koala (DAWE, 2022a) has identified four spatially distinct, genetic koala management units, including: • QLD and NSW populations north of the Clarence River Valley, NSW; • South of the Clarence River Valley, NSW to north of the Sydney Basin; • South of the Sydney Basin to approximately the NSW/VIC boarder, and • VIC and SA populations Given the Project's location within the QLD and NSW Koala management unit, any localised habitat fragmentation is unlikely to result in a genetically distinct subpopulation from forming. Koalas are more than capable of traversing the ROW and associated infrastructure areas (Youngentob, Marsh, & Skewes, 2021), indicating that this ROW is unlikely to fragment an existing population. It is therefore unlikely that the construction of the Project will result in genetically distinct populations from forming from habitat isolation.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Predation by Feral Dogs (*Canis sp.*) is listed as a key threatening process for the Koala (DAWE, 2022a). It is considered unlikely that the construction and ongoing operation of the Project will result in this species becoming established in the area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** The Koala retrovirus and Chlamydia (*Chlamydia percorum*) are known to be present within Koala populations (DAWE, 2022a). They can be a major contributor to population decline and reduction in population viability. It is currently unknown whether these diseases are present within the local population of Koalas that have been identified within the Study area, but it is considered unlikely that the construction and ongoing operation of the Project will introduce these diseases to local populations, or exacerbate any preexisting diseases that may already be present. Whilst the prevalence of these diseases has been found to increase following localised habitat loss and fragmentation, the scale of the Projects' impacts on suitable habitat for this species is considered unlikely to trigger such outbreaks. It is therefore considered unlikely that the Project could introduce diseases that could cause populations to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** Given the high-profile nature of the Koala there is an abundance of conservation advice and recovery objectives documented for this species. Both the National Recovery Plan for the Koala (DAWE, 2022b) and the South-East Queensland Koala Conservation Strategy 2020-2025 (DES, 2020) lists ecosystem health and habitat protection as priority conservation objectives. Considering that the construction of the Project will require the removal of 16.1 ha of potentially suitable habitat for the Koala, it is therefore considered likely that this action could interfere with the recovery of the species.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Likely** Koalas are reported to utilise more than 400 different species of tree for their food and habitat requirements (DAWE, 2022a) resulting in all vegetated areas within the Study area being mapped as potential habitat for this species. Breeding, feeding and resting sites for Koalas are not location-specific and will be dispersed across habitat throughout the Study area, though there is some evidence that Koalas have a preference for individual trees in any given area of habitat (DAWE, 2022a). Considering that the development of the Project will result in the removal of 16.1 ha of potentially suitable habitat for the Koala, it is likely that the Project will disrupt ecologically significant locations for this species.
It is considered **likely** that the Project will have a significant residual impact on the Koala.	

4.5.1.4 Grey Snake (*Hemiaspis damelii*)

Whilst suitable habitat has been identified for the grey snake within the broader Study area, the construction of the Project will not result in any direct impacts to suitable habitat for this species. Regardless of this, an assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Grey Snake has been provided in **Table 4.6**. Suitable habitat mapping for this species can be found in **Figure 3.12**.

Table 4.6: Significant Residual Impact Assessment for the Endangered Grey Snake

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a population?	**Unlikely** The presence of Grey Snake records in the region surrounding the Study area suggests that local population may occur within suitable habitat mapped in the broader Study area. The nearest record is approximately 1 km to the north-east (Arrow 2012). The construction and ongoing operation of the Project will not impact and suitable habitat for this species. Grey snakes are cryptic species that are typically only active for a few hours after sunset where they forage for prey (frogs) within soil cracks, in the open or beneath vegetation, typically during warmer weather and especially after heavy rain (DCCEEW, 2022a). Several areas of suitable habitat have been identified for this species within the Study area, all of which contained cracking soils or Gilgai's which are key habitat features for this species. This suitable habitat was restricted to the northern portion of the Study area which contains isolated patches of vegetation surrounded by cleared pastoral land. Considering the cryptic nature of this species and the highly fragmentated nature of suitable habitat within the Study area, it is considered unlikely that the construction and ongoing operation of the Project could lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the grey snake is approximately 471,500 km^2 (DCCEEW, 2022a). Whilst several patches of suitable habitat have been identified for this species within the broader Study area, these patches are completely isolated from other larger tracts of suitable habitat that have been identified in the broader landscape. Furthermore, the Project will not directly impact any mapped habitat for this species. Considering that the Project is situated well within the known distribution of the grey snake and this region is already experiencing localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** The overall grey snake population is considered severely fragmented due to specific ecological constraints. Moreover, intra-population fragmentation is caused by agricultural practices removing suitable habitat (DCCEEW, 2022a). There is currently no information available about home range and dispersal ability of the grey snake, however based on the information available from other Australian elapids, it is inferred that the Grey Snake is likely to have little capacity to move between isolated populations (DCCEEW, 2022a). During the design stages of this Project, Arrow has also attempted to co-locate this pipeline with existing linear infrastructure to further reduce the effects of habitat fragmentation. Localised fragmentation may occur during construction activities, however once these areas have been constructed and rehabilitated, these areas are unlikely to represent ongoing physically barriers to the movement of local grey snake populations. It is therefore considered unlikely that the Project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Although it is considered that there is considerably little gene flow among isolated and fragmented populations (DCCEEW, 2022a), localised intra-population dispersal may still occur. Project infrastructure is unlikely to physically inhibit the dispersal of locally fragmented populations. Given the Project's location within the QLD and NSW grey snake distribution, any localised habitat fragmentation is unlikely to result in a genetically distinct population from forming.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Predation by Feral Cats (*Felis catus*) and European Red Foxes (*Vulpes vulpes*), and habitat destruction by Feral Pigs (*Sus scrofa*) are listed as potential threatening processes for the grey snake (DCCEEW, 2022a). It is considered unlikely that the construction and ongoing operation of the Project will result in these species' becoming established in the area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as threatening processes for the grey snake. It is therefore considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause the population to decline.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Unlikely** The conservation advice for the Grey Snake (DCCEEW, 2022a), lists protecting habitat from destruction and controlling invasive species as priority conservation and recovery objectives. Considering that the construction and ongoing operation of the Project will not require the removal of any suitable habitat for the grey snake, it is unlikely that this action will interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** Whilst several nearby populations of grey snakes have been confirmed in proximity to the Study area, the presence of a local population has not been verified. Given that the occurrence of grey snakes is limited to specific microhabitats (i.e. cracking soils near alluvial systems), it is reasonable to assume that any suitable habitat mapped for this species could be utilised for breeding and/or foraging activities. While suitable habitat for this species has been mapped within the broader Study area, the construction and ongoing operation of the Project will not disturb these areas. The Project is therefore considered unlikely to impact any ecologically significant locations for this species.
It is considered **Unlikely** that the Project will have a significant residual impact on the Grey Snake.	

4.5.2 Impacts on habitat for vulnerable fauna species

4.5.2.1 Dunmall's Snake (*Furina dunmalli*)

Whilst suitable habitat has been identified for Dunmall's snake within the broader Study area, the construction of the Project will not result in any direct impacts to suitable habitat for this species. Regardless of this, an assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for Dunmall's snake has been provided in **Table 4.7**. Suitable habitat mapping for this species can be found in **Figure 3.12**.

Table 4.7: Significant Residual Impact Assessment for the Vulnerable Dunmall's snake

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a population?	**Unlikely** The presence of Dunmall's snakes in the region surrounding the Study area suggests that there may be sufficient suitable habitat to support a local population of this species. The nearest record is approximately 13 km to the north-west (ALA 2000). The construction and ongoing operation of the Project will not impact and suitable habitat for this species. Whilst little is known about this cryptic species, captive specimens have indicated that they are nocturnal and are likely to shelter under fallen timber and in deep soil cracks and other cavities (DOE, 2014). Their diet is thought to consist primarily small skinks and geckos. Patches of RE 11.4.3 (dominated by *Acacia harpophylla*) within the Study area have been identified as suitable habitat for this species. This suitable habitat was restricted to the northern portion of the Study area which contains isolated patches of vegetation surrounded by cleared pastoral land. Considering the cryptic nature of this species, the absence of records from the Study area and the highly fragmentated nature of suitable habitat, it is considered unlikely that the construction and ongoing operation of the Project could lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). Whilst the extent of occurrence for this species has not been formally calculated as part of its conservation advice, it is estimated to be approximately 169,262 km^2 using the built-in ALA tool (ALA 2024). Whilst several patches of suitable habitat have been identified for this species within the broader Study area, these patches are completely isolated from other larger tracts of suitable habitat that have been identified in the broader landscape. Furthermore, the Project will not directly impact any mapped habitat for this species. Considering that the Project is situated well within the known distribution of the grey snake and this region is already experiencing localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** The broader distribution of Dunmall's snakes across its known range has been severely fragmentated by broadscale land clearing and habitat modification (DOE, 2014). Habitat preferred by this species continues to be extensively modified through clearing for agriculture or pasture, overgrazing by stock and urban development. There is currently no information available about home range and dispersal capabilities of the Dunmall's snake, however based on the information available from other Australian elapids, it is inferred that this species is likely to have little capacity to move between isolated populations. During the design stages of this Project, Arrow has also attempted to co-locate this pipeline with existing linear infrastructure to further reduce the effects of habitat fragmentation. Localised fragmentation may occur during construction activities, however once these areas have been constructed and rehabilitated, these areas are unlikely to represent ongoing physically barriers to the movement of local Dunmall's snake populations. It is therefore considered unlikely that the Project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Although it is considered that there is considerably little gene flow among isolated and fragmented populations (DCCEEW, 2022a), localised intra-population dispersal may still occur. Project infrastructure is unlikely to physically inhibit the dispersal of locally fragmented populations. Given the Project's location within the QLD and NSW Grey Snake distribution, any localised habitat fragmentation is unlikely to result in a genetically distinct population from forming.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Predation by feral animals has been listed as a threatening process for the Dunmall's snake (DOE, 2014). It is considered unlikely that the construction and ongoing operation of the Project will result in feral species becoming established in the Study area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as potential threatening processes for the Dunmall's snake. It is therefore considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause the population to decline.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Unlikely** The conservation advice for the Dunmall's snake (DOE, 2014), lists several local priority actions to support the recovery of this species including: • Minimise adverse impacts from land use (in the form of habitat loss, disturbance and modification) at known sites • Ensure land owners/managers use appropriate management regimes and stocking density to reduce trampling by livestock • Continue baiting and population control measures for feral animals. Considering that the construction and ongoing operation of the Project will not require the removal of any suitable habitat for Dunmall's snake, it is unlikely that this action will interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** Whilst a nearby population of Dunmall's snake have been confirmed in proximity to the Study area, the presence of a local population has not been verified. Given that the occurrence of this species is limited to suitable habitat with specific microhabitat features (i.e. fallen timber and in deep soil cracks and other cavities), it is reasonable to assume that any suitable habitat mapped for this species could be utilised for breeding and/or foraging activities. While suitable habitat for this species has been mapped within the broader Study area, the construction and ongoing operation of the Project will not disturb these areas. The Project is therefore considered unlikely to impact any ecologically significant locations for this species.
It is considered **Unlikely** that the Project will have a significant residual impact on the Dunmall's snake.	

4.5.2.2 Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)

Construction of the Project will result in the direct loss of 0.9 ha of potentially suitable habitat for the Glossy Black-cockatoo. An assessment undertaken in accordance with the SRI Guideline (DEHP, 2014) for the Glossy Black-cockatoo has been provided in **Table 4.8**. Suitable habitat mapping for this species can be found in **Figure 3.9**.

Table 4.8: Significant Residual Impact Assessment for the Vulnerable Glossy Black-cockatoo

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** No glossy black-cockatoo records have been observed within the Study area, however, the occurrence of numerous records in the region surrounding the project suggests that local populations may utilise nearby suitable habitat. The nearest historical record of this species is approximately 9.5 km to the south-east (ALA 1983). Whilst the construction and ongoing operation of the Project will require the removal of approximately 0.9 ha of suitable habitat for this species, they are highly dispersive and any individuals using the Study area are likely to occupy a far greater home range. It is unlikely that any population would rely heavily on the limited suitable habitat identified within the Project footprint for the entirety of its resource needs. It is therefore unlikely that the Project will lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the glossy black-cockatoo is approximately 470,000 km^2 (DCCEEW, 2022). Whilst the Project will require the removal of approximately 0.9 ha of suitable habitat for this species, they are highly dispersive and any individuals using the Study area are likely to occupy a far greater range. It is unlikely that any population would rely heavily on suitable habitat within the Project footprint for the entirety of its resource needs. Project impacts are therefore considered unlikely to reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** Glossy black-cockatoos' are known to be susceptible to habitat fragmentation (DCCEEW, 2022), however they are also highly mobile and capable of traveling considerable distances to isolated fragments in search of food. The region surrounding the Project is already highly fragmented from pastoral activities and existing CSG infrastructure. Given the Projects location within a large tract of contiguous vegetation, and its proximity to several State Forests, it is unlikely that the removal of 0.9 ha of suitable habitat for this species could result in substantial habitat fragmentation for this species. It is therefore considered unlikely that the project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Glossy black-cockatoos have already been broken up into three genetically distinct distinct subspecies: *C. l. lathami* (south-eastern), *C. l. halmaturinus* (King Island), and *C. l. erebus* (northern). The location of the Project is situated within the core range of the south-eastern subspecies. Additionally, the high mobility of this species suggests

SRI Criteria	Project Response
	that the construction of Project is unlikely to present a significant barrier to this species' movement. It is therefore unlikely that the construction of the Project will result in genetically distinct populations from forming from habitat isolation.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Localised fragmentation and the removal of HBT may increase predation of nestlings or result in higher competition for hollows by 'edge' species such as the common brushtail possum (DCCEEW, 2022). The Project is not expected to introduce and new invasive species to the Study area, nor are any established invasive species such as cats, foxes and invasive weeds, likely to pose a threat to resource accessibility. Regardless of this, Arrow have developed a PMP for the broader SGP. This WPMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. This WPMP will also include hygiene procedure to minimise the spread of Buffel Grass and other invasive species listed under the Biosecurity Act 2014. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** Psittacine Beak and Feather Disease (PBFD) is a potentially fatal disease caused by psittacine circovirus, typically transferred between adults, nestlings and contaminated nest hollows. Although glossy black-cockatoos are susceptible to PBFD, the threat level is relatively low compared to other threats (DCCEEW, 2022). While the loss of nest hollows can lead to greater competition, and thus an increased likelihood of transmission, impacts to suitable habitat for this species (0.9 ha) are relatively small and unlikely to result in a significant loss of hollows or impinge on connectivity with surrounding habitat and hollows. It is considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause the local population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The Conservation Advice for glossy black-cockatoo (DCCEEW, 2022) lists protecting, restoring and enhancing the quality of known suitable habitat, maintaining connectivity, increasing hollow availability and appropriate fire regimes as priority conservation and recovery objectives for this species. Arrow will implement bushfire mitigation strategies across the Project in accordance with those already established for the broader SGP. These have been designed to account for both buried infrastructure and exposed vents/drains so that during the construction and operational phases of the Project, bushfire risks are mitigated. Whilst the Project will require the removal of 0.9 ha of suitable habitat for this species, when compared to the abundance of suitable habitat remaining within the surrounding region, this impact only represents a small loss of habitat. To reduce and mitigate this impact Arrow have attempted to collocate this pipeline with existing linear infrastructure to further reduce the effects of habitat fragmentation. Therefore, whilst the Project is likely to interfere with the recovery of the glossy black-cockatoo, these impacts are not considered to be significant for the broader population.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Possible** The glossy black-cockatoo rely on nine species of she-oaks (*Allocasuarina spp*. and *Casuarina spp*.) for feeding. In south-east Queensland, they show preference for Black Sheoak (*A. littoralis*) and Forest Sheoak (*A. torulosa*) for foraging resources and they prefer Narrow-leaved Ironbark (*Eucalyptus crebra*) for nesting hollows (DCCEEW, 2022). Whilst the Project will require the removal of 0.9 ha of suitable habitat for the glossy black-cockatoo, this species has not been recorded within the Study area, and the nearest record is approximately 9.5 km to the south-east. This suggests that there are no active ecological significant locations within the Project area, however they cannot be discounted entirely. Therefore, whilst the Project may interfere with ecologically significant locations for the glossy black-cockatoo, these impacts are not considered to be significant for the broader population.
It is considered **Likely** that the Project will have a significant residual impact on the Glossy Black-cockatoo.	

4.5.2.3 Diamond Firetail (*Stagonopleura guttata*)

Construction of the Project will result in the direct loss of 9.3 ha of potentially suitable habitat for the diamond firetail. An assessment undertaken in accordance with the SRI Guideline (DEHP, 2014) for the diamond firetail has been provided in **Table 4.10**. Suitable habitat mapping for this species can be found in **Figure 3.9**.

Table 4.9: Significant Residual Impact Assessment for the Vulnerable diamond firetail

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** Whilst no diamond firetails have been observed within the Study area, there are historical records in the vicinity of the Project, indicating that a local population may be present. The nearest (dated) record to the Project is approximately 36 km to the south-east (ALA 2024). Diamond firetails are thought to be sedentary, through some populations have been recorded locally suggesting that this species may be less susceptible to localised fragmentation (DCCEEW, 2023). Whilst the construction and ongoing operation of the Project will require the removal of approximately 9.3 ha of suitable habitat, the absence of local records from within the Study area and the linear nature of the proposed disturbance suggests that this impact is unlikely to result in a long-term decrease in the size of a potentially occurring local population
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the diamond firetail is approximately 1,500,000 km^2 (DCCEEW, 2023). Whilst the Project will require the removal of approximately 9.3 ha of suitable habitat for this species, they are able to use a wide range of habitats for foraging and nesting, and an abundance of suitable habitat will remain within the Project area and broader landscape. It is unlikely that local population would rely solely on the suitable habitat identified within the Project footprint for the entirety of its resource needs. Project impacts are therefore considered unlikely to reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** Some diamond firetail populations have been recorded dispersing locally, suggesting that this species may be less susceptible to localised fragmentation (DCCEEW, 2023). The landscape surrounding the Study area, whilst containing large tracts of intact remnant vegetation, has been subjected to ongoing historical disturbance to support pastoral activities and existing CSG infrastructure. Given the linear nature of the proposed disturbance and the absence of records within the Study area, it is considered unlikely that the construction and ongoing development of the Project is likely to effectively fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** There are currently no known subspecies of diamond firetail, and all individuals are considered to belong to the same genetic population. Some diamond firetail populations have been recorded dispersing locally, suggesting that this species may be less susceptible to localised fragmentation (DCCEEW, 2023). Given the linear nature of the proposed disturbance, and their ability to disperse locally, it is considered unlikely that the construction and ongoing operation of the

SRI Criteria	Project Response
	Project could lead to a genetically distinct population forming as a result of habitat fragmentation.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Habitat degradation from European rabbits (Oryctolagus cuniculus) and exotic weeds are listed as threatening processes for the diamond firetail (DCCEEW, 2023). It is considered unlikely that the construction and ongoing operation of the Project will result in these feral species becoming established in the Study area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as threatening processes for the diamond firetail. It is considered unlikely that the construction and ongoing operation of the Project will introduce any that could cause potential populations to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The conservation advice for the diamond firetail (DCCEEW, 2023) lists retaining and protecting woodland, open forest, grassland and mallee habitat from clearing and fragmentation as a key conservation objective for this species. Considering that the construction of the Project will require the removal of 9.3 ha of potentially suitable habitat for the diamond firetail, it is therefore considered likely that this action could interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Possible** Diamond firetails are known to utilise a wide range of habitat types including eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees (DCCEEW, 2023). Their ability to utilise such a wide range of habitats suggests that any suitable habitat identified for this species, could constitute an ecologically significant location. Despite the occurrence of 9.3 ha of suitable habitat for the diamond firetail, this species has not been recorded within the Study area, and the nearest (dated) record is approximately 36 km to the south-east. This suggests that there are no active ecological significant locations within the Project area, however they cannot be discounted entirely. Therefore, whilst the Project may interfere with ecologically significant locations for the diamond firetail, these impacts are not considered to be significant for the broader population.
It is considered **Likely** that the Project will have a significant residual impact on the Glossy Black-cockatoo.	

4.5.2.4 White-throated Needletail (*Hirundapus caudacutus*)

To determine whether the Project will have a significant residual impact on this species, an assessment of potential impacts against the Significant Residual Impact Guidelines (DEHP, 2014) for this vulnerable species has been undertaken, the results of which are provided in **Table 4.11**.

Table 4.10: Assessment of significant residual impacts for the Vulnerable white-throated needletail

SRI Criteria	Project Response
Is the action likely to lead to a long-term decrease in the size of a local population?	**Unlikely** The occurrence of historical records adjacent to the Study area indicates that the broader SGP Project is utilised by a portion of the global population of white-throated needletails during their non-breeding season. The nearest record is approximately 3 km to the north-west (Arrow 2018). Whilst the development of the Project will require the removal vegetation within the Project footprint, these terrestrial impacts are unlikely to affect the availability of aerial foraging habitat for this species. When roosting, white-throated needletails prefer dense roosting habitat (TSSC, 2019). The structural category of REs as listed in the Regional Ecosystem Description Database (REDD) provides a useful proxy, with 'dense' REs indicating potential roosting habitat. A review of the ground-truthed REs within the Project footprint indicated that there is unlikely to be any suitable roosting habitat for this species. It is therefore considered unlikely that development of the Project will lead to a long-term decrease in the size of a local population.
Is the action likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The extent of occurrence for the White-throated Needle encompasses the entirety of Australia which is approximately 7.7 million km^2 (TSSC, 2019; ALA, 2024). Whilst the construction and ongoing operation of the Project will require the removal of vegetation within the Project footprint, these terrestrial impacts are unlikely to affect the availability of aerial foraging habitat for this species. Additionally, no suitable roosting habitat has been identified within the Study area. It is therefore considered unlikely that the Projects' terrestrial impacts will reduce the extent of occurrence for this species.
Is the action likely to fragment an existing population?	**Unlikely** The landscape within the Study area has already been partly fragmented from by pastoral activities and existing CSG infrastructure. Based on available aerial imagery, this fragmentation dates back to at least the early 1950s (QI, 2025). Considering the aerial nature of this species, terrestrial fragmentation is unlikely to affect the dispersal capabilities of this species as they move through the surrounding landscape. Whilst the construction and ongoing operation of the Project will contribute to the general terrestrial fragmentation of the surrounding landscape, no suitable roosting habitat for this species has been observed within the Study area. It is

SRI Criteria	Project Response
	therefore considered unlikely that the construction and ongoing operation of the Project will fragment an existing population of White-throated Needletails.
Is the action likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** There are currently two recognised subspecies of White-throated Needletail (*H.c. nudipes* and *H.c. caudacutus*) (TSSC, 2019). *H.c caudactus* is the only subspecies known to overwinter in Australia. Whilst extensive genetic studies have not yet been conducted on this species, it is believed that all individuals found in Australia belong to a single genetic population. Furthermore, no suitable roosting habitat for this species has been mapped within the Study area and terrestrial fragmentation resulting from the Project is unlikely to isolate any locally occurring populations. It is therefore considered unlikely that the construction and ongoing operation of the Project will result in genetically distinct populations forming.
Is the action likely to result in invasive species that are harmful to the endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Whilst numerous invasive flora and fauna species have been observed across the broader SGP Project, there are currently no invasive species listed as threatening processes for the White-throated Needletail (TSSC, 2019). Regardless of this, to help manage pest species across the Project, Arrow have developed an overarching pest management strategy and Pest Management Plan (PMP) for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint, including the Black Rat. It is therefore considered unlikely that the construction and ongoing operation of the Project will result in any invasive species becoming established.
Is the action likely to introduce disease that may cause the population to decline?	**Unlikely** The conservation advice does not list any diseases as threatening processes for the White-throated Needletail (TSSC, 2019). It is therefore considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause this species to decline.
Is the action likely to interfere with the recovery of the species?	**Unlikely** There are currently no recovery or management objectives listed for the White-throated Needletail in the conservation advice (TSSC, 2019). Considering the aerial nature of this species, and the fact that they are a non-breeding migrant to Australia, it is conceivable that the protection of suitable roosting sites may become a recovery objective for this species. Given their aerial nature and ability to forage above most vegetated areas, it is unlikely that impacts to foraging habitat is likely to become a recovery objective for this species. No suitable roosting habitat for this species has been mapped within the Study area. Whilst the development of the Project will require the removal of terrestrial vegetation, these impacts are unlikely to impact the aerial foraging habitat above these communities. It is therefore considered unlikely that the construction and ongoing operation of the Project will interfere with the recovery of this species.

SRI Criteria	Project Response
Is the action likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** Considering the abundance of historical records adjacent to the Project, the Study area can be considered an ecologically significant location for the White-throated Needletail as it supports and abundance foraging opportunities for this species. Given their aerial nature, terrestrial impacts to vegetation communities are unlikely to affect the foraging opportunities for this species. Furthermore, no suitable roosting habitat has been identified within the Study area. It is therefore considered unlikely that impacts to support the construction and ongoing operation of the Project will disrupt an ecologically significant location for the White-throated Needletail.
It is therefore considered **unlikely** that the Project will have a significant residual impact on the White-throated Needletail.	

4.5.3 Impacts on habitat for Special Least Concern species

4.5.3.1 Short-beaked Echidna (Tachyglossus aculeatus)

Construction of the Project will not result in any direct loss of potentially suitable habitat for the short-beaked echidna. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the short-beaked echidna has been provided in **Table 4.12**. The distribution of potentially suitable habitat for this species is presented in **Figure 3.11**.

Table 4.11: Significant Residual Impact Assessment for the Special Least Concern short-beaked echidna

SRI Criteria	Project Response
Are impacts to suitable habitat likely to result in a long-term decrease in the size of a local population?	**Unlikely** The presence and abundance of short-beaked echidna records in the region surrounding the Study area suggests that there is sufficient suitable habitat to support a local population of this species. The nearest record is approximately 5 km to the north-west (ALA 2008). Whilst the construction of the Project will not result in any direct loss of potentially suitable habitat for this species, they are capable of utilising a broad range of habitats including forests and woodlands, heaths, grasslands and arid environments (BHA, 2024), suggesting that there is an abundance of suitable habitat in the surrounding landscape. Whilst designing the Project, Arrow have attempted to co-locate this linear infrastructure with other linear infrastructure and avoid vegetated areas wherever possible and to avoid further fragmentation of non-remnant habitat. Given the scale and type of disturbance associated with linear infrastructure, the construction and ongoing operation of the Project is not likely to permanently displace echidnas from the Study area. It is therefore unlikely that the Project will lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to result in a reduced extent of occurrence for the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). Whilst a formal assessment of the short-beaked echidna's extent of occurrence hasn't been undertaken, the EOO tool embedded in the Atlas of Living Australia (ALA) indicates that the extent of occurrence for this species is will cover the entire Australian landmass. The Project will not result in any direct loss of potentially suitable habitat for the short-beaked echidna. The Project impacts on 17.9 ha of remnant vegetation and 0.2 ha of regrowth vegetation and this only represents only a fraction of the suitable habitat identified in the Study area. Considering the distribution of this species throughout Australia and the localised habitat fragmentation already present within the broader Study area, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to result in fragmentation of an existing population?	**Unlikely** The short-beaked echidna forages at ground level and it may travel considerable distances through fragmentated landscapes in search of food (BHA, 2024). Arrow co-located the Project RoW with other linear infrastructure to minimise the impact of the overall construction RoW wherever possible. Given the scale and type of impact required for this Project (i.e. linear infrastructure 18-29 m wide), development at this location is not likely to impact dispersal of the echidna. Whilst dispersal opportunities may be impacted during the construction of the project (i.e. trenching and storage of infrastructure above ground), once constructed the project is not likely to physically inhibit the dispersal of the echidna throughout the Study area. It is therefore considered unlikely that the Project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** The short-beaked echidna is a very widespread species, colonising most of the Australian mainland. The development and ongoing operation of the Project does not completely dissect or isolate a population or populations, nor will it physically inhibit echidnas from travelling between fragmented areas of suitable habitat. It is unlikely that impacts to suitable habitat will isolate populations of the Short-beaked Echidna to the extent that genetically distinct populations will be formed.
Are impacts to suitable habitat likely to result in disruption to ecologically significant locations (breeding, feeding or nesting sites) or a species?	**Unlikely** The Short-beaked Echidna is widespread and occupies are a variety of vegetation types, allowing it to remain fairly non-specialised. A key requirement for this species is the availability of day shelters. Day shelters can consist of a variety of habitat structures, such as hollow logs, rabbit burrows, depressions in the ground under fallen trees or leaf litter, and various crevices and cavities (Wilkinson, Grigg, & Beard, 1998). Re-use of day shelters has also been observed (Wilkinson, Grigg, & Beard, 1998), indicating site recognition of particularly good shelters. Suitable habitat for the short-beaked echidna has been identified in accordance with the *Method for mapping matters of state environmental significance, Version 7* (DESI, 2024). Whilst this habitat mapping is likely an underestimation of the actual extent of useable habitat for the species, it has been adopted for the purposes of this impact assessment. Based upon this approach, no suitable habitat for the echidna has been mapped within the Study area. Considering the construction of the Project will not result in any direct loss of potentially suitable habitat for the short-beaked echidna, it is unlikely that the Project will disrupt any ecologically significant locations for this species.
It is considered **Unlikely** that the Project will have a significant residual impact on the Short-beaked Echidna.	

4.5.4 Impacts on mapped essential habitat

There are no impacts to 'essential habitat' on the Queensland Government Essential Habitat Map in accordance with section 20AC of the *Vegetation Management Act 1999* for a species of wildlife listed as critically endangered, endangered, vulnerable under the *Nature Conservation Act 1992*. Whilst some essential habitat mapping was initially identified across the Projects' disturbance footprint, this habitat was mapped for Near Threatened species under the NC Act, which does not constitute a PEM in this assessment.

4.5.5 Impacts to fish passage

The construction of the Project will involve crossing one Green (low impact) and one Purple (major impact) waterway crossings. Crossing methodologies for the pipe installations are discussed in **Section 4.1.2**.

The two creek crossings associated with the Project will be bed level crossings that will comply with the 'Accepted development requirements for operational work that is constructing or raising waterway barrier works" (ADR (DAF 2018). There will be no culvert crossings or other structures placed in the waterways. Pipe crossing works and the use of bed-level crossings will be undertaken in accordance with the accepted development requirements (ADR) of the waterway barrier (WWB) self-assessable code or the temporary WWB code.

To assess the potential impacts to fish passage, waterways have been grouped based on their level of risk for impacts to fish passage. There is one low waterway (green) with bed level crossings on 1st order drainage features that is an open depression with no defined bed or banks and does not contain water outside of irregular flow events. It is considered to be low risk waterway and an SRI assessment is presented in **Table 4.13**.

Wambo Creek has defined bed and banks that frequently contain water and is considered to be higher risk waterway and an SRI assessment is presented in **Table 4.13**. An assessment of the potential fish passage area impacted by the Project on Wambo Creek is estimated to be 0.1 ha (40 m W x 20 m L) (**Plate 8** and **Plate 9**).

Plate 8: Facing north on western outer bank of Wambo Creek

Plate 9: Facing upstream on eastern outer bank of Wambo Creek

An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for impacts to fish passage has been provided in **Table 4.13**. A conservative assessment has been undertaken based on the proposed works. An action is likely to have a significant impact on a waterway providing for fish passage if there is a real possibility that it will cause an impact on any of the criteria in the table below.

Table 4.12: Significant Residual Impact Assessment for impacts to fish passage

SRI Criteria	Low risk waterway (1st order drainage feature)	Higher risk waterway (Wambo Creek)
Result in the mortality or injury of fish	**Unlikely** These waterways are generally dry except during high flow events and construction will not occur during these times.	**Possible** Waterways contain water more often and dewatering during construction maybe required.
Result in conditions that substantially increase risks to the health, wellbeing and productivity of fish seeking passage such as through the depletion of fishes energy reserves, stranding, increased predation risks, entrapment or confined schooling behaviour in fish	**Unlikely** The construction will preferentially be undertaken during no/low flow periods, the area affected by construction is small and standing water in these waterways are uncommon.	**Unlikely** The construction will preferentially be undertaken during no/low flow periods, the area affected by construction is small.
Reduce the extent, frequency or duration of fish passage previously found at a site	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.

SRI Criteria	Low risk waterway (1st order drainage feature)	Higher risk waterway (Wambo Creek)
Substantially modify, destroy or fragment areas of fish habitat (including, but not limited to in-stream vegetation, snags and woody debris, substrate, bank or riffle formations) necessary for the breeding and/or survival of fish	**Unlikely** No significant habitat is present in these waterways and the profiles and substrates are reinstated to their original location.	**Possible** Temporary impacts to fish habitat may occur. The works are only for a small area of potential habitat and the profiles and substrates are reinstated to their original location.
Result in a substantial and measurable change in the hydrological regime of the waterway, for example, a substantial change to the volume, depth, timing, duration and frequency of flows	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.
Lead to significant changes in water quality parameters such as temperature, dissolved oxygen, pH and conductivity that provide cues for movement in local fish species	**Unlikely** The construction will preferentially be undertaken during low flow periods, the area affected by construction is small and standing water in these waterways are uncommon.	**Unlikely** The construction will preferentially be undertaken during low flow periods, the area affected by construction is small and will be undertaken in accordance with the WWB ADR.
	It is considered **Unlikely** that the Project will have a significant residual impact on fish passage for this waterway.	It is considered **Possible** that the Project will have a significant residual impact on fish passage for this waterway.

5. Summary of proposed amendments

Impacts associated with the construction of the proposed Project are set out below and have been compared against the current conditions in the Jammat PPL EA.

5.1 Environmentally sensitive areas

Standard conditions within the Jammat PPL EA state that only low impact petroleum activities may be undertaken in Category A ESAs or Category B ESAs or Category C ESAs other than state forests or timber reserves, or within the ESAs' Primary Protection Zones (PPZs). However, the Jammat PPL EA includes variation conditions with 'despite' clauses that authorise disturbance within primary protection zones, secondary protection zones, and Category C ESAs. Conditions with 'despite' clauses that are relevant to the Project include:

- Variation 1, which authorises the construction and maintenance of linear infrastructure within the primary protection zone (PPZ) of a Category C ESA (of concern RE)
- Variation 2 and Variation 3, which authorises linear infrastructure to be constructed and maintained within the PPZ of a Category B ESA (endangered RE) providing that no reasonable or practicable alternative exists
- Variation 4, which authorises linear infrastructure to be constructed within the PPZ of a Category C ESA (of concern RE) and within 300 m (secondary protection zone) of a category B ESA (endangered RE) in accordance with the following order of preference:
    1. pre-existing cleared areas or pre-existing significantly disturbed areas less than 300 m from a Category B ESA;
    2. undisturbed areas less than 300 m from a Category B ESA;
    3. pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a regional ecosystem, and/or areas containing high densities of weed or pest specifies which has inhibited re-colonisation of native regrowth); and
    4. areas where clearing of a Category C ESA is unavoidable.

No impacts are proposed to Category A or Category B ESAs. However, the Project footprint will impact the following:

- Category C ESAs and their PPZs for of concern RE, as initially discussed in **Section 3.1.1** and **Section 4.4.**
- Category B ESA PPZ's and secondary protection zones (SPZ's) for an Endangered RE, as initially discussed in **Section 3.2.1.1** and **Section 4.2.1**.

A summary of these impacts has been provided in **Table 5.1**.

Table 5.1: Proposed disturbance in ESAs

ESA Type	Details	Allowable activities	Proposed impact (ha)
Category B ESA			
N/A			0 ha
Total disturbance in Category B ESA			**0 ha**
Category B PPZ			
Endangered RE	PPZ (within 200 m)	Only low impact petroleum activities Linear infrastructure is permitted provided that no reasonable or practicable alternative exists.	19.8 ha

ESA Type	Details	Allowable activities	Proposed impact (ha)
Category B SPZ			
Endangered RE	SPZ (within 300 m)	Linear infrastructure is permitted provided that the order of preference for clearing is demonstrated	6.2 ha
Category C ESA			
Of concern REs	RE 11.3.25	Only low impact petroleum activities	0.9 ha
'Protected wildlife habitat' that is located within Category A, B or C remnant regulated vegetation	Habitat for Koala, Greater Glider (southern and central), Glossy Black-cockatoo (south-eastern), Brigalow Woodland Snail, Diamond Firetail, Dunmall's Snake	Only low impact petroleum activities	11.9 ha
Total disturbance in Category C ESA			**11.9 ha**
Category C PPZ			
Of concern REs		Low impact petroleum activities Linear infrastructure is permitted provided that the order of preference for clearing is demonstrated	2.2 ha[1]

[1]The area of Category C PPZ does not contain buffers of Near Threatened Essential Habitat.

5.2 Prescribed environmental matters

A summary of the Projects' impacts to recognised PEMs have been included in **Table 5.2**. These PEMs are based on the prescribed environmental matters are outlined in Schedule 2 of the *Environmental Offsets Regulation 2014* and the impacts identified in **Section 3** of this report.

As discussed in **Section 1.4.1**, an EPBC approval (EPBC 2018/8223; **Appendix A**) is in effect for the Project which authorises up to 65 ha of impact on Koala habitat.

Table 5.2: Significant residual impacts to prescribed environmental matters

Prescribed Environmental Matter	Proposed Impact (ha)	Approved maximum extent of impact (ha)	Amendment required
Endangered regional ecosystem			
RE 11.4.3	N/A	0.6	No
Of Concern regional ecosystem			
-	N/A	N/A	No

Prescribed Environmental Matter	Proposed Impact (ha)	Approved maximum extent of impact (ha)	Amendment required
Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map			
RE 11.3.25 (16a)	0.5 ha	N/A	0.5 ha
Essential habitat (not in an urban area) for endangered wildlife			
-	N/A	N/A	No
Essential habitat (not in an urban area) for vulnerable wildlife			
-	N/A	N/A	No
Connectivity areas			
Landscape Fragmentation and Connectivity Tool	17.9 ha	N/A	17.9 ha
Wetlands and watercourses			
A wetland in a wetland protection area shown on the map of referable wetlands	N/A	N/A	No
A wetland of high ecological significance shown on the Map of referable wetlands	0	0.3 ha	No
Designated precincts in a strategic environmental area			
Designated precinct in a strategic environmental area	N/A	N/A	No
Protected wildlife habitat			
An area shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife.	N/A	N/A	No
An area not shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife.	N/A	N/A	No
A non-juvenile koala habitat tree located in an area of bushland habitat, high value rehabilitation or medium value rehabilitation habitat in the 'Map of Assessable Development Area Koala Habitat Values'	N/A	N/A	No
Habitat for an animal that is endangered wildlife			
Brigalow Woodland Snail, *Adclarkia cameroni*	1.3 ha	N/A	1.3 ha
Koala, *Phascolarctos cinereus*[1]	16.1 ha	N/A	MNES
Greater Glider, *Petauroides volans*	1.3 ha	N/A	1.3 ha
Habitat for an animal that is vulnerable wildlife			
Glossy Black-cockatoo, *Calyptorhynchus lathami lathami*	0.9 ha	N/A	0.9 ha
Diamond Firetail, *Stagonopleura guttata*	9.3 ha	N/A	9.3 ha
Habitat for an animal that is special-least concern wildlife			
Short-beaked Echidna, *Tachyglossus aculeatus*	0	8.3 ha	No

Prescribed Environmental Matter	Proposed Impact (ha)	Approved maximum extent of impact (ha)	Amendment required
Platypus, *Ornithorhynchus anatinus*	0	6.0 ha	No
Protected areas			
National park	N/A	N/A	No
Regional park	N/A	N/A	No
Nature refuge	N/A	N/A	No
Highly protected zones of State marine parks			
Conservation park zone	N/A	N/A	No
Marine national park zone	N/A	N/A	No
Preservation zone	N/A	N/A	No
Other zones	N/A	N/A	No
Fish habitat areas			
A declared fish habitat area	N/A	N/A	No
Waterway providing for fish passage			
Fish passage (not in an urban area)	0.1 ha	10 ha	No
Marine plants			
Marine plant (not in an urban area)	N/A	N/A	No
Legally secured offset area			
Legally secured offset area	N/A	N/A	No

[1]Impact managed under EPBC approval 2018/8223

5.3 Biodiversity conditions not applicable to the Project

As discussed in **Section 1.4.2**, the existing Jammat PPL EA was approved based on concept design. Further engineering design for Project development has considered the avoidance principle in the mitigation hierarchy, and additional ecology survey data has been gathered. Accordingly, some varied EA conditions (or their elements) relating to ESAs are not applicable to the Project as outlined in **Table 5.3**

Table 5.3: Jammat PPL Conditions (or elements) that are not applicable to the Project

Variation Condition		Commentary
Number	**Condition**	
Variation 1	Despite condition PPSCA 3, linear infrastructure may be constructed and maintained within the primary protection zone of a Category C ESA of the following types: (a) of concern regional ecosystem; (b) state forest or timber reserve; (c) essential habitat area; (d) regional park; and (e) essential regrowth habitat.	Linear infrastructure is not proposed within a primary protection zone (PPZ) of the following Category C ESA types mentioned in this condition: (b) state forest or timber reserve; (c) essential habitat area; (d) regional park; and (e) essential regrowth habitat.
Variation 3	Where linear infrastructure is to be constructed within the primary protection zone of a Category C ESA in accordance with condition (Variation 1), or within the primary protection zone of a Category B ESA in accordance with condition (Variation 2), the holder of this environmental authority must: (a) be able to demonstrate that no reasonable or practicable alternative exists; and (b) where the ESA is a State Forest or Timber Reserve: i. obtain written approval from the authority responsible for the administration of the *Forestry Act 1959*; ii. comply with all restrictions and condition contained within the approval required under Condition (Variation 3)(b)(i); iii. where the conditions of the approval required under Condition (Variation 3)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of the environmental authority; and iv. provide a copy of the written approval required under Condition (Variation 3)(b)(i) to the administering authority upon request.	Linear infrastructure is not proposed within a Category C ESA or Category B ESA that is a State Forest or Timber Reserve. Accordingly, subsection (b) of this condition is not applicable to the Project.

<table>
<tr><th colspan="2">Variation Condition</th><th rowspan="2">Commentary</th></tr>
<tr><th>Number</th><th>Condition</th></tr>
<tr><td>Variation 5</td><td>Despite conditions (Variation 1) to (Variation 4), this environmental authority does not authorise disturbance in ESAs, apart from the disturbance authorised in Table 1 – Authorised Disturbance in ESAs.

Table 1 – Authorised Disturbance in ESAs
<table><tr><th>Description of infrastructure</th><th>ESA description</th><th>Location</th><th>Maximum extent of disturbance (hectares)</th></tr><tr><td></td><td>Category C ESA (essential habitat)</td><td>PPL2047</td><td>5.5</td></tr></table></td><td>Disturbance is not proposed to occur within a Category C ESA (essential habitat). As the golden tailed gecko is listed as near threatened species, this does not constitute a Category C ESA for essential habitat.

Disturbance is not proposed to occur within Category C ESA (essential habitat) for the pale imperial hairstreak (vulnerable).</td></tr>
</table>

6. References

ALA. (2001). *https://biocache.ala.org.au/occurrences/d0ce0020-114f-48af-9501-188fda32a8ba*. Retrieved from Human observation of Grantiella picta (Gould, 1838) | Painted Honeyeater recorded on 2001-11-04: https://biocache.ala.org.au/occurrences/d0ce0020-114f-48af-9501-188fda32a8ba

ALA. (2015). *Area of Occupancy and Extent of Occurrence*. Retrieved from https://www.ala.org.au/spatial-portal-help/aoo/.

Arrow. (n.d). *Jammat Petroleum Pipeline Application Report.* Brisbane, Queensland: Arrow Energy.

Australian National University. (2021). *A review of Koala habitat assessment criteria and methods.* . Canberra: Australian National University.

BHA. (2024). *Bush Heritage Australia*. Retrieved from https://www.bushheritage.org.au/species/echidna#:~:text=Echidnas%20are%20solitary%2C%20wanderers%3A%20they,their%20young%20in%20a%20burrow.

Braby, M. (2016). *The Complete Field Guide to Butterflies of Australia.*

Cogger, H. G. (2018). *Reptiles & Amphibians of Australia* (7th ed.). Clayton South, Victoria: CSIRO Publishing.

DAWE. (2022a). *Conservation Advice for Petaurus australis australis (yellowbellied glider (south-eastern)).* Canberra: Department of Agriculture, Water and the Environment.

DAWE. (2022a). *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory.* Canberra: Department of Agriculture, Water and the Environment.

DCCEEW. (2022). *Conservation Advice for Calyptorhynchus lathami lathami (South-eastern Glossy Black Cockatoo).* Department of Climate Change, Energy, the Environment and Water. Canberra: Australian Government.

DCCEEW. (2022a). *Conservation Advice for Hemiaspis damelii (grey snake).* Department of Climate Change, Energy, the Environment and Water. Canberra: Australian Government.

DCCEEW. (2022b). *Conservation Advice for Petauroides volans (greater glider (southern and central)).* Department of Climate Change, Energy, the Environment and Water. Canberra: Australian Governmnet.

DCCEEW. (2023). *Conservation advice for Climacteris picumnus victoriae (brown treecreeper (south-eastern)).* Canberra: Australian Government.

DCCEEW. (2023). *Conservation Advice for Stagonopleura guttata (diamond firetal).* Canberra: Australian Government.

DCCEEW. (2023). *Species Profile and Threats Database. Grantiella picta — Painted Honeyeater.* Retrieved from https://www.environment.gov.au/cgibin/sprat/public/publicspecies.pl?taxon_id=470 [Accessed July 14, 2023

DCCEEW. (2024). *Conservation Advice for Gallinago hardwickii (Latham's snipe).* Canberra: Australian Government.

DEHP. (2014). *Significant Residual Impact Guideline* . Canberra: Department of Environment and Heritage Protection.

DEHP. (2015). *Eligibility criteria and standard conditions Petroleum pipeline activities – Version 2.* Retrieved from Department of Environment and Science: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.des.qld.gov.au/policies?a=272936:policy_registry/rs-es-petroleum-pipeline.pdf

DES. (2020). *South East Queensland Koala Conservation Strategy 2020–2025.* Brisbane: Department of Environment and Science.

DESI. (2023). *Queensland Environmental Offsets Policy.* Brisbane: Department of Environment, Science and Innovation.

DESI. (2024). *Method for mapping matters of state environmental significance, Version 7.* Department of Environment, Science and Innovation.

DOE. (2014). *Approved Conservation Advice for Furina dunmallii.* Canberra.

DOE. (2015). *Conservation Advice for Grantiella picta (painted honeyeater).* Canberra: Australian Government.

EcoSmart. (2014). *Daandine Phase 1 Project. EPBC Terrestrial Flora and Fauna Survey.*

EcoSmart. (2017). *Surat Gas Project Terrestrial Ecology Report.* EcoSmart ecology.

EcoSmart. (2018). *Daandine Loopline Dunmall's Snake (Furina dunmalli): Targeted Survey Report.* EcoSmart Ecology.

EcoSmart Ecology. (2018). Mark Sanders Incidental Recordings - Painted Honeyeater.

EcoSmart Ecology. (2023). *Threatened Species Mapping Rules Review - Surat Gas Project.*

EcoSmart Ecology. (2023). *Threatened Species Mapping Rules Review: Surat Gas Project.* Brisbane: Arrow Energy.

Environments, C. (2013). *Supplementary Report to the Surat Gas Project EIS.*

Eyre, T. J., Ferguson, D. J., Smith, D. C., Mathieson, M. T., Venz, M. F., Hogan, L. D., . . . Rowland, J. (2022). *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland.* Brisbane: Department of Environment and Science, QUeensland Government.

Eyre, T. J., Smith, G. C., Venz, M. F., Mathieson, M. T., Hogan, L. D., Starr, C., . . . McDonald, K. (2022). *Guide to greater glider habitat in Queensland.* Brisbane: Department of Agriculture, Water and the Environment; Department of Environment and Science.

Herbarium, Q. (2024). *Regional Ecosystem Description Database (REDD). Version 13.1.* Brisbane: Department of Science and Innovation.

Higgins, P. J., Peter, J., & Steele, W. (2001). *Handbook of Australian, New Zealand and Antarctic Birds.* Melbourne: Oxford University Press.

IUCN. (2024). *Guidelines for Using the IUCN Red List Categories and Criteria.* Retrieved from Atlas of Living Australia: https://support.ala.org.au/support/solutions/articles/6000208436-area-of-occupancy-and-extent-of-occurrence

MCD. (2020). *Central Darling Downs Land Management Manual, Southern Queensland*. Retrieved from https://www.publications.qld.gov.au/dataset/land-resource-areas-central-darling-downs-mcd

Menkhorst, P., Rogers, D., Clarke, R., Davies, J., Marsack, P., & Franklin, K. (2022). *The Austalian Bird Guide.* CSRIO Publishing .

MWD. (2022). *Murilla, Tara and Chinchilla Shires Land Management Manual, Southern Queensland*. Retrieved from https://www.publications.qld.gov.au/dataset/land-resource-areas-murilla-tara-chinchilla-mwd

Neldner, V. J., Wilson, B. A., Dillewaard, H. A., Ryan, T. S., Butler, D. W., McDonald, W. J., . . . Appelman, C. N. (2023). *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland Version 7.0.* Queensland Herbarium, Science and Technology Division, Department of Environment and Science. Brisbane: Queensland Government.

NSW Environment & Heritage. (2021). *Jalmenus eubulus, (a butterfly) - critically endangered species listing*. Retrieved from NSW Environment & Heritage: https://www.environment.nsw.gov.au/topics/animals-and-

plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/jalmenus-eubulus-a-butterfly-critically-endangered-species-listing

Oliver, D., Chambers, M., & Parked, D. (2003). *Habitat and resource selection of the Painted Honeyeater (Grantiella picta) on the northern floodplains region of New South Wales.* Emu - Austral Ornithology.

Phillips, S., & Callaghan, J. (2011). The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. *Australian Zoologist, 35*(3), 744-780.

Pizzey, G., Knight, F., & Pizzey, S. (2012). *The field guide to the birds of Australia.* Sydney: Harper Collins Publishers.

QI. (2025). *Queensland Imagery*. Retrieved from https://qimagery.information.qld.gov.au/

Stanisic, J., Shea, M., Potter, D., & Griffiths, O. (2010). *Australian Land Snails Volume 1. A field guide to eastern Australian Species.* Rivière-des-Anguilles, Mauritius: Bioculture Press.

TSSC. (2016a). *Conservation Advice Adclarkia dulacca Dulacca woodland snail.* Threatened Species Scientific Committee.

TSSC. (2016b). *Conservation Advice Adclarkia cameroni brigalow woodland snail.* Threatened Species Scientific Committee.

TSSC. (2019). *Conservation advice Hirundapus caudacutus White-throated Needletail.* Canberra: Threatened Species Scientific Committee.

Wilkinson, D., Grigg, G., & Beard, L. (1998). *Shelter selection and home range of echidnas, Tachyglossus aculeatus, in the highlands of south-east Queensland.* CSIRO.

Youngentob, K. N., Marsh, K. F., & Skewes, J. A. (2021). *A review of koala habitat assessment criteria and methods.* Canberra: Department of Agriculture, Water and the Environment.

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Appendix A

EPBC Approval

Australian Government

Department of Agriculture, Water and the Environment

APPROVAL

Surat Gas Project Pipelines, Surat Basin, Queensland (EPBC 2018/8223)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*. Note that section 134(1A) of the EPBC Act applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Arrow Energy Pty Ltd
ACN of approval holder	078 521 936
Action	To construct and operate pipelines and related infrastructure to transport gas and water associated with the Arrow Energy Surat Gas Project, located in the Surat Basin, Queensland.

Approval decision

My decision on whether or not to approve the taking of the action for the purposes of the controlling provision for the action is as follows.

Controlling Provisions

Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve

Period for which the approval has effect

This approval has effect until 31 December 2080

Decision-maker

Name and position	Andrew McNee Assistant Secretary of Assessments and Governance Branch Department of Agriculture, Water and the Environment
Signature	
Date of decision	28 May 2020

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

Maximum Impact Limits

1. The approval holder must not **clear** more than 65 hectares (ha) of **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat**.

Environmental Offset Requirements

2. To compensate for the **clearing** of 65 ha of **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat** as specified in condition 1, the approval holder must provide environmental offsets consistent with the **Environmental offsets policy**.

3. The approval holder must submit an Offset Area Management Plan (OAMP) prepared by a **suitably qualified ecologist** for the written approval of the **Minister**. The approval holder must not **commence the action** until the OAMP has been approved by the **Minister**. The approved OAMP must be implemented.

4. The approval holder must ensure the OAMP required under condition 3 includes the following:

    a. details to demonstrate how the offset compensates for the clearance of **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat** in accordance with the **Environmental offsets policy**;

    b. a description of the offset, including location, size, condition, environmental values present and surrounding land uses;

    c. relevant baseline data and other supporting evidence, including results from field validation surveys and quantifiable ecological data, that documents the presence of the Koala and the quality of the **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat** within the offset area;

    d. an assessment of site **habitat quality** using a method agreed to in writing by the **Department**;

    e. details of how the offset area will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the Koala;

    f. a description and maps (including **shapefiles**) to clearly define the location and boundaries of the offset areas, accompanied by the offset attributes (including physical address of the offset areas, coordinates of the boundary points in decimal degrees and the size of the environmental offsets in hectares);

    g. specific offset completion criteria derived from the site **habitat quality** to demonstrate the improvement in the **habitat quality** for Koala in the offset area over the period of effect of this approval;

    h. details of the management measures (including timing, frequency, duration and method of outcome measurement), to be carried out to meet the offset completion criteria set in condition 4.g;

    The management measures must specify activities that will be prohibited in the offset area(s), including (but not limited to) mining/exploration, development and alternate land uses.

    The management measures proposed must be consistent with the **Environmental Management Plan Guidelines** and the **Approved conservation advice**.

i. performance criteria that set targets at 5-yearly intervals for expected progress towards the completion criteria set in condition 4.g;

j. details of the nature, timing and frequency of monitoring to inform progress against achieving the 5-yearly interim milestones (the frequency of monitoring must be sufficient to track progress towards each set of milestones, and sufficient to determine whether the offset area is likely to achieve those milestones in adequate time to implement all necessary corrective actions);

k. proposed timing for the submission of monitoring reports which provide evidence demonstrating whether the interim milestones have been achieved;

l. timing for the implementation of corrective actions if monitoring activities indicate the interim milestones have not been achieved;

m. a risk analysis and a risk management and mitigation strategy for all risks to the successful implementation of the OAMP and timely achievement of the offset completion criteria set in condition 4.g, including for if the offset fails to achieve and maintain the completion criteria; and

n. the proposed legal mechanism for **legally securing** the offset area, such that **legal security** remains in force over the offset area for at least the period of effect of this approval.

Legal Securing of Environmental Offset

5. The approval holder must **legally secure** the environmental offset within 12 months from the date that the OAMP is approved by the **Minister**. The approved OAMP must be attached to the legal mechanism used to **legally secure** the offset area.

6. The approval holder must notify the **Department** within 5 **business days** of the legal mechanism being executed.

7. The legal mechanism used to **legally secure** the offset area must remain in force for the period of effect of this approval.

Part B – Standard administrative conditions

Notification of date of commencement of the action

8. The approval holder must notify the **Department** in writing of the date of **commencement of the action** within 5 **business days** after the date of **commencement of the action**.

9. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.

Compliance records

10. The approval holder must maintain accurate and complete **compliance records**.

11. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request.

Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **Department**'s website or through the general media.

Preparation and publication of plans

12. The approval holder must:

a. submit **plans** electronically to the **Department** for approval by the **Minister**;

b. publish each **plan** on the **website** within 20 **business days** of the date the **plan** is approved by the **Minister** or of the date a revised **plan** is approved in writing by the **Minister**;

c. exclude or redact **sensitive ecological data** from **plans** published on the **website** or provided to a member of the public; and

d. keep **plans** published on the **website** until the end date of this approval.

13. The approval holder must ensure that any **monitoring data** (including **sensitive ecological data**), surveys, maps, and other spatial and metadata required under condition 4, is prepared in accordance with the **Department's** *Guidelines for biological survey and mapped data* (2018) and submitted electronically to the **Department** in accordance with the requirements of the OAMP.

Annual compliance reporting

14. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:

    a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period;

    b. notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within five **business days** of the date of publication;

    c. keep all **compliance reports** publicly available on the **website** until this approval expires;

    d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and

    e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

Note: **Compliance reports** may be published on the **Department**'s website.

Reporting non-compliance

15. The approval holder must notify the **Department** in writing of any: **incident;** non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than two **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:

    a. any condition which is or may be in breach;

    b. a short description of the **incident** and/or non-compliance; and

    c. the location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.

16. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:

    a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;

    b. the potential impacts of the **incident** or non-compliance; and

    c. the method and timing of any remedial action that will be undertaken by the approval holder.

Independent audit

17. The approval holder must ensure that **independent audits** of compliance with the conditions are conducted when requested in writing by the **Minister**.

18. For each **independent audit**, the approval holder must:

    a. provide the name and qualifications of the independent auditor and the draft audit criteria to the **Department**;

    b. only commence the **independent audit** once the audit criteria have been approved in writing by the **Department**; and

    c. submit an audit report to the **Department** within the timeframe specified in the approved audit criteria.

19. The approval holder must publish the audit report on the **website** within 10 **business days** of receiving the **Department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval.

Revision of the OAMP

20. The approval holder may, at any time, apply to the **Minister** for a variation to the OAMP required under condition 3 and approved by the **Minister**, or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the **EPBC Act**. If the **Minister** approves a revised OAMP (ROAMP) then, from the date specified, the approval holder must implement the ROAMP in place of the previous approved OAMP.

Completion of the action

21. Within 30 days after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Part C – Definitions

In these conditions, except where contrary intention is expressed, the following definitions are used:

Approved conservation advice means the *Approved Conservation Advice for* Phascolarctos cinereus *(combined populations in Queensland, New South Wales and the Australian Capital Territory)* (2012).

Business day means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.

Clear/clearing means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including weeds – see the *Australian weeds strategy 2017 to 2027*, or subsequent revision, for further guidance).

Commencement of the action means the first instance of **clearing** or any works that has the potential to kill any **Koala** or reduce **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat**.

Completion data means an environmental report and spatial data clearly detailing how the conditions of this approval have been met. The **Department**'s preferred spatial data format is **shapefile**. This includes, but is not limited to, the:

i. area of **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat cleared**; and

ii. quality of the **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat** in the offset area at the end date of this approval.

Completion of the action means the time at which all approval conditions (except condition 21) have been fully met.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in the approval holder's possession or that are within the approval holder's power to obtain lawfully.

Compliance reports means written reports:

i. providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans**;

ii. consistent with the **Department's** *Annual Compliance Report Guidelines* (2014), or subsequent revision;

iii. include a **shapefile** of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12 month period; and

iv. annexing a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12 month period.

Department/al means the Australian Government agency responsible for administering the **EPBC Act**.

Environmental Management Plan Guidelines means the **Department's** *Environmental Management Plan Guidelines* (2014), or subsequent revision.

Environmental offsets policy means the **EPBC Act** *Environmental Offsets Policy* (2012), or subsequent revision, including the **Offset assessment guide**.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Habitat quality score/s means the score out of 10 which is input into the **Offset assessment guide** calculator based on an assessment of the **habitat quality**, and must be consistent with the **Environmental offsets policy**.

Habitat quality means the baseline condition of **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat** determined from field surveys and with consideration of relevant **departmental** documents, including, but not limited to, the **Environmental offsets policy** and **Approved conservation advice**.

Incident means any event which has the potential to, or does, impact on one or more **protected matter**.

Independent audit means an audit conducted by an independent and **suitably qualified person** as detailed in the **EPBC Act** *Independent Audit and Audit Report Guidelines* (2019), or subsequent revision.

Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat means **a**ny forest or woodland (including remnant, regrowth and modified vegetation communities) containing species that are Koala food trees or any shrubland with emergent Koala food trees.

Note: For the impact site, this is mapped at **Appendix 1**.

Legally securing/legal security/legally secure means to secure a legal agreement under relevant Queensland legislation, in relation to a site, to provide long-term protection for the site against development incompatible with conservation

Minister means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.

Monitoring data means the data required to be recorded under the conditions of this approval.

Offset assessment guide means the guidance document titled *How to use the Offsets assessment guide* (2012), which includes the requirements for **habitat quality scores**, provided by the **Department** to assist users of the **Environmental offsets policy**.

Plan(s) means any of the documents required to be prepared, approved by the **Minister**, implemented by the approval holder and/or published on the **website** in accordance with these conditions (includes action management plans and/or strategies).

Protected matter means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect.

Sensitive ecological data means data as defined in the **Department's** *Sensitive Ecological Data – Access and Management Policy V1.0* (2016), or subsequent revision.

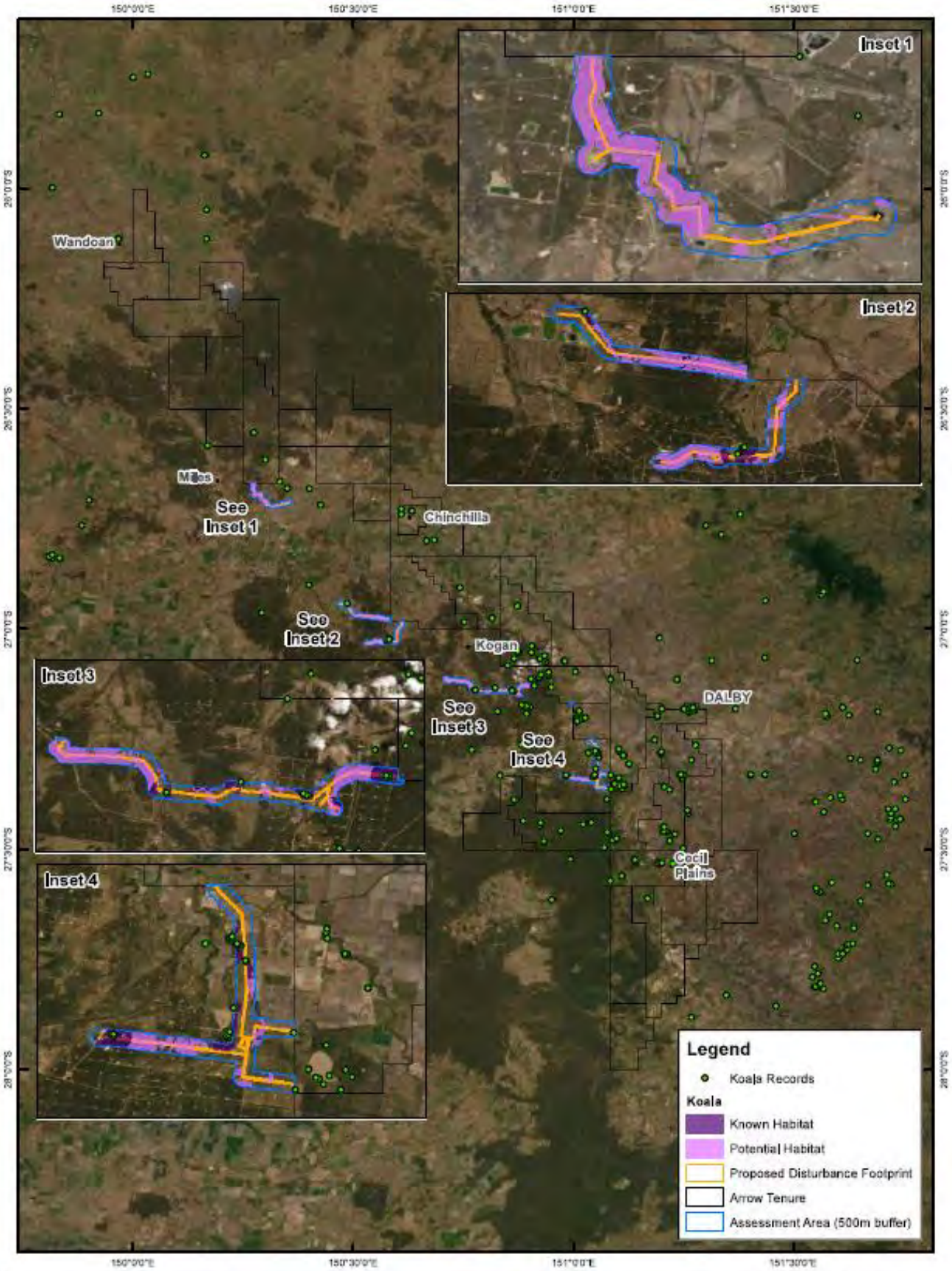
Shapefile means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx', '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes**.**

Suitably qualified ecologist means a person who has professional qualifications and at least three (3) years of work experience designing and implementing surveys for the Koala and its habitat, and can give an authoritative assessment and advice on the presence of the Koala using relevant protocols, standards, methods and/or literature.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Appendix 1: Maximum impact area for **Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat**



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Appendix B

Environmental Authority

Permit

Environmental Protection Act 1994

Environmental authority EA0002166

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EA0002166

Environmental authority takes effect on a date to be decided later.

Environmental authority holder(s)

Name(s)	Registered address
ARROW CSG (AUSTRALIA) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Non-Scheduled Petroleum Activity Petroleum Pipeline Licence - PPL	PPL2047

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days);

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or

b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or

c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Sustainable Planning Act 2009* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Clancy Mackaway
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Date issued: 25 February 2020

Enquiries:
Petroleum and Gas Unit
Department of Environment and Science

Phone: 3330 5715
Email: EnergyandExtractive@des.qld.gov.au

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Legislative requirements and conditions of environmental authority

Legislative requirements

Standard conditions

This environmental authority contains standard conditions. Standard conditions are identified by (S) after the condition number.

Eligibility criteria

	Eligibility criteria
PPEC 1	The applicant for the environmental authority is the holder of, or an applicant for a Pipeline Licence (PPL) tenure type issued under the *Petroleum and Gas (Production and Safety) Act 2004.*
PPEC 2	The petroleum activities are authorised petroleum activities for the purpose of the *Petroleum and Gas (Production and Safety) Act 2004*.
PPEC 3	The petroleum activity does not include extending an existing pipeline by more than 150 kilometres under a petroleum authority.
PPEC 4	The petroleum activity does not include construction a new pipeline of more than 150 kilometres under a petroleum authority.
PPEC 5	The petroleum activities do not occur in coastal waters of Queensland.
PPEC 6	The petroleum activity is not, or will not be, carried out under an environmental authority under which any of the following is, or is to be, authorised: (a) the injection of a waste fluid or gas for gas storage into a natural underground reservoir or aquifer (b) a regulated dam (c) the carrying out of the following environmentally relevant activities (ERAs): i. ERA 8 – Chemical Storage ii. ERA 60(1a) – (1d) – Regulated waste disposal iii. ERA 60(2d) – (2h) – General waste disposal > 10,000t/year iv. ERA 63(1a)(ii) – (1b)(ii), (1c) – (1g) – Sewage treatment with a total daily peak design capacity of greater than 21 equivalent persons (EP) which releases to other than an infiltration trench or irrigation scheme or where the sewage treatment activities have a total combined daily peak design capacity exceeding 1500 equivalent persons (EP)

	Eligibility criteria
	v. ERA 64(2a) and (2b) and (4a) and (4b) – Water treatment where desalination of more than 0.5ML of water is treated, allowing the release of waste to waters other than seawater; or carrying out, in a day, advanced treatment of 5ML or more of water, allowing the release of waste only to seawater; or to waters other than seawater.

Conditions of environmental authority

Condition number	Condition
Schedule A – Authorised activities	
PPSCA 1 (S)	All reasonable steps must be taken to ensure the petroleum activities comply with the eligibility criteria for the activity.
PPSCA 2 (S)	The following types of petroleum activities are not authorised: (a) processing or storing petroleum or petroleum by-products that are not necessarily associated with pipeline construction or operation (b) extracting earthen materials (other than drilling waste rock or trench spoil) of more than 100,000t/year (c) extracting by dredging more than 1000t/year of material from the bed of naturally occurring surface waters (d) construction of power lines (either above or below ground) outside the right of way necessary for the pipeline. ***Explanatory Note:*** *Standard Condition PPSCA 2(d) does not authorise additional significant disturbance to land. The construction of power lines must be within the pipeline's right of way.*
PPSCA 3 (S)	Only low impact petroleum activities can be undertaken within Category A Environmentally Sensitive Areas (ESAs), or Category B ESAs or Category C ESAs other than state forests or timber reserves, or within the ESAs' primary protection zone. ***Explanatory Note:*** *Standard condition (PPSCA 3) does not allow for petroleum activities other than low impact petroleum activities within the mentioned ESAs, therefore negative impacts are not authorised to environmental or biodiversity values that are required to be offset under any relevant Queensland Offset Policy. In the event that standard condition (PPSCA 3) needs to be varied to allow for such impacts, offsets under any relevant Queensland Offset Policy may be required.*

Variation 1	Despite condition PPSCA 3, linear infrastructure may be constructed and maintained within the primary protection zone of a Category C ESA of the following types: (a) of concern regional ecosystem; (b) state forest or timber reserve; (c) essential habitat area; (d) regional park; and (e) essential regrowth habitat.
Variation 2	Despite condition PPSCA 3, linear infrastructure may be constructed and maintained within the primary protection zone of a Category B ESA of the following types: (a) an endangered regional ecosystem identified in the database known as the 'Regional ecosystem database' published on the administering authority's website.
Variation 3	Where linear infrastructure is to be constructed within the primary protection zone of a Category C ESA in accordance with condition (Variation 1), or within the primary protection zone of a Category B ESA in accordance with condition (Variation 2), the holder of this environmental authority must: (a) be able to demonstrate that no reasonable or practicable alternative exists; and (b) where the ESA is a State Forest or Timber Reserve: i. obtain written approval from the authority responsible for the administration of the *Forestry Act 1959*; ii. comply with all restrictions and condition contained within the approval required under Condition (Variation 3)(b)(i); iii. where the conditions of the approval required under Condition (Variation 3)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of the environmental authority; and iv. provide a copy of the written approval required under Condition (Variation 3)(b)(i) to the administering authority upon request.
Variation 4	Where linear infrastructure is to be constructed within the primary protection zone of a Category C ESA in accordance with condition (Variation 1), or within 300m of a Category B ESA in accordance with condition (Variation 2), disturbance to land must only be located and carried out in areas according to the following order of preference: (a) pre-existing cleared areas or pre-existing significantly disturbed areas less than 200m from a Category C ESA or less than 300m from a Category B ESA;

<table>
<tr><td></td><td>(b) undisturbed areas less than 200m from a Category C ESA or less than 300m from a Category B ESA;
(c) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a regional ecosystem, and/or areas containing high densities of weed or pest specifies which has inhibited re-colonisation of native regrowth); and
(d) areas where clearing of a Category C ESA is unavoidable.</td></tr>
<tr><td>Variation 5</td><td>Despite conditions (Variation 1) to (Variation 4), this environmental authority does not authorise disturbance in ESAs, apart from the disturbance authorised in Table 1 – Authorised Disturbance in ESAs.
Table 1 – Authorised Disturbance in ESAs
<table>
<tr><th>Description of infrastructure</th><th>ESA description</th><th>Location</th><th>Maximum extent of disturbance (hectares)</th></tr>
<tr><td></td><td>Category C ESA (essential habitat)</td><td>PPL2047</td><td>5.5</td></tr>
</table></td></tr>
<tr><td>Variation 6</td><td>For conditions (Variation 7) to (Variation 8), where mapped biodiversity values differ from those confirmed under condition (PPSCD3), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground biodiversity values.</td></tr>
<tr><td>Variation 7</td><td>The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles:
(a) maximise the use of areas of pre-existing disturbance;
(b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative impacts, on areas of native vegetation or other areas of ecological value;
(c) minimise disturbance to land that may result in land degradation;
(d) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and
(e) in order of preference, avoid then minimise clearing of native mature trees.</td></tr>
</table>

Variation 8	A report must be prepared for each annual return period for all petroleum activities that involved clearing of any environmentally sensitive area or protection zone which includes: (a) records able to demonstrate compliance with conditions (Variation 7) and (PPSCD 2): (b) a description of the works; (c) a description of the area and its pre-disturbance values (which may include maps or photographs, but must include GPS coordinates for the works); and (d) based on the extent of environmentally sensitive areas and primary protection zones on the relevant resource authority(ies), the proportion of native vegetation cleared per environmentally sensitive area and primary protection zone, including regional ecosystem type, over the annual return period.

<table>
<tr>
<td>Variation 9</td>
<td>
Impacts to prescribed environmental matters

Significant residual impacts to prescribed environmental matters, are not authorised under this environmental authority or the Environmental Offsets Act 2014 unless the impact(s) is specified in Protecting biodiversity values, Table 2—Significant residual impacts to prescribed environmental matters.

Table 2 Protecting biodiversity values—Significant residual impacts to prescribed environmental matters
<table>
<tr><th>Prescribed environmental matter</th><th>Location of impact</th><th>Maximum extent of impact (ha)</th></tr>
<tr><td colspan="3">Wetlands and watercourses</td></tr>
<tr><td>A wetland of high ecological significance shown on the Map of referable wetlands – to be surveyed before ground disturbance</td><td>Harry, Tipton, FCS8 to Jordan B2 Route</td><td>0.3</td></tr>
<tr><td colspan="3">Protected wildlife habitat</td></tr>
<tr><td>• Tachyglossus aculeatus</td><td>QGC Water return, Kenya WTF</td><td>8.3</td></tr>
<tr><td>• Ornithorhynchus anatinus</td><td>FCS2, McNulty</td><td>6</td></tr>
<tr><td colspan="3">Waterway providing for fish passage</td></tr>
<tr><td>Fish passage (not in an urban area) – to be surveyed before ground disturbance</td><td>David Stalk, FCS8 to Jordan B2 Route, FCS2, McNulty, Harry, Tipton, FCS8 to Jordan B2 Route, Jammat, QGC Water return, Kenya WTF</td><td>10</td></tr>
</table>
</td>
</tr>
<tr>
<td>Variation 10</td>
<td>Despite condition (Variation 9), for prescribed environmental matters not assessed under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) or listed in Table 2 Protecting biodiversity values – significant residual impacts to prescribed environmental matters, an environmental offset must be undertaken for the maximum extent of impact to each prescribed environmental matter.</td>
</tr>
</table>

Variation 11	Records demonstrating that each impact to a prescribed environmental matter not listed in ***Table 2 Protecting biodiversity values —Significant residual impacts to prescribed environmental matters*** did not, or is not likely to, result in a significant residual impact to that matter must be: a) completed by an suitably qualified person; and b) kept for the life of the environmental authority.
Variation 12	An environmental offset made in accordance with the *Environmental Offsets Act 2014* and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in ***Table 2 Protecting biodiversity values — Significant residual impacts to prescribed environmental matters***, unless a lesser extent of the impact has been approved in accordance with condition (Variation 13).
Variation 13	Prior to the commencement of any impacts to a prescribed environmental matter for which an environmental offset is required by condition (Variation 12), a report completed by a suitably qualified person that contains an analysis of the estimated maximum extent of impact to each prescribed environmental matter must be provided to the administering authority.
Variation 14	The report required by condition (Variation 13) must be approved by the administering authority before the notice of election, if applicable, is given to the administering authority.
Variation 15	The notice of election for the environmental offset required by condition (Variation 12), if applicable, must be provided to the administering authority no less than three months before the proposed commencement of the significant residual impacts for which the environmental offset is required.
Schedule B – Protecting environmental values	
PPSCB 2 (S)	Petroleum activities must not cause environmental nuisance from dust, odour, light, smoke or noise at a sensitive place, other than where an alternative arrangement is in place.
PPSCB 3 (S)	Contaminants must not be directly or indirectly released to land or air except for those releases authorised by conditions (PPSCC 9), (PPSCC 13), (PPSCC 14), (PPSCC 15), (PPSCC 16), (PPSCE 4), (PPSCE 8), (PPSCE 11), (PPSCE 12), (PPSCF 3), (Variation 21) and (Variation 22).
PPSCB 4 (S)	Only low impact petroleum activities are permitted in a designated precinct of a Strategic Environmental Area.
PPSCB 5 (S)	Petroleum activities must:

	(a) firstly, avoid, then minimise, then mitigate any negative impacts on areas of vegetation or other areas of ecological value (b) minimise disturbance to land that may otherwise result in land degradation (c) minimise isolation, fragmentation or dissection of tracts of vegetation that would lead to a reduction in the current level of ecosystem functioning or ecological connectivity (d) minimise clearing of mature or hollow bearing trees. ***Explanatory Note:*** *A written route selection report or CEMP or OEMP or decommissioning plan for the different stages of pipeline petroleum activities can be developed to demonstrate compliance with standard condition (PPSCB 5).*
PPSCB 6 (S)	Where significant disturbance to land is to occur, records demonstrating compliance with standard condition (PPSCB 5) must be kept.
Schedule C – Operating standards	
Documentation	
PPSCC 1 (S)	All plans, procedures and reports must: (a) be certified by a suitably qualified person (b) be kept on record for a minimum of 5 years.
PPSCC 2 (S)	All plans and procedures required to be developed must be implemented.
Plant and equipment	
PPSCC 3 (S)	All plant and equipment reasonably necessary to ensure compliance with the conditions of this environmental authority must be installed.
PPSCC 4 (S)	All plant and equipment must be maintained and operated in their proper and effective condition.
PPSCC 5 (S)	All measures reasonably necessary to ensure compliance with the conditions of this environmental authority must be implemented.
Contingency and emergency response	
PPSCC 6 (S)	Petroleum activities involving significant disturbance to land or which have the potential to cause environmental harm can only commence after the development of written contingency procedures which address the risks of non-compliance with Schedule B standard conditions.

PPSCC 7 (S)	The contingency procedures must include, but not necessarily be limited to: (a) environmental nuisance and complaint management procedures including: i. a description of the petroleum activities that might result in non-compliance with Schedule B standard conditions and what mitigation measures are required to be implemented; and ii. the action that will be undertaken when a member of the public makes a valid complaint. (b) management procedures including details of what actions will be taken to protect environmental values and minimise potential environmental harm from petroleum activities as a result of floods, severe storms and fires (c) environmental emergency management procedures including details of the response and mitigation measures that will be actioned to reduce negative impacts to environmental values in the event of a non-compliance with Schedule B standard conditions. ***Explanatory note:*** *The contingency procedures may incorporate other documents by reference and may include the emergency response procedures required under the* Petroleum and Gas (Production and Safety) Act 2004.
Soil management	
PPSCC 8 (S)	Measures must be implemented and maintained to minimise stormwater entry onto significantly disturbed land.
PPSCC 9 (S)	Sediment and erosion control measures to prevent soil loss and deposition beyond significantly disturbed land must be implemented and maintained.
PPSCC 10 (S)	The measures required by standard conditions (PPSCC 8) and (PPSCC 9) must be in accordance, to the greatest practicable extent, with the International Erosion Control Association (IECA) *Best Practice Erosion and Sediment Control (BPESC) document* and/or the Australian Pipelines and Gas Association (APGA) *Code of Environmental Practice: Onshore Pipelines* (2017).
Chemical storage	
PPSCC 11 (S)	Chemicals and fuels on the relevant tenures must be stored in, or serviced by, an effective containment system that meets Australian Standards, where such a standard is relevant.
Waste management	
PPSCC 12 (S)	Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.

PPSCC 13 (S)	For waste fluids that can be stored in a container that is other than a low hazard dam, the container must either be an above ground container or a structure which contains the wetting front.
PPSCC 14 (S)	Waste, including waste fluids, must be transported off-site for lawful re-use, remediation, recycling or disposal unless the waste is specifically authorised by conditions (PPSCC 15), (PPSCC 16), (PPSCE 8),(PPSCF 3) and conditions (Variation 16) to (Variation 18) inclusive to be disposed of or used on-site.
Variation 16	Produced water may be used for dust suppression provided the following criteria are met: (a) the amount applied does not exceed the amount required to effectively suppress the dust; and (b) the application: i. does not cause on-site ponding or run-off; ii. is directly applied to the area being dust suppressed; iii. does not harm vegetation surrounding the area being dust suppressed; and iv. does not cause visible salting.
Variation 17	Produced water may be used for construction purposes provided the use: (a) does not result in negative impacts on the composition of the structure of soil or subsoils; (b) is not directly or indirectly released to waters; (c) does not result in runoff from the construction site; and (d) does not harm vegetation surrounding the construction site.
Variation 18	If there is an indication that any of the circumstances in condition (Variation 16)(b)(i) to (Variation 16)(b)(iv) or condition (Variation 17)(a) to (Variation 17)(d) is occurring, the use must cease immediately and the affected area must be remediated without delay.
PPSCC 15 (S)	Green waste may be used on-site for rehabilitation and/or sediment and erosion control purposes.
Treated sewage effluent	
PPSCC 16 (S)	Treated sewage effluent or greywater can be released to land provided it: (a) meets or exceeds secondary treated class B standards for a treatment system with a daily peak design capacity of between 150 EP and 1500 EP; or

	(b) meets or exceeds secondary treated class C standards for a treatment system with a daily peak design capacity of less than 150 EP; and (c) is released within fenced and signed contaminant release area(s) and does not result in pooling or run-off or aerosols or spray drift or vegetation die-off.
Schedule D – Pipeline planning	
Site planning	
PPSCD 1 (S)	Pipeline planning must be in accordance, to the greatest practicable extent, with the relevant section of the APGA *Code of Environmental Practice: Onshore Pipelines* (2017) and/or AS 2885.1:2012.
Planning for disturbance	
PPSCD 2 (S)	Notwithstanding condition (PPSCD 1), pipeline construction corridors must: (a) be minimised in width to the greatest practicable extent (b) not exceed 40m in width (c) not include turn around and work areas associated with pipeline construction that exceed 50m in width (d) be preferentially located alongside existing linear infrastructure.
PPSCD 3 (S)	Prior to any significant disturbance to land: (a) an ecological assessment of areas with native vegetation that are to be significantly disturbed, must be conducted in accordance with the Queensland Government's *Biocondition, a Condition Assessment Framework for Terrestrial Biodiversity in Queensland, Assessment Manual*; and (b) an assessment of the impacts that will occur as a result of significant disturbance to land must be undertaken.
Schedule E – Construction conditions	
PPSCE 1 (S)	Pipeline construction must be in accordance, to the greatest practicable extent, with the relevant section of the APGA *Code of Environmental Practice: Onshore Pipelines* (2017) and/or AS 2885.1:2012.
Activities in watercourses, wetlands, lakes and springs	
PPSCE 2 (S)	Petroleum activities that require earthworks, vegetation clearing and/or placing fill, other than that associated with the construction of linear infrastructure, are not permitted in or within:

	(a) 200 metres of any wetland, lake or spring; or (b) 100 metres of the outer bank of any other watercourse.
PPSCE 3 (S)	The construction and/or maintenance for linear infrastructure that will result in significant disturbance to a wetland, lake, spring or watercourse must be conducted in accordance with the following order of preference. Conducting works: 1. firstly, in times where there is no water present 2. secondly, in times of no flow 3. thirdly, in times of flow, but in a way that does not impede low flow.
PPSCE 4 (S)	Petroleum activities must not result in water turbidity increases of more than 10% in high ecological value waters outside contained construction or maintenance areas.
Variation 19	The construction and/or maintenance for linear infrastructure that will result in significant disturbance to a lake, spring or watercourse must be designed and undertaken by a suitably qualified person in accordance with the *Riverine Protection Permit Exemption Requirements* published by the Department of Natural Resources, Mines and Energy as it is amended from time to time.
Variation 20	The construction and/or maintenance for linear infrastructure that will result in significant disturbance to a wetland must be designed and undertaken by a suitably qualified person, taking into consideration the *Riverine Protection Permit Exemption Requirements* published by the Department of Natural Resources, Mines and Energy as it is amended from time to time.
Fauna Management	
PPSCE 7 (S)	Measures to prevent fauna entrapment must be implemented during the construction of pipelines in pipe sections and pipeline trenches and operation of dams.
Waste	
Variation 21	Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that ensures: (a) the flare is enclosed; or (b) compliance with condition (Variation 22) below.
Variation 22	If gas is flared and an enclosed flare is not utilised, then the holder of this environmental authority must ensure all of the following: (a) that an automatic ignition system is used;

	(b) that the flame is, or flames are, visible at all times when waste gas is being flared; and (c) there are no visible smoke emissions other than for a total period of no more than five (5) minutes in any two (2) hours.
PPSCE 8 (S)	Trench water, hydrostatic testing water or water from low point drains, may be released to land provided that it: (a) can be demonstrated to meet the acceptable standards for release to land (b) is released in a way that does not cause visible scouring or erosion.
PPSCE 9 (S)	If hydrostatic testing water quality does not or can not be treated to meet the requirements of standard condition (PPSCE 8), it must be managed in accordance with standard conditions (PPSCC 13) or (PPSCC 14).
Blasting	
PPSCE 10 (S)	A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.
PPSCE 11 (S)	Blasting operations must be designed to not exceed an airblast overpressure level of 120dB (linear peak) at any time, when measured at or extrapolated to any sensitive place.
PPSCE 12 (S)	Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10mm/s at any time, when measured at or extrapolated to any sensitive place.
Structures that are dams or levees	
PPSCE 13 (S)	The consequence category of any dam or levee to be used in carrying out petroleum activities must be assessed in accordance with the Queensland Government *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures.*
PPSCE 14 (S)	Low consequence dams and structures must be: (a) constructed, operated and maintained in accordance with accepted engineering standards currently appropriate for the purpose for which the dam is intended to be used; and (b) designed with a floor and sides made of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during both its operational life and including any period of decommissioning and rehabilitation.

PPSCE 15 (S)	All low consequence dams and structures must be monitored for early signs of loss of structural or hydraulic integrity as specified in the initial consequence assessment.
PPSCE 16 (S)	When no longer required all low consequence dams and structures must be decommissioned to no longer accept inflow from the petroleum activities and be either: (a) rehabilitated; or (b) agreed to in writing by the administering authority and the landholder to remain in situ following the cessation of the petroleum activity(ies) associated with the dam, with the contained water of a quality suitable for the intended ongoing uses(s) by that landholder.
Pipeline reinstatement and revegetation	
PPSCE 17 (S)	Pipeline trenches must be backfilled and topsoils reinstated within 3 months after pipe laying.
PPSCE 18 (S)	Reinstatement and revegetation of the pipeline right of way must commence within 6 months after completion of petroleum activities for the purpose of pipeline construction.
Variation 23	Backfilled, reinstated and revegetated pipeline trenches and right of way must be: (a) a stable landform (b) re-profiled to a level consistent with surrounding soils (c) re-profiled to original contours and established drainage lines (d) vegetated with groundcover which is not a declared pest species, not a prohibited matter and not a restricted matter, and which is established and self-sustaining.
Schedule F – Post-construction conditions including operations, maintenance and decommissioning	
PPSCF 1 (S)	Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the APGA *Code of Environmental Practice: Onshore Pipelines* (2017) and/or AS 2885.3:2012.
PPSCF 2 (S)	Written procedures must be developed to ensure operations and maintenance of the pipeline complies with the conditions of the environmental authority.
PPSCF 3 (S)	Flush water may be released to land provided that it meets the requirements of standard condition (PPSCE 8).
Final acceptance criteria for rehabilitation	

Variation 24	After decommissioning, all significantly disturbed land caused by the carrying out of the petroleum activity(ies) must be rehabilitated to meet the following final acceptance criteria: (a) any contaminated land (e.g. contaminated soils) is remediated and rehabilitated (b) rehabilitation is undertaken in a manner such that any actual or potential acid sulfate soils on the area of significant disturbance are treated to prevent or minimise environmental harm in accordance with the *Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines*, as it is updated from time to time. (c) for land that is not being cultivated by the landholder: i. groundcover, that is not a declared pest species, is not a prohibited matter and is not a restricted matter, is established and self-sustaining ii. vegetation of similar species richness and species diversity to pre-selected analogue sites is established and self-sustaining (d) for land that is to be cultivated by the landholder, cover crop is revegetated, unless the landholder will be preparing the site for cropping within 3 months of petroleum activities being completed.
PPSCF 5 (S)	Monitoring of performance indicators must be carried out on rehabilitation activities until final acceptance criteria in standard condition (Variation 24) have been met for the rehabilitated area.
Schedule G – Monitoring and reporting conditions	
Monitoring	
PPSCG 1 (S)	All monitoring must be undertaken by a suitably qualified person.
PPSCG 2 (S)	If requested by the administering authority in relation to investigating a valid complaint, monitoring must be undertaken within 10 business days.
PPSCG 3 (S)	All laboratory analyses and tests must be undertaken by a laboratory that has NATA accreditation for such analyses and tests, except as otherwise authorised in writing by the administering authority.
PPSCG 4 (S)	Notwithstanding standard condition (PPSCG 3), where there are no NATA accredited laboratories available to test for a specific analyte or substance, then duplicate samples must be sent to separate laboratories for independent testing or evaluation.
Sampling	

PPSCG 5 (S)	The methods of surface water sampling must comply with that set out in the Queensland Government's *Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009*.
PPSCG 6 (S)	The methods of groundwater sampling must comply with the Australian Government's *Groundwater Sampling and Analysis – A Field Guide* (2009:27 GeoCat #6890.1).
PPSCG 7 (S)	Noise must be measured in accordance with the prescribed standards in the *Environmental Protection Regulation 2019*.
PPSCG 8 (S)	The method of measurement of ambient air quality or point source contaminant releases to air must comply with the *Queensland Air Quality Sampling Manual* and/or Australian Standard 4323.1:1995 *Stationary source emissions method 1: Selection of sampling positions*, whichever is appropriate for the relevant measurement.
Notification	
PPSCG 9 (S)	In addition to the requirements under section 320A of the *Environmental Protection Act 1994*, the administering authority must be notified in writing within 5 business days of any event which has resulted in the contingency procedures required by standard conditions (PPSCC 6) and (PPSCC 7) being activated. ***Explanatory note**: Notification under standard condition (PPSCG 9) should occur using the form,* Incident notification for resource activities other than mining (EM706) *available from the administering authority's website.*
Reporting	
PPSCG 10 (S)	The annual return must include an Update Report detailing activities during the annual return period, demonstrating: (a) significant disturbance during the period (b) rehabilitation undertaken (c) a list of all valid complaints relating to environmental issues made including the date, source, reason for the complaint and a description of investigations undertaken in resolving the complaint (d) the results of all monitoring undertaken.

Definitions

Explanatory note: *Where a term is not defined in this document, the definition in the* Environmental Protection Act 1994*, its regulations and* environmental protection policies*, then the* Acts Interpretation Act 1954 *then the Macquarie Dictionary should be used in that order.*

Term	Definition
acceptable standards for release to land	is defined as: (a) electrical conductivity (EC) not exceeding 3000µS/cm (b) sodium adsorption ratio (SAR) not exceeding 8 (c) and for hydrostatic testing water, water from low point drains and flush water, total heavy metals for each element listed meets the respective short term trigger value in Table 4.2.6. – Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) 2000.
accepted engineering standards	in relation to dams, means those standards of design, construction, operation and maintenance that are broadly accepted within the profession of engineering as being good practice for the purpose and application being considered. In the case of dams, the most relevant documents would be publications of the *Australian National Committee on Large Dams* (ANCOLD), guidelines published by Queensland government departments and relevant Australian and New Zealand Standards.
acid sulfate soil(s)	means a soil or soil horizon which contains sulfides or an acid soil horizon affected by oxidation of sulfides.
administering authority	has the meaning in Schedule 4 of the *Environmental Protection Act 1994.*
alternative arrangement	means a written agreement about the way in which a particular nuisance impact will be dealt with at a sensitive place, and may include an agreed period of time for which the arrangement is in place. An alternative arrangement may include, but is not limited to, a range of nuisance abatement measures to be installed at the sensitive place, or provision of alternative accommodation for the duration of the relevant nuisance impact.
analogue site(s)	means an area of land which contains values and characteristics representative of an area to be rehabilitated prior to disturbance. Such values must encompass land use, topographic, soil, vegetation and other ecological characteristics. Analogue sites can be the pre-disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters.
analyte(s)	means a chemical parameter determined by either physical measurement in the field or by laboratory analysis.
annual return period	means the most current 12-month period between 2 anniversary dates.

Term	Definition
aquifer	means an identifiable stratigraphic formation that has the potential to produce useful flows of water.
areas of pre-existing disturbance	means areas where environmental values have been negatively impacted as a result of anthropogenic activity and these impacts are still evident. Areas of pre-disturbance may include areas where legal clearing, logging, timber harvesting, or grazing activities have previously occurred, where high densities of weed or pest species are present which have inhibited re-colonisation of native regrowth, or where there is existing infrastructure (regardless of whether the infrastructure is associated with the authorised petroleum activities). The term 'areas of pre-disturbance' does not include areas that have been impacted by wildfire/s, controlled burning, flood or natural vegetation die-back.
associated water	means underground water taken or interfered with, if the taking or the interference happens during the course of, or results from, the carrying out of another authorised activity under a petroleum authority, such as a petroleum well, and includes waters also known as produced formation water. The term includes all contaminants suspended or dissolved in the water.
Australian Standard 2187	means Australian Standard 2187.0:1998 Explosives—Storage, transport and use, Part 0, Australian Standard 2187.1:1998 Explosives—Storage, transport and use Part 1 and Australian Standard 2187.2:2006 Explosives—Storage and use, Part 2 or any updated versions that becomes available from time to time.
Australian Standard 2885	means Australian Standard 2885.0:2008 Pipelines – Gas and Liquid Petroleum General Requirements, Australian Standard 2885.0-2008/Amdt 1-2012 Pipelines - Gas and Liquid Petroleum General Requirements, Australian Standard 2885.1:2012 Pipelines – Gas and Liquid Petroleum Design and Construction and Australian Standard 2885.3:2012 Pipelines – Gas and Liquid Petroleum Operation and Maintenance, or any updated versions that become available from time to time.
bed	of any waters, has the meaning in Schedule 19 Part 2 of the Environmental Protection Regulation 2019.
biodiversity values	for the purposes of this environmental authority, means environmentally sensitive areas, prescribed environmental matters and wetlands
business day	has the meaning in section 36 of the *Acts Interpretation Act 1954*.

Term	Definition
Category A ESA	means any area listed in Schedule 19, Part 2 of the Environmental Protection Regulation 2019.
Category B ESA	means any area listed in Schedule 19, Part 2 of the Environmental Protection Regulation 2019.
Category C ESA	means any of the following areas: • nature refuges as defined in the conservation agreement for that refuge under the *Nature Conservation Act 1992* • State forests or timber reserves as defined under the *Forestry Act 1959* • resources reserves under the *Nature Conservation Act 1992* • an area validated as 'essential habitat' or 'essential regrowth habitat' from ground-truthing surveys in accordance with the *Vegetation Management Act 1999* for a species of wildlife listed as endangered or vulnerable wildlife under the *Nature Conservation Act 1992* • 'of concern regional ecosystems' identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions
certified	in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams means, a Statutory Declaration by a suitably qualified person or suitably qualified third party accompanying the written document stating: • the person's qualifications and experience relevant to the function • that the person has not knowingly included false, misleading or incomplete information in the document • that the person has not knowingly failed to reveal any relevant information or document to the administering authority • that the document addresses the relevant matters for the function and is factually correct; and • that the opinions expressed in the document are honestly and reasonably held.
clearing	has the meaning in the dictionary of the *Vegetation Management Act 2000*.
cultivated	means used for cropping or gardening.

Term	Definition
coastal waters	has the meaning in section 440ZH of the *Environmental Protection Act 1994* and means the coastal waters of the state, and includes other waters within the limits of the state that are subject to the ebb and flow of the tide.
dam(s)	means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. A dam does not mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.
daily peak design capacity	for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the Environmental Protection Regulation 2019 as the higher equivalent person (EP) for the works calculated using each of the formulae found in the definition for EP.
declared pest species	has the meaning in the Land Protection (Pest and Stock Route Management) Regulation 2003 and is a live animal or plant declared to be a declared pest under section 36 (Declaring Pests by Regulation) or section 37(2) (Declaring Pest under Emergency Pest Notice) of that Act and includes reproductive material of the animal or plant.
decommissioning	in relation to pipelines means the actions undertaken in accordance with the requirements of Australian Standard 2885, as amended from time to time, to prepare the pipeline and peripheral facilities for pending suspension or abandonment.
department	means the administering authority.
designated precinct	has the meaning in Part 5 section 15(3) of the Regional Planning Interests Regulation 2014: • for a strategic environmental area mentioned in section 4(1)—the area identified as a designated precinct on the strategic environmental area map for the strategic environmental area; or • for a strategic environmental area is shown on a map in a regional plan—the area identified on the map as a designated precinct for the strategic environmental area.
documents	has the meaning in section 36 of the *Acts Interpretation Act 1954*.
ecological connectivity	is a measure of ecological condition and means the flow or connection of organisms and ecological processes across landscapes at multiple scales.

Term	Definition
	Ecological connectivity has a positive relationship with landscape connectivity and habitat connectivity and effects vary between species. It includes connectivity by stepping stone or contiguous bioregional/local corridor networks.
ecosystem functioning	means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of the vegetation community.
eligibility criteria	for an environmentally relevant activity, has the meaning in section 112 of the *Environmental Protection Act 1994*.
environmental attribute	has the meaning in section 11(2) of the *Regional Planning Interests Act 2014*.
environmental harm	has the meaning in section 14 of the *Environmental Protection Act 1994*.
environmental value(s)	has the meaning in section 9 of the *Environmental Protection Act 1994*.
environmental nuisance	has the meaning in section 15 of the *Environmental Protection Act 1994.*
environmental offset	has the meaning in section 7 of the *Environmental Offsets Act 2014*
environmentally relevant activity or ERA	has the meaning in section 18 of the *Environmental Protection Act 1994.*
environmentally sensitive area	means Category A, B or C environmentally sensitive areas (ESAs).
equivalent person or EP	has the meaning under section 3 of the Planning Guidelines For Water Supply and Sewerage, 2005, published by the Queensland Government. It is calculated in accordance with Schedule 2, Section 63(4) of the Environmental Protection Regulation 20019 where: • EP = V/200 where V is the volume, in litres, of the average dry weather flow of sewage that can be treated at the works in a day; or • EP = M/2.5 where M is the mass, in grams, of phosphorus in the influent that the works are designed to treat as the inlet load in a day.
estimated rehabilitation cost	has the meaning in section 300(2) of the *Environmental Protection Act 1994*.
green waste	means waste that is grass cuttings, trees, bushes, shrubs, material lopped from trees, untreated timber or other waste that is similar in nature but does not include declared pest species.
greywater	means wastewater generated from domestic activities such as laundry, dishwashing, and bathing. Greywater does not include sewage.
high ecological value waters	means Queensland waters that are scheduled waters under the Environmental Protection (Water) Policy 2009 as high value ecological waters.

Term	Definition
lake	means: • a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and • the bed and banks and any other element confining or containing the water.
land degradation	has the meaning in the *Vegetation Management Act 1999* and means the following: • soil erosion • rising water tables • the expression of salinity • mass movement by gravity of soil or rock • stream bank instability • a process that results in declining water quality.
levee	means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.
linear infrastructure	means powerlines, pipelines, roads and access tracks.
low consequence dam	has the meaning in schedule 19 of the Environmental Protection Regulation 2019.
low impact petroleum activities	means petroleum activities which do not result in the clearing of native vegetation, cause disruption to soil profiles through earthworks or excavation or result in significant disturbance to land which cannot be rehabilitated immediately using hand tools after the activity is completed. Examples of such activities include but are not necessarily limited to soil surveys (excluding test pits), topographic surveys, cadastral surveys and ecological surveys, may include installation of monitoring equipment provided that it is within the meaning of low impact and traversing land by car or foot via existing access tracks or routes or in such a way that does not result in permanent damage to vegetation.
month	has the meaning in s36 of the *Acts Interpretation Act 1954.*

Term	Definition
NATA accreditation	means accreditation by the National Association of Testing Authorities Australia.
non-linear infrastructure	means infrastructure that is other than a powerline, a pipeline, a road, an access track and includes only the following: • workers camps • maintenance facilities • no-release sewage treatment plants • laydown areas • structures (i.e. dams or levees) • tanks • sediment and erosion control measures • above ground containers and chemical / fuel storages • water pumps and generators stockpiles.
notice of election	has the meaning in section 18(2) of the *Environmental Offsets Act 2014.*
outer bank	has the meaning in section 5A of the *Water Act 2000*.
performance indicator(s)	means a quantitative measure against which success can be assessed and audited in a consistent, objective and repeatable manner.
prescribed environmental matters	Has the meaning in section 10 of the *Environmental Offsets Act 2014*, limited to the matters of State environmental significance listed in schedule 2 of the Environmental Offsets Regulation 2014 .
primary protection zone	means an area within 200 metres from the boundary of any Category A, B or C environmentally sensitive area.
produced water	has the meaning in section 15A of the *Petroleum and Gas (Production and Safety) Act 2004* and means CSG water or associated water for a petroleum tenure
prohibited matter	has the meaning in section 19 of the *Biosecurity Act 2014*.
protection zone	refers to either the primary protection zone or the secondary protection zone.

Term	Definition
regional ecosystem	Has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil. Regional ecosystems of Queensland were originally described in Sattler and Williams (1999). The Regional Ecosystem Description Database (Queensland Herbarium 2013) is maintained by the Queensland Herbarium and contains the current descriptions of regional ecosystems.
regulated structure	has the meaning in schedule 8, Part 1 of the Environmental Protection Regulation 2019.
rehabilitation or rehabilitated	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and restoration.
reinstated or reinstatement	means the process of bulk earth works and structural replacement of pre-existing conditions of a site (i.e. soil surface typography, watercourses, culverts, fences and gates and other landscape(d) features) and is detailed in the APGA *Code of Environmental Practice: Onshore Pipelines* (2017).
release, releases or released	has the meaning in Schedule 4 of the *Environmental Protection Act 1994.*
restoration	means the replacement of structural habitat complexity, ecosystem processes, services and function from a disturbed or degraded site to that of a pre-determined or analogue state. For the purposes of pipelines, restoration applies to final rehabilitation after pipeline decommissioning.
restricted matter	has the meaning in section 21 of the *Biosecurity Act 2014*.
revegetation or revegetating or revegetate	means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.
right of way	means the linear construction footprint required to install pipelines.
secondary protection zone	in relation to a Category A or Category B environmentally sensitive area means an area within 100 metres from the boundary of the primary protection zone.
secondary treated class B standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L

Term	Definition
	• total nitrogen as N, maximum 30mg/L • 5-day biochemical oxygen demand (inhibited) (e.g. release pipe from sewage treatment plant), maximum 20mg/L • suspended solids, maximum 30mg/L • pH, range 6.0 to 8.5 • e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 1000cfu per 100mL, maximum 10000cfu per 100mL.
sensitive place	means: • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel) • a library, childcare centre, kindergarten, school, university or other educational institution • a medical centre, surgery or hospital • a protected area • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees accommodation or public roads • for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2019.
significantly disturbed or significant disturbance or significant disturbance to land or areas	means disturbance to land as defined in Schedule 12, section 4 of the Environmental Protection Regulation 2019.
significant residual impact	has the meaning in section 8 of the *Environmental Offsets Act 2014*.
species richness	means the number of different species in a given area.
species diversity	means the diversity within an ecological community that incorporates both species richness and the evenness of species' abundances.
spring(s)	has the meaning in Schedule 4 of the *Water Act 2000.*

Term	Definition
stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.
strategic environmental area	Has the meaning in section 11(1) of the *Regional Planning Interests Act 2014*.
structure	means a dam or levee.
suitably qualified person	means a person who has qualifications, training, skills and experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
top soil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
trench spoil	means soil from the pipeline trench.
valid complaint	means a complaint that is not considered by the administering authority or holder of the environmental authority to be frivolous, vexatious or based on mistaken belief.
waste and resource management hierarchy	has the meaning provided in section 9 of the *Waste Reduction and Recycling Act 2011*.
waste and resource management principles	has the meaning provided in section 4(2)(b) of the *Waste Reduction and Recycling Act 2011*.
waters	means all or any part of a creek, river, stream, lake, lagoon, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.
watercourse	has the meaning provided in Schedule 4 of the *Environmental Protection Act 1994*.
wetland	has the meaning provided in schedule 19 of the Environmental Protection Regulation 2019.

Term	Definition
year(s)	has the meaning in s36 of the *Acts Interpretation Act 1954.*

END OF ENVIRONMENTAL AUTHORITY

Attexo

Appendix C

LoOM species habitat criteria

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Secluded small lagoons / wetlands not associated with any particular Regional Ecosystem.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Large Gilgai wetland with surrounding terrestrial vegetation, aquatic flora and shallow water.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Shallow water in the broad by-wash of large farm dams where there is aquatic vegetation and nearby adjacent terrestrial vegetation.	Permanent shallow water or water of varying depths.	Permanent shallow water or water of varying depths.	Permanent shallow water or water of varying depths.	Not Mapped as Essential Habitat (No)			Likely
		Shallow permanent water in the flood out zones of major streams or "anabranches' of smaller streams where there is still water, sedges, aquatic vegetation and dense ground cover. Mostly associated with open pasture areas surrounded by mature vegetation.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Wetlands, marshes and swamps associated with water of varying depths, aquatic vegetation and Melaleuca specie (paperbark trees).							Needs More Info
		Brackish Melaleuca wetlands and swamps in coastal dune swales.							N/A
		Not in listed vegetation types							Yes
									No
Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Brigalow Scrub with semi evergreen vine thicket (SEVT) understory and dense leaf litter ground cover and emergent bottletrees.	Dense ground covering of leaf litter and fine debris.	Dense ground covering of leaf litter and fine debris.	Dense ground covering of leaf litter and fine debris.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	SEVT/Acacia sp. with a canopy height of 4-6 metres, dense shrub layer and no ground cover. Ground cover typically covered with dense layer of leaves and fine debris.	Brigalow with SEVT understory, SEVT and/or microphyll vine forest.	Brigalow with SEVT understory, SEVT and/or microphyll vine forest.	Brigalow with SEVT understory, SEVT and/or microphyll vine forest.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Araucarian vine forest with a canopy height of 25+m, dense mid stratum and understory with very little ground cover except for leaf litter and woody debris.	Dense low thicket of Acacia or woodland species with 80-100% canopy cover and dense understory.	Dense low thicket of Acacia or woodland species with 80-100% canopy cover and dense understory.	Dense low thicket of Acacia or woodland species with 80-100% canopy cover and dense understory.	Not Mapped as Essential Habitat (No)			Likely
		Coastal SEVT with a dense understory and a deep covering of leaf litter. Will not occur west of the divide and highly unlikely to occur in the gas fields.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Simple notophyll vine forest with a dense understory and a deep covering of leaf litter. Occurs as small pockets of unmapped vegetation in gullies on western side of ranges.							
		Coastal rainforest with a dense understory and a deep covering of leaf litter. May occur as small pockets of unmapped vegetation in gullies on eastern side of ranges.							
		Not in listed vegetation types							
Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah.	Timbered watercourses with Casuarina spp. associated with permanent water.	Timbered watercourses with Casuarina spp. associated with permanent water.	Timbered watercourses with Casuarina spp. associated with permanent water.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river she-oak or Casuarina species.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypts on rocky jump up and scarps with hollows trees and Casuarina species.	Isolated medium to large belah trees containing cones	Isolated medium to large belah trees containing cones	Isolated medium to large belah trees containing cones				Known
		Mixed Eucalypt / Oak woodland with hollow trees and feed trees.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				
		Bull-oak Woodland.							
		Cleared country with scattered belah trees							
		Not in listed vegetation types							
Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Dry Eucalypt woodlands of ironbark, spotted gum or species with flaking bark.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Eucalypt woodland of poplar box.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Not Mapped as Essential Habitat (No)			Likely

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Lancewood scrub on ridges with dense woody debris and flaking bark. Brigalow melon-hole country with woody debris, soil cracks and water. Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Open forest.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Riverine woodlands.	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Dry sclerophyll low woodland.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Not Mapped as Essential Habitat (No)			Likely
		Brigalow with woody debris, soil cracks and water. Woodland, open forests and riverine equivalence in close proximity to water bodies in cleared country. Cleared land with good-quality melon holes Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypt/box woodlands and semi-arid areas with gum/box.	Primary feed trees, bieng *E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada* and *E. tereticornis ssp. tereticornis* represent the **dominant** canopy species within the vegetation community.	Primary feed trees, bieng *E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada* and *E. tereticornis ssp. tereticornis* represent the **dominant** canopy species within the vegetation community.	Primary feed trees, bieng *E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada* and *E. tereticornis ssp. tereticornis* represent the **dominant** canopy species within the vegetation community.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypt woodlands on low ranges and undulating country with mixed Eucalypts.	Secondary feed trees, being *E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon* represent the **dominant** canopy species within the vegetation community.	Secondary feed trees, being *E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon* represent the **dominant** canopy species within the vegetation community.	Secondary feed trees, being *E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon* represent the **dominant** canopy species within the vegetation community.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river red gum, forest red gum, poplar box and coolabah.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypts on alluvial soils in close proximity to water. Cleared land on fertile soil with scattered koala primary food trees Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Eucalypt woodlands on watercourses with sandstone ledges and caves in close proximity.	Sandstone/volcanic, rocky outcrops or the interface of a sandstone escarpment and fertile valleys with crevices, caves and overhangs on land zones 7, 9 and 10.	Sandstone/volcanic, rocky outcrops or the interface of a sandstone escarpment and fertile valleys with crevices, caves and overhangs on land zones 7, 9 and 10.	Sandstone/volcanic, rocky outcrops or the interface of a sandstone escarpment and fertile valleys with crevices, caves and overhangs on land zones 7, 9 and 10.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Dry open Eucalypt woodland with bull-oak and cypress on rocky jump-ups / scarps.	Erosion gullies with vertical banks containing crevices, ledges and tree hollows associated with land zone 3 and 5.	Erosion gullies with vertical banks containing crevices, ledges and tree hollows associated with land zone 3 and 5.	Erosion gullies with vertical banks containing crevices, ledges and tree hollows associated with land zone 3 and 5.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Semi evergreen vine thicket with Brigalow canopy on surface rock or sandstone interface.	Intact Eucalypt, SEVT and Acacia dominated communities with good structural representation <3kms from roosting structures listed in the other two attributes.	Intact Eucalypt, SEVT and Acacia dominated communities with good structural representation <3kms from roosting structures listed in the other two attributes.	Intact Eucalypt, SEVT and Acacia dominated communities with good structural representation <3kms from roosting structures listed in the other two attributes.	Not Mapped as Essential Habitat (No)			Likely
		Bendee or lancewood scrub, dry, open forest in land zone 5, 7 and 10 or where softer country transitions to scarps, jump-ups and rock ledges. Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Northern Quoll	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 CQ to the vicinity of Carnarvon Range NP. Occasional records as far south in QLD as Maleny on the Sunshine Coast Hinterland.	Rocky escarpments' with formations of large rocks and crevices on land zone 10 (horizontally bedded plateaus, ledges an scarps).	Rocky sandstone escarpments, rocky outcrops, caves and crevices.	Rocky sandstone escarpments, rocky outcrops, caves and crevices.	Rocky sandstone escarpments, rocky outcrops, caves and crevices.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Steep rocky slopes with large boulders, large mature eucalypts, hollow trees and large woody debris on land zones 10 and 9. Farms, dams or permanent water is usually nearby.	Moderately dense diverse vegetation with a range of eucalypts, tree hollows, large woody debris.	Moderately dense diverse vegetation with a range of eucalypts, tree hollows, large woody debris.	Moderately dense diverse vegetation with a range of eucalypts, tree hollows, large woody debris.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Ironstone jump-ups and sandy soils over duri-crusts with small caves & eucalypts with moderate dense vegetation. Often in close proximity to farm dams and caged chickens.	Permanent water, large pools and associated sand flats with diverse range of micro-habitat for insects, small birds, rodents and small mammals.	Permanent water, large pools and associated sand flats with diverse range of micro-habitat for insects, small birds, rodents and small mammals.	Permanent water, large pools and associated sand flats with diverse range of micro-habitat for insects, small birds, rodents and small mammals.	Not Mapped as Essential Habitat (No)			Likely
		Sandstone plateaus, escarpments and ledges with nearby permanent watercourses and eucalypt woodlands associated with land zones 3 (alluvial) and 9 (sandstone) where they occur together.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Rocky and isolated gorge country with vertical gullies, dense undisturbed eucalypt vegetation and pools of water with a diversity of wildlife.							
		Sandstone escarpment and steep rocky gorges with large body of permanent water and deposited alluvial sands with diverse vegetation.							
		Not in listed vegetation types							
Ornamental Snake	Occurs in central eastern Queensland in the Dawson and Bowen Basins. Generally restricted to heavy black soil habitat where it shelters under litter and fallen timber during the day. This includes Brigalow communities with Gilgai formations and altered and degraded habitat.	Degraded Brigalow habitat on cracking clay black/brown soils and Gilgai usually associated with Land zones 3 and 4.	Seasonally flooded gilgais on degraded grazing lands with heavy black cracking clay soils.	Seasonally flooded Gilgais on degraded grazing lands with heavy black cracking clay soils.	Seasonally flooded Gilgais on degraded grazing lands with heavy black cracking clay soils.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Flooded Gilgai/low lying habitats on cracking clays in association with aquatic vegetation, regrowth Brigalow and frog breeding habitat.	Scattered regrowth brigalow on low-lying plains, no obvious water with fallen wood material, leaf litter, evidence of previous aquatic vegetation and black/brown cracking clays.	Scattered regrowth brigalow on low-lying plains, no obvious water with fallen wood material, leaf litter, evidence of previous aquatic vegetation and black/brown cracking clays.	Scattered regrowth brigalow on low-lying plains, no obvious water with fallen wood material, leaf litter, evidence of previous aquatic vegetation and black/brown cracking clays.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Brigalow with woody debris, sparse tussock grasses, low shrubs, leaf litter, soil cracks, pools of water, frog habitat and woody debris.	Remnant brigalow on black/brown cracking clays with soil cracks, woody debris, evidence of aquatic vegetation, seasonally flooded gilgai and obvious fro habitat.	Remnant brigalow on black/brown cracking clays with soil cracks, woody debris, evidence of aquatic vegetation, seasonally flooded gilgai and obvious fro habitat.	Remnant brigalow on black/brown cracking clays with soil cracks, woody debris, evidence of aquatic vegetation, seasonally flooded gilgai and obvious fro habitat.	Not Mapped as Essential Habitat (No)			Likely
		Degraded pasture with minimal vegetation where there are numerous seasonally flooded Gilgai with low aquati vegetation on black/brown cracking clays.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Swamps, wetlands, seasonally flooded lowlands and riparian areas with black/brown cracking clays, Brigalow and aquatic vegetation.							
		Not in listed vegetation types							
Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Brigalow open forest with a low-moderately dense tree mid-story of SEVT species on gently undulating clay and/or weathered basalt plains with much surface gravel.	Colonies of small black ants (Iridomyrme species) present.	Colonies of small black ants (Iridomyrme species) present.	Colonies of small black ants (Iridomyrme species) present.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Roadside strips of Brigalow/Belah.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Brigalow open woodland on alluvial plain with low tree layer of wilga and false sandalwood.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)			Likely
		Brigalow/Belah open forest on clay soils with gilgai present, most containing deeper water. Understory often has wilga and false sandalwood.							Known

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Mapped/unmapped HVR of brigalow with a moderately dense SEVT understory. Often have emergent bottle-trees, sometimes with belah or occasional Eucalypt species.							
		Not in listed vegetation types							
Red goshawk	Coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. It is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia, from western Kimberley Division to northeastern NSW, and occasionally on continental islands.	Open forest and woodlands on land zone 5.	Watercourse with permanent water.	Watercourse with permanent water.	Watercourse with permanent water.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Riparian / riverine woodlands with a shrub layer and abundant small birds on alluvial terraces on land zone 3.	Open forests, woodlands and partially cleared country with tall retained roosting trees.	Open forests, woodlands and partially cleared country with tall retained roosting trees.	Open forests, woodlands and partially cleared country with tall retained roosting trees.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Tall open forests of mixed Brigalow / eucalypts with a shrubby understorey on land zone 4 in association with water bodies.	Gorge and rocky escarpments.	Gorge and rocky escarpments.	Gorge and rocky escarpments.	Not Mapped as Essential Habitat (No)			Likely
		Mapped/unmapped sparse riverine woodlands/watercourses with permanent water surrounded by partially cleared country and tall retained roosting trees.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Ironstone jump-ups with ironbarks, tall lancewood and Acacia sp. on land zone 7.							
		Gorge and escarpment country in close proximity to water on land zone 9 and 10.							
		Not in listed vegetation types							
Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Eucalypt woodlands with water less than 3km away, sandy areas dissected by gravel ridges, and burnt areas.	Open box woodland with sandy soils, farm tracks, previously burnt areas and a grassy understory.	Open box woodland with sandy soils, farm tracks, previously burnt areas and a grassy understory.	Open box woodland with sandy soils, farm tracks, previously burnt areas and a grassy understory.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Riverine woodlands with sandy areas, cattle tracks and low impact grazing.	Watercourse with sandy bed and degraded remnant or non-remnant eucalypt/ box vegetation.	Watercourse with sandy bed and degraded remnant or non-remnant eucalypt/ box vegetation.	Watercourse with sandy bed and degraded remnant or non-remnant eucalypt/ box vegetation.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Poplar box woodlands and non-remnant areas in close proximity to farm dams, cattle troughs and dry sandy creek beds.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypt woodlands, non-remnant vegetation areas and old sandy farm tracks in close proximity to grasslands, old cultivation paddocks and watercourses. Often observed on the sandy track or 2-3 metres off the track in small open areas of sandy grassland.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Cattle troughs and old leaking farm tanks adjacent to old cultivation paddocks, overgrazed land, and degraded areas frequented by cattle and buildings. Often observed in groups of 2-3 pairs.							
		Not in listed vegetation types							
Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Dry ironbark and cypress pine scrub or gum/box country.	Intact Eucalypt and Acacia dominated woodland to open forest communities with a shrub understory <1m tall and native grasses (combined) >50% cover.	Intact Eucalypt and Acacia dominated woodland to open forest communities with a shrub understory <1m tall and native grasses (combined) >50% cover.	Intact Eucalypt and Acacia dominated woodland to open forest communities with a shrub understory <1m tall and native grasses (combined) >50% cover.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Mixed lancewood scrub and Eucalypts on rocky jump-ups / scarps.	Cavities under and partly between partly buried rocks, rock piles, rock shale, crevices, caves.	Cavities under and partly between partly buried rocks, rock piles, rock shale, crevices, caves.	Cavities under and partly between partly buried rocks, rock piles, rock shale, crevices, caves.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Mulga and/or other low Acacia scrub country with dense woody debris.	Log piles, scattered large hollow logs associated with fallen trees, dense wood debris, stick-raked windrows and abandoned animal burrows.	Log piles, scattered large hollow logs associated with fallen trees, dense wood debris, stick-raked wind-rows and abandoned animal burrows.	Log piles, scattered large hollow logs associated with fallen trees, dense wood debris, stick-raked wind-rows and abandoned animal burrows.	Not Mapped as Essential Habitat (No)			Likely
		Dense lancewood scrub with dense woody debris and rock.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Brigalow melon-hole country with woody debris, soil cracks and water.							

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Bendee scrub on jump-ups or ridges with dense woody debris and rock.							
		Not in listed vegetation types							
Boggomoss snail	Endemic to the Dawson River catchment in inland south-eastern Queensland, occurring on alluvial flats and in riparian environments between Mt Rose (approximately 30km north of Monto) and Theodore.	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Timbered watercourses in REs 11.3.3, 11.3.4, 111.3.25, 11.3.27 and 11.3.36	Riparian forest associations within Regional Ecosystem (RE) 11.3.25 on the Dawson River, which support Queensland Blue Gum or River Red Gum Eucalyptus camaldulensis with Carnarvon Fan Palm as a co-dominant species in the canopy or a dominant sub-canopy species	Riparian forest associations within Regional Ecosystem (RE) 11.3.25 on the Dawson River, which support Queensland Blue Gum or River Red Gum Eucalyptus camaldulensis with Carnarvon Fan Palm as a co-dominant species in the canopy or a dominant sub-canopy species	Riparian forest associations within Regional Ecosystem (RE) 11.3.25 on the Dawson River, which support Queensland Blue Gum or River Red Gum Eucalyptus camaldulensis with Carnarvon Fan Palm as a co-dominant species in the canopy or a dominant sub-canopy species	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Not in listed vegetation types	Open Queensland Blue Gum forests fringing ephemeral wetlands and artesian springs, on the Dawson River floodplain.	Open Queensland Blue Gum forests fringing ephemeral wetlands and artesian springs, on the Dawson River floodplain.	Open Queensland Blue Gum forests fringing ephemeral wetlands and artesian springs, on the Dawson River floodplain.	Not Mapped as Essential Habitat (No)			Likely
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
									Needs More Info
Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Poplar box/gum, cypress pine and bull-oak country in REs 11.3.2, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.5.1, 11.5.4 and 11.5.20.	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow/Belah in REs 11.3.1, 11.4.3, 11.4.10 and 11.9.5.	Poplar box, gum-topped box, or forest re gum over ground cover of native grasses	Poplar box, gum-topped box, or forest re gum over ground cover of native grasses	Poplar box, gum-topped box, or forest re gum over ground cover of native grasses	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river she-oak or Casuarina species in REs 11.3.14, 11.3.17, 11.3.18, 11.3.25 and 11.3.27a.	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	Not Mapped as Essential Habitat (No)			Likely
		Woodland and grassland on alluvial plains in REs 11.3.21 and 11.3.3 Woodland on Cainozoic clay plains in RE 11.4.12	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Not in listed vegetation types							
Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Woodland and scrub on alluvial or sand plains in all REs from land zones 3, 4 anc 5 (excluding wetlands such as 11.3.25f and 11.3.27).	Any wooded ecosystem (remnant or regrowth) that develops a dense leaf litter layer	Any wooded ecosystem (remnant or regrowth) that develops a dense leaf litter layer	Any wooded ecosystem (remnant or regrowth) that develops a dense leaf litter layer	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah in REs 11.3.1, 11.3.16, 11.3.17, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.11, 11.5.16, 11.7.1, 11.9.1, 11.9.4, 11.9.5, 11.9.4, 11.9.5, 11.9.6, 11.9.10, 11.9.11, 11.9.12, 11.11.13, 11.11.14, 11.11.16, 11.11.19 and 11.12.21.	Deep, fixed leaf litter suitable for concealment	Deep, fixed leaf litter suitable for concealment	Deep, fixed leaf litter suitable for concealment	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Woodland and scrub on sedimentary rocks in all REs from land zones 8 and 9.	Healthy shrub layer present	Healthy shrub layer present	Healthy shrub layer present	Not Mapped as Essential Habitat (No)			Likely
		Forests and scrub on rocky jump up and scarps in all REs from land zones 7 and 10.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Forests and scrub on hills and lowlands on sedimentary or granitic rocks in all REs from land zones 11 and 12.							
		Semi-evergreen vine thicket (SEVT) in REs 11.3.11, 11.4.1, 11.5.15, 11.7.1, 11.8.3, 11.8.13, 11.9.4, 11.10.8, 11.11.18, 11.11.21, 11.12.4, 11.12.7.Semi-evergreen vine thicket (SEVT) in REs 11.3.11, 11.4.1, 11.5.15, 11.7.1, 11.8.3, 11.8.13, 11.9.4, 11.10.8, 11.11.18, 11.11.21, 11.12.4, 11.12.7.							
		Not in listed vegetation types							

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Woodland sites, including open dry eucalypt woodland, includes sites with ar understorey of grasses and creeping lantana (Lantana montevidensis) on ston soils or rocky ridges.	Suitable, dense ground structure; such as woody debris and logs and/or rocky habitats	Suitable, dense ground structure; such as woody debris and logs and/or rocky habitats	Suitable, dense ground structure; such as woody debris and logs and/or rocky habitats	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalyptus populnea woodland on alluvia plains in RE 11.3.2.	Dense vegetation within the canopy and mid-strata, with minimal impacts from grazing.	Dense vegetation within the canopy and mid-strata, with minimal impacts from grazing.	Dense vegetation within the canopy and mid-strata, with minimal impacts from grazing.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Brigalow / Eucalyptus populnea open forest on fine-grained sedimentary rocks in RE 11.9.10.	No evidence of recent fire; moderate or intense.	No evidence of recent fire; moderate or intense.	No evidence of recent fire; moderate or intense.	Not Mapped as Essential Habitat (No)			Likely
		Corymbia citriodora woodland on coarse-grained sedimentary rocks in RE 11.10.1	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Eucalypt and Lysicarpus woodland on coarse-grained sedimentary rocks in RE 11.10.4							
		Not in listed vegetation types							
Dulacca woodland snail	The Dulacca woodland snail is endemic to south-east Queensland, where it occurs as a small number of isolated and fragmented populations in the area between Miles and Dulacca, and south to Meandarra.	Mapped/unmapped remnant and scattered vine thicket and Acacia harpophylla (brigalow) woodland patches on rocky outcrops with clay to loam soils	Tree cover and accumulated ground debris of loose bark	Tree cover and accumulated ground debris of loose bark	Tree cover and accumulated ground debris of loose bark	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow open forest with a low-moderately dense tree mid-story of SEVT species, usually 11.4.9 on gently undulating clay and/or weathered basalt plains with much surface gravel.	Brigalow and/or SEVT with rocks in the ground layer	Brigalow and/or SEVT with rocks in the ground layer	Brigalow and/or SEVT with rocks in the ground layer	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Roadside strips of Brigalow/Belah in REs 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.9.1, 11.9.4, 11.9.5, 11.9.6 and 11.9.11.	Decaying logs and other forest debris.	Decaying logs and other forest debris.	Decaying logs and other forest debris.	Not Mapped as Essential Habitat (No)			Likely
		Eucalyptus citriodora and E. crebra woodland on course-grained sedimentary rocks in RE 11.10.1	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Not in listed vegetation types							
Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Remnant and high value regrowth (HVR) in open forest and woodland. Furina dunmalli prefers dry sclerophyll forests usually on black clay and clay loam soils.	Shelter available from features such as rocks or soil cracks.	Shelter available from features such as rocks or soil cracks.	Shelter available from features such as rocks or soil cracks.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah in REs 11.3.1, 11.4.3, 11.7.1, 11.9.4, 11.9.5, 11.9.6 and 11.9.10	Shelter available from ground debris and features such as logs and bark slabs.	Shelter available from ground debris and features such as logs and bark slabs.	Shelter available from ground debris and features such as logs and bark slabs.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Narrow-leaved ironbark and spotted gum woodland on course-grained sedimentary rocks in REs 11.10.1 and 1.10.7	Deep cracking black clay and loam soils.	Deep cracking black clay and loam soils.	Deep cracking black clay and loam soils.	Not Mapped as Essential Habitat (No)			Likely
		Woodland adjacent to ephemeral water courses with cracking clay and clay-loam soils in RE 11.3.17	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Woodland with cracking clay and clay-loam soils adjacent to ephemeral palustrine wetlands in RE 11.4.3a							
		Woodland adjacent to ephemeral water courses with cracking clay and clay-loam soils in RE 11.3.25							
		Not in listed vegetation types							
Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Transitory in airspace (1m to >1000m above ground) over regrowth of native vegetation, including High Value Regrowth of open woodlands, forests, riparian woodlands and shrublands; potentially over any regrowth across Gas Field.	Airspace (from 1m to >1000m above ground level) around cliffs and hills.	Airspace (from 1m to >1000m above ground level) around cliffs and hills.	Airspace (from 1m to >1000m above ground level) around cliffs and hills.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Transitory in airspace (1m to >1000m above ground) over cleared or sparsely wooded land, including farmland, inland open plains and settled areas (e.g. towns roads). Also recorded over parks and gardens, plantations and heavily populated areas (large towns and cities).	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settle areas.	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settle areas.	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settle areas.	Not Mapped as Essential Habitat (No)			Likely
		Transitory in airspace (1m to >1000m above ground) above cliffs and hills.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Not in listed vegetation types							
Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Mixed eucalypt woodland on sedimentary rocks in REs 11.9.2, 11.9.7, 11.9.9, 11.9.10, 11.10.1, 11.10.1d, 11.10.7, 11.10.11 and 11.11.1.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypt forest with Brigalow / Belah in REs 11.4.7, 11.4.10 and 11.9.10.	High density of hollow-bearing trees, particularly trees with large (150-300mm) to very-large (>300mm) hollows	High density of hollow-bearing trees, particularly trees with large (150-300mm) to very-large (>300mm) hollows	High density of hollow-bearing trees, particularly trees with large (150-300mm) to very-large (>300mm) hollows	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses dominated by eucalypt species in REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	Presence of very large and mature trees, particularly those with a DBH greater tha 50cm	Presence of very large and mature trees, particularly those with a DBH greater tha 50cm	Presence of very large and mature trees, particularly those with a DBH greater tha 50cm	Not Mapped as Essential Habitat (No)			Likely
		Eucalypts on duricrust, (potentially rocky jump up and scarps) with hollows trees ir REs 11.7.4, 11.7.6 and 11.7.7.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Eucalypt woodland on clay plains in REs 11.4.2, 11.4.7, 11.4.10 and 11.4.12.							
		Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.							
		Not in listed vegetation types							
Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	River red gum Eucalyptus camaldulensis and coolibah forest red gum E. tereticornis-lined watercourses	Timbered lowland plains, with acacia shrublands that are crossed by tree-lined watercourses	Timbered lowland plains, with acacia shrublands that are crossed by tree-lined watercourses	Timbered lowland plains, with acacia shrublands that are crossed by tree-lined watercourses	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Eucalyptus coolabah Coolibah-lined water course in lowland sandy and stony plains	Treeless areas, tussock grassland and open woodland.	Treeless areas, tussock grassland and open woodland.	Treeless areas, tussock grassland and open woodland.	Not Mapped as Essential Habitat (No)			Likely
		Occur in sparsely-timbered habitats such as tussock grasslands, open woodlands and sand-dunes	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Sometimes recorded near and over swamps, bores and waterholes where surface water attracts prey.							
		Not in listed vegetation types							
Major Mitchell cockatoo	In Queensland, the species occurs in the south-western and south-central part of the state, extending from west of Eromanga, north along the Barcoo River to the vicinity of Isisford and east to Roma and St George. There are occasional records further east to Goondiwindi and the Darling Downs, eas to around Warra.	Dry ironbark and cypress pine, bull-oak scrub country in REs 11.5.1, 11.5.4, 11.5.15, 11.5.20 and 11.5.21.	Trees with suitable nesting hollows and within close proximity to fresh surface water.	Trees with suitable nesting hollows and within close proximity to fresh surface water.	Trees with suitable nesting hollows and within close proximity to fresh surface water.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypts on alluvial in close proximity to water in REs 11.3.2, 11.3.4 and 11.3.14	Timbered watercourses with large eucalypts or Callitris spp. associated wit permanent water.	Timbered watercourses with large eucalypts or Callitris spp. associated wit permanent water.	Timbered watercourses with large eucalypts or Callitris spp. associated wit permanent water.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with Callitris gracilis or Casuarina species in REs 11.3.17, 11.3.18 and 11.3.25 / 11.3.25a.	Nesting habitat, specifically trees with nesting hollows >150mm.	Nesting habitat, specifically trees with nesting hollows >150mm.	Nesting habitat, specifically trees with nesting hollows >150mm.	Not Mapped as Essential Habitat (No)			Likely

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Eucalypt / box woodlands and semi-arid areas with gum/box in REs 11.3.6, 11.3.14, 11.3.37, 11.4.2, 11.4.10 and 11.4.12	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Mixed eucalypt / sheoak woodland with hollow trees and feed trees in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5 and 11.5.16							
		Not in listed vegetation types							
Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country in REs 11.5.1, 11.5.4, 11.5.15, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.	Forest and woodland eucalypts containing mistletoes of the genus Amyema.	Forest and woodland eucalypts containing mistletoes of the genus Amyema.	Forest and woodland eucalypts containing mistletoes of the genus Amyema.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah in REs 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9 and 11.4.10, 11.9.5, 11.9.10 and 11.9.13, containing mistletoes of the genus Amyema.	Boree/weeping myall (Acacia pendula) woodlands, brigalow (A. harpophylla) woodlands, box-gum woodlands and box-ironbark forests with abundant mistletoes of the genus Amyema.	Boree/weeping myall (Acacia pendula) woodlands, brigalow (A. harpophylla) woodlands, box-gum woodlands and box-ironbark forests with abundant mistletoes of the genus Amyema.	Boree/weeping myall (Acacia pendula) woodlands, brigalow (A. harpophylla) woodlands, box-gum woodlands and box-ironbark forests with abundant mistletoes of the genus Amyema.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river red gum in REs 11.3.14, 11.3.17 and 11.3.25 / 11.3.25a, containing mistletoes of the genus Amyema.	Riparian woodlands of river red gum and forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum and forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum and forest red gum with an abundance of mistletoes of the genus Amyema.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypt / Box woodlands and semi arid areas with gum/box in REs 11.3.2, 11.3.4, 11.3.6, 11.3.14, 11.3.37, 11.4.2, 11.4.10, 11.4.12, , 11.5.5, 11.5.9 and 11.5.13 containing mistletoes of the genus Amyema.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Bull-oak Woodland on in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.							
		Not in listed vegetation types							
Regent honeyeater	In Queensland, their current predicted distribution is limited to the south-east at scattered sites including the Brisbane region, Bribie Island and several sites in the Granite Belt from Warwick, west to Gore and south to Sundown National Park. The BAAM habitat modelling extends as far west as Miles.	Mapped/unmapped remnant or High Value Regrowth (HVR) woodlands where mistletoe is present, including dry eucalypt forests and woodlands dominated by box and ironbark eucalypts on inland slopes of the Great Divide, particularly more fertile, moister sites along creeks, broad river valleys and the lower slopes of foothills.	Forest or woodland containing mugga (or red) ironbark, yellow box, white box, yellow gum, spotted gum, broad-leaved ironbark, containing abundant mistletoes of the genus Amyema or long-flowered mistletoe (Dendropthoe vitellina).	Forest or woodland containing mugga (or red) ironbark, yellow box, white box, yellow gum, spotted gum, broad-leaved ironbark, containing abundant mistletoes of the genus Amyema or long-flowered mistletoe (Dendropthoe vitellina).	Forest or woodland containing mugga (or red) ironbark, yellow box, white box, yellow gum, spotted gum, broad-leaved ironbark, containing abundant mistletoes of the genus Amyema or long-flowered mistletoe (Dendropthoe vitellina).	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypt / box woodlands and semi-arid areas with gum/box in REs 11.3.4, 11.3.6, 11.3.14, 11.3.37, 11.4.2, 11.4.10 and 11.4.12, containing numerous mistletoes	Mature, large individual trees on highly fertile sites and in riparian areas.	Mature, large individual trees on highly fertile sites and in riparian areas.	Mature, large individual trees on highly fertile sites and in riparian areas.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Ironbark / sheoak woodland in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes	Riparian woodlands of river red gum or forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum or forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum or forest red gum with an abundance of mistletoes of the genus Amyema.	Not Mapped as Essential Habitat (No)			Likely
		Timbered watercourses with river red gum, forest red gum and river sheoak in RE 11.3.25 / 11.3.25a, containing an abundance of mistletoes	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Ironbark woodland and open forests with numerous mistletoes in REs 11.7.4 and 11.7.7							
		Not in listed vegetation types							

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Rufous fantail	Can potentially occur as a non-breeding visitor to many of the QGC tenements and widely across the Gas Field. The species probably occur as an uncommon or rare non-breeding visitor (from autumn to spring) to the Darling Downs, occasionally extending west of Dalby	Brigalow / Belah forests or woodlands, particularly with shaded areas of dense o damp understory vegetation; potentially i RE's 11.3.1, 11.4.3, 11.4.7, 11.4.10, 11.9.5, 11.9.6 and 11.9.10	Brigalow / Belah or Semi-Evergreen Vine Thicket associated with Land Zones 3, 4 and 9	Brigalow / Belah or Semi-Evergreen Vine Thicket associated with Land Zones 3, 4 and 9	Brigalow / Belah or Semi-Evergreen Vine Thicket associated with Land Zones 3, 4 and 9	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Semi-evergreen Vine Thicket in RE 11.9.4	Timbered watercourses or eucalypt-dominated woodlands and open forests associated with Land Zones 3, 4, 5, 7, 9 and 10	Timbered watercourses or eucalypt-dominated woodlands and open forests associated with Land Zones 3, 4, 5, 7, 9 and 10	Timbered watercourses or eucalypt-dominated woodlands and open forests associated with Land Zones 3, 4, 5, 7, 9 and 10	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses and wetlands, especially with shaded areas of dense or damp understory vegetation; potentially i RE's 11.3.25 and 11.3.27f	Dense or moist understory or mid-story vegetation, particularly shaded and sheltered sites (e.g. in gullies)	Dense or moist understory or mid-story vegetation, particularly shaded and sheltered sites (e.g. in gullies)	Dense or moist understory or mid-story vegetation, particularly shaded and sheltered sites (e.g. in gullies)	Not Mapped as Essential Habitat (No)			Likely
		Mixed Eucalypt woodland or open forest, especially in gullies or shaded areas of dense or damp understory vegetation; potentially in RE's 11.3.2, 11.3.3, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.4.12, 11.5.1, 11.5.2, 11.5.4, 11.5.5, 11.5.20, 11.7.6, 11.7.7, 11.9.7, 11.10.1 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Occasionally parks and gardens with areas of dense or damp understory vegetation							
		Not in listed vegetation types							
South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Dry ironbark and cypress pine, bull-oak o gum/box country in REs 11.4.7, 11.5.1, 11.5.4, 11.5.5, 11.5.20, 11.5.21, 11.9.9 and 11.9.10	Poplar box, ironbark, cypress pine, buloke woodlands.	Poplar box, ironbark, cypress pine, buloke woodlands.	Poplar box, ironbark, cypress pine, buloke woodlands.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Poplar box woodland in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, where there is cypress and buloke.	Large intact, extensive stands of vegetation with old-growth vegetation.	Large intact, extensive stands of vegetation with old-growth vegetation.	Large intact, extensive stands of vegetation with old-growth vegetation.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with mixed eucalypt species REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	Distinct canopy with a dense, cluttered understorey layer.	Distinct canopy with a dense, cluttered understorey layer.	Distinct canopy with a dense, cluttered understorey layer.	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
									Needs More Info
									N/A
									Yes
									No
Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August to south-eastern Queensland, occasionally extending to the Darling Downs	Eucalyptus and/or Corymbia dominated woodlands with large nectar-bearing trees, especially box-ironbark communities and woodlands dominated by key foraging tree species; potentially i RE's 11.3.4, 11.4.10, 11.5.1, 11.5.20, 11.7.6, 11.7.7 and 11.10.1	Woodlands and forests, particularly box-ironbark communities or Queensland Blue Gum-dominated woodlands on Lanc Zones 3, 4, 5, 7 and 10	Woodlands and forests, particularly box-ironbark communities or Queensland Blue Gum-dominated woodlands on Lanc Zones 3, 4, 5, 7 and 10	Woodlands and forests, particularly box-ironbark communities or Queensland Blue Gum-dominated woodlands on Lanc Zones 3, 4, 5, 7 and 10	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Other eucalypt-dominated woodlands an forests, including riparian woodlands: potentially in REs 11.3.2, 11.3.3, 11.3.17 11.3.18, 11.3.25, 11.3.27f, 11.4.12, 11.5.4, 11.5.5, 11.7.4, 11.9.7, 11.9.10 and 11.10.7	Other eucalypt-dominated woodlands on Land Zones 3, 4, 5, 7, 9 and 10	Other eucalypt-dominated woodlands on Land Zones 3, 4, 5, 7, 9 and 10	Other eucalypt-dominated woodlands on Land Zones 3, 4, 5, 7, 9 and 10	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Occasionally parks, gardens, farmland and wind-breaks with mature nectar-bearing eucalypts such as Sugar Gum E. cladocalyx	Woodlands or forests with mature and large (DBH ≥60cm) nectar-producing trees, particularly the following key Swift Parrot foraging tree species: Mugga Ironbark Eucalyptus sideroxylon, Grey Box E. microcarpa / E. woollsiana, Gum-topped Box E. mollucana, White Box E. albens, Yellow Box E. melliodora, Spotte Gum Corymbia maculata, Queensland Blue Gum E. tereticornis or River Red Gum E. camaldulensis	Woodlands or forests with mature and large (DBH ≥60cm) nectar-producing trees, particularly the following key Swift Parrot foraging tree species: Mugga Ironbark Eucalyptus sideroxylon, Grey Box E. microcarpa / E. woollsiana, Gum-topped Box E. mollucana, White Box E. albens, Yellow Box E. melliodora, Spotte Gum Corymbia maculata, Queensland Blue Gum E. tereticornis or River Red Gum E. camaldulensis	Woodlands or forests with mature and large (DBH ≥60cm) nectar-producing trees, particularly the following key Swift Parrot foraging tree species: Mugga Ironbark Eucalyptus sideroxylon, Grey Box E. microcarpa / E. woollsiana, Gum-topped Box E. mollucana, White Box E. albens, Yellow Box E. melliodora, Spotte Gum Corymbia maculata, Queensland Blue Gum E. tereticornis or River Red Gum E. camaldulensis	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
White-throated needletail	Distribution includes all coastal regions ir QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on plains in Land Zones 3 and 4	High, open spaces above open wooded areas	High, open spaces above open wooded areas	High, open spaces above open wooded areas	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Above forest on sand plains in Land Zone 5	Above or below canopy of forests or rainforests	Above or below canopy of forests or rainforests	Above or below canopy of forests or rainforests	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Above forest on scarps and rocky jump ups in Land Zone 7 and 10	Large tracts of native vegetation	Large tracts of native vegetation	Large tracts of native vegetation	Not Mapped as Essential Habitat (No)			Likely
		Above forest on rocky ground in Land zone 8 and 9	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Above forest on hills and lowlands in Land Zones 11 and 12							
		Not in listed vegetation types							
Woma	In Queensland, the Woma occurs in the dry subtropics from the Queensland-Northern Territory and Queensland-South Australia borders east to the Yuleba-Miles-St George areas in Brigalow Biogeographic Region (BBR)	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow in REs 11.4.3, 11.4.7 and 11.9.10	Poplar box Eucalyptus populnea, white cypress-pine Callitris glaucophylla and beefwood Grevillea striata on reddish sandy soils.	Poplar box Eucalyptus populnea, white cypress-pine Callitris glaucophylla and beefwood Grevillea striata on reddish sandy soils.	Poplar box Eucalyptus populnea, white cypress-pine Callitris glaucophylla and beefwood Grevillea striata on reddish sandy soils.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Poplar box Eucalyptus populnea and white cypress-pine Callitris glaucophylla in REs 11.3.2, 11.3.17, 11.3.18, 11.4.10, 11.4.12, 11.9.7 and 11.9.10.	Presence of suitable refugia such as hollow logs, rock shelters and/or animal burrows (e.g., rabbit warrens).	Presence of suitable refugia such as hollow logs, rock shelters and/or animal burrows (e.g., rabbit warrens).	Presence of suitable refugia such as hollow logs, rock shelters and/or animal burrows (e.g., rabbit warrens).	Not Mapped as Essential Habitat (No)			Likely
		Woodland on stony ridges in REs 11.7.1, 11.7.2, 11.7.4, 11.7.5 and 11.9.10.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Poplar box and Brigalow woodland in stony ridge areas in REs 11.9.10 and often with adjacent REs 11.7.1, 11.7.2, 11.7.4 and 11.7.5							
		Not in listed vegetation types							
Brown treecreeper (south-eastern)	Brown treecreepers (southeastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Eucalypt / box woodlands in REs 11.3.2, 11.3.3, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.4.7, 11.4.10 and 11.4.12.	Relatively undisturbed grassy woodland on flats and lower slopes (particularly areas dominated by smooth-barked eucalypts, poplar box and grey/Pilliga box) with open or sparse shrub cover and open native grassy and herbaceous ground cover.	Relatively undisturbed grassy woodland on flats and lower slopes (particularly areas dominated by smooth-barked eucalypts, poplar box and grey/Pilliga box) with open or sparse shrub cover and open native grassy and herbaceous ground cover.	Relatively undisturbed grassy woodland on flats and lower slopes (particularly areas dominated by smooth-barked eucalypts, poplar box and grey/Pilliga box) with open or sparse shrub cover and open native grassy and herbaceous ground cover.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Ironbark / smooth-barked apple / box woodland in REs 11.5.1, 11.5.4, 11.5.20 and 11.5.21.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses and palustrine wetlands with river red gum, forest red gum and she-oak in RE 11.3.25 / 11.3.25a and 11.3.27f.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Fallen timber, logs and leaf litter which provide essential foraging habitat.				Known
			No Habitat Attribute Present	No Habitat Attribute Present	No Habitat Attribute Present				
Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Open grassy forests and woodlands, dry pastures at wooded edges and occasionally in farmlands and grasslands with scattered trees.	Landforms 3, 4, 5 and possibly 9.	Landforms 3, 4, 5 and possibly 9.	Landforms 3, 4, 5 and possibly 9.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	They occur mainly in eucalypt, acacia or casuarina woodlands and open forests with a predominantly grassy ground cover.	Eucalypt, acacia or casuarina woodlands open forests and other lightly timbered habitats.	Eucalypt, acacia or casuarina woodlands open forests and other lightly timbered habitats.	Eucalypt, acacia or casuarina woodlands open forests and other lightly timbered habitats.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
			Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Hooded robin (south-eastern)	The Hooded Robin (southeastern) occurs in south-eastern Australia from far southern Queensland to Yorke Peninsula	Occur in lightly timbered woodlands and shrublands dominated by eucalypts and/or wattles.	Dry eucalypt and/or acacia woodlands and shrublands (patches as small as 3ha but usually >10ha) with an open understorey, complex and well-developed grassy and herbaceous ground layer, ample leaf litter and dead or fallen timber	Dry eucalypt and/or acacia woodlands and shrublands (patches as small as 3ha but usually >10ha) with an open understorey, complex and well-developed grassy and herbaceous ground layer, ample leaf litter and dead or fallen timber	Dry eucalypt and/or acacia woodlands and shrublands (patches as small as 3ha but usually >10ha) with an open understorey, complex and well-developed grassy and herbaceous ground layer, ample leaf litter and dead or fallen timber	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Often occur in dry woodland dominated by eucalypts (e.g., Grey Box, Yellow Box, Manna Gum, Blakely's Red Gum), rough-barked apple and cypress pine Callitris spp.;	Standing dead or live trees or shrubs (eucalypts, angophoras, wattles, casuarinas and cypress pines) and tree stumps for nesting, roosting and foraging. Low perching sites (usually to 3m high) from which to forage	Standing dead or live trees or shrubs (eucalypts, angophoras, wattles, casuarinas and cypress pines) and tree stumps for nesting, roosting and foraging. Low perching sites (usually to 3m high) from which to forage	Standing dead or live trees or shrubs (eucalypts, angophoras, wattles, casuarinas and cypress pines) and tree stumps for nesting, roosting and foraging. Low perching sites (usually to 3m high) from which to forage	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		They also occur in tall to low shrublands and low woodlands dominated by acacia (including Lancewood Acacia shirleyi, Brigalow Acacia harpophylla and Mulga).	Moderately-deep to deep soils, rocks and fallen timber, which provide essential foraging habitat.	Moderately-deep to deep soils, rocks and fallen timber, which provide essential foraging habitat.	Moderately-deep to deep soils, rocks and fallen timber, which provide essential foraging habitat.	Not Mapped as Essential Habitat (No)			Likely
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly occur in arid and semi-arid acacia eucalypt and cypress pine Callitris woodlands and shrublands	Relatively undisturbed open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly semi-arid acacia, eucalypt and cypress pine communities. Potentially occur on Landforms 3, 4, 5 and possibly 9.	Relatively undisturbed open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly semi-arid acacia, eucalypt and cypress pine communities. Potentially occur on Landforms 3, 4, 5 and possibly 9.	Relatively undisturbed open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly semi-arid acacia, eucalypt and cypress pine communities. Potentially occur on Landforms 3, 4, 5 and possibly 9.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence		Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
			Living and dead trees with hollows, holes or crevices, or dense, spiny-leaved shrubs, which are essential for roosting and nesting.	Living and dead trees with hollows, holes or crevices, or dense, spiny-leaved shrubs, which are essential for roosting and nesting.	Living and dead trees with hollows, holes or crevices, or dense, spiny-leaved shrubs, which are essential for roosting and nesting.	Not Mapped as Essential Habitat (No)			Likely
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Yellow-bellied Gliders (south-eastern) occur in dry eucalypt-dominated forests and woodlands, including wet and dry sclerophyll forests, typically in areas of high rainfall.	Large contiguous areas of floristically diverse and old-growth eucalypt forest, which are dominated by a mixture of trees, particularly winter-flowering and smooth-barked eucalypts.	Large contiguous areas of floristically diverse and old-growth eucalypt forest, which are dominated by a mixture of trees, particularly winter-flowering and smooth-barked eucalypts.	Large contiguous areas of floristically diverse and old-growth eucalypt forest, which are dominated by a mixture of trees, particularly winter-flowering and smooth-barked eucalypts.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	There is a strong preference for forests dominated by winter-flowering and smooth-barked eucalypts with the latter providing a wide range of foraging substrates and food resources.	Mature living hollow-bearing trees (particularly old, smooth-barked eucalypts) and sap trees Spotted Gum Corymbia citriodora / C. maculata, Grey Gum E. longirostrata, Queensland Blue Gum E. tereticornis and Smooth-barked Apple with DBH 41-60cm).	Mature living hollow-bearing trees (particularly old, smooth-barked eucalypts) and sap trees Spotted Gum Corymbia citriodora / C. maculata, Grey Gum E. longirostrata, Queensland Blue Gum E. tereticornis and Smooth-barked Apple with DBH 41-60cm).	Mature living hollow-bearing trees (particularly old, smooth-barked eucalypts) and sap trees Spotted Gum Corymbia citriodora / C. maculata, Grey Gum E. longirostrata, Queensland Blue Gum E. tereticornis and Smooth-barked Apple with DBH 41-60cm).	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
			Short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) and/or habitat corridors required to facilitate dispersal of the gliders between fragmented habitat patches and/or that enable recolonization or movement away from threats.	Short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) and/or habitat corridors required to facilitate dispersal of the gliders between fragmented habitat patches and/or that enable recolonization or movement away from threats.	Short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) and/or habitat corridors required to facilitate dispersal of the gliders between fragmented habitat patches and/or that enable recolonization or movement away from threats.	Not Mapped as Essential Habitat (No)			Likely

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known

Attexo

Appendix D

PEC Reports

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 34DY94, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 40ha for the Jammat Inlet Processing Facility.		
Lot Plan:	34DY94	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	31/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Revii
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration	
☐ Appraisal	☐ Development / Production	☐ Monitoring	
☐ Microseismic	☐ Directional	☐ Tiltmeter Array	
☐ Gravel Pit	☐ Campsite	☐ Access Track	
☐ Seismic	☐ Gathering System	☐ Security Hut	
☐ Trunkline	☐ Gas Pipeline	☐ Water Pipeline	
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond	
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)	
☑ Other: Processing facility		☐ Frac Pond	

RECOMMENDATIONS:		
☐ No Environmental issues on site	☑ Environmental issues identified & surveyed	☑ EA amendment required
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	☑ Fauna spotter required
☐ Other: EA amendment		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Significant Vegetation – Category B ESA

- **An EA amendment may be required** for disturbance within a Category B ESA triggered by the isolated patch (Polygon #7) within the centre of the survey area comprised remnant RE 11.4.3 (Endangered [BDS]).
- **An EA amendment may be required** for disturbance within the Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers of a Category B ESA triggered by field verified remnant RE 11.4.3 (Endangered [BDS]). (Polygons #41 and #40) within the Lot/ Plan 12RP190989.

- The three remnant RE 11.4.3 vegetation communities shown by Polygons #7, #40 and #41 met the criteria of a Brigalow Threatened Ecological Community (TEC) (***Brigalow*** [***Acacia harpophylla*** **dominant and co-dominant**] **ecological community**).

  Fauna

- Five (5) threatened species were shown as 'likely' to occur by the LoOM process.
- Bioidiversity offsets for habitat of threatened species may be required.
- Fauna spotter-catcher required for clearing activities.

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	The property comprised isolated patches of remnant vegetation and non-remnant open paddocks (historically and recently cleared) grazed by cattle that were dissected by access tracks and encompassed CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed the entire property supports non-remnant vegetation. Ground truthing detected an unmapped 1.55-hectare patch (Polygon #7) of remnant RE 11.4.3 (Endangered [VM Act] and [BDS]) within the centre of the proposed infrastructure. The remaining survey area within Lot/ Plan 34DY94 was field verified as non-remnant vegetation. Two patches of remnant RE 11.4.3 (Polygons #41 and #40) within the adjoining property to the west (Lot/ Plan 12RP190989) were also ground truthed during this survey.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	Ground truthing confirmed the isolated patch (Polygon #7) within the centre of the survey area comprised remnant RE 11.4.3 (Endangered [BDS]), which is a Category B ESA. o **An EA amendment may be required for disturbance within a Category B ESA.** The two patches of remnant RE 11.4.3 (Polygons #40 and #41) within the Lot/ Plan 12RP190989 were also considered Category B ESA's and therefore the survey area was within the PPZ and SPZ of these Category B ESA. o **An EA amendment may be required for disturbance within a Category B ESA PPZ and SPZ.**
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report.*	The isolated patch within the centre of the survey area (Polygon #7) was ground truthed as a Brigalow TEC (***Brigalow*** [***Acacia harpophylla* dominant and co-dominant**] **ecological community**) comprising remnant RE 11.4.3 and by meeting the diagnostic characteristics and condition thresholds. o **An EA amendment may be required for disturbance within a Brigalow TEC.** o **Offsets may apply to clearing of Brigalow TEC.** The two patches of remnant RE 11.4.3 (Polygons #41 and #40) within the Lot/ Plan 12RP190989 were also recorded to meet Brigalow TEC status.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	Non-remnant vegetation has been subjected to recent and historical clearing establishing very-sparsely-scattered low woody regrowth.
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment (see the EFAS report for details of the LoOM process) indicated the following are 'likely' to occur in the survey area: • Brigalow woodland snail (*Adclarkia cameroni*) 'endangered' under the EPBC and 'vulnerable' under the NCA

indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable. Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	• Dunmall's snake (*Furina dunmalli*) 'vulnerable' under the EPBC and NCA • Glossy black-cockatoo (*Calyptorhynchus lathami*) 'vulnerable' under the EPBC and NCA • Golden-tailed gecko (*Strophurus taenicauda*) 'near threatened under the NCA • Grey snake (*Hemiaspis damelii*) 'endangered' under the EPBC and NCA Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for the above threatened species is increased to 'known'. The clearing of woodland at the site may require offsetting and any threatened species detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any fauna.
Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers Attach completed *Water Features Checklist / Wetland Features Report*	No watercourses were mapped or detected within 100m of the survey area. Gilgais were present within the non-remnant Polygon #36 (~80% cover of gilgais) and Polygon #7. The gilgais within Polygon #36 were highly disturbed by heavy grazing and vegetation clearing establishing low-quality habitat value (Rating 1&2) regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species. Polygon #7 comprised a brigalow dominated community (remnant RE 11.4.3) with moderate quality (Rating 3) gilgais heavily grazed by cattle. See appended Wetland Features Report for ecological rating value, descriptions, and representative photos. There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	High risk (1). Biosecurity Act restricted invasive weed velvety tree pear (*Opuntia tomentosa*) recorded as rarely occurring.
Additional Considerations:	Relocation of proposed infrastructure to avoid Polygon #7 verified as Category B ESA and Brigalow TEC. Licenced fauna spotter required before and during clearing activities.
Attachments Included:	✓ Sketch ✓ QA mark-up map ✓ LoOM ✓ ESPT ☐ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ✓ Wetland Feature Report

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344.
This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.
Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.

Completed By	Date
Lincoln Smith Gerry Callahan (edits)	28/11/2024 2/02/2025

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m² and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 34DY94, Off-tenure Pipeline Ecology Resurvey		
ATP / PL number:	PL443 and PL253		
Site name: (Field and Well#)	Jammat Inlet Processing Facility	Development: (Infrastructure Type)	Processing Facility
Lot Plan:	34DY94	Disturbance size:	To be determined

Was the infrastructure shifted and why?	The proposed area was surveyed.
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable)*? • Survey new/correct extents of REs • Reference survey points and site photos	State mapping showed the entire property supports non-remnant vegetation. Ground truthing detected an unmapped 1.55-hectare patch (Polygon #7) of remnant RE 11.4.3 (Endangered [VM Act] and [BDS]) within the centre of the proposed infrastructure. The remaining survey area within Lot/ Plan 34DY94 was field verified as non-remnant vegetation. Two patches of remnant RE 11.4.3 (Polygons #41 and #40) within the adjoining property to the west (Lot/ Plan 12RP190989) were also ground truthed during this survey.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	Ground truthing confirmed the isolated patch (Polygon #7) within the centre of the survey area comprised remnant RE 11.4.3 (Endangered [BDS]) which is a Category B ESA. o **An EA amendment may be required for disturbance within a Category B ESA.** The two patches of remnant RE 11.4.3 (Polygons #40 and #41) within the Lot/ Plan 12RP190989 were also considered Category B ESA's and therefore the survey area was within the PPZ and SPZ of these Category B ESA. o **An EA amendment may be required for disturbance within a Category B ESA PPZ and SPZ.**
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Gathering to this infrastructure was via the northern property boundary of Lot/ Plan 11RP190982, which comprised non-remnant vegetation containing low quality gilgais. The site is likely to be accessed from the existing fenceline track traversing non-remnant vegetation (unsealed).
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	The isolated patch within the centre of the survey area (Polygon #7) was ground truthed as a Brigalow TEC (***Brigalow*** [***Acacia harpophylla*** **dominant and co-dominant**] **ecological community**) comprising remnant RE 11.4.3 and by meeting the diagnostic characteristics and condition thresholds. o **An EA amendment may be required for disturbance within a Brigalow TEC.** o **Offsets may apply to clearing of Brigalow TEC.** The two patches of remnant RE 11.4.3 (Polygons #41 and #40) within the Lot/ Plan 12RP190989 were also recorded to meet Brigalow TEC status.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora were recorded on site.

Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	Site was not in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	**Introduction** The *Likelihood of Occurrence Matrix* (LoOM) was developed by CHEC Environmental (CHEC) to facilitate consistency in habitat assessments by its ecologists. The LoOM, in its current version, considers the likelihood of 34 threatened (federal and/or state) fauna species occurring at a proposed development site. The included species are those with potential to occur within QGC's 'Upstream' and 'Midstream' project areas (and are applicable to Arrow Energy's Surat Gas Project areas), which are detailed in QGC's combined *Significant Species Management Plan* (SSMP). The LoOM (and SSMP) is regularly reviewed and revised to ensure alignment with changes to federal and state conservation status listings. The distribution and habitat information contained in the LoOM (and SSMP) were sourced from the latest reliable reference material, including published texts and journals, SPRAT profiles, *Atlas of Living Australia* maps, *Wildlife Online* searches and QGC GIS records. The LoOM assessment is a systematic process, where you work across the spreadsheet from left to right for each species, starting with viewing a distribution map, then making selections (where prompted) from lists for 'broad area of occurrence', then 'habitat attributes', occurrence of 'Essential Habitat', 'historical' or 'recent' confirmed records. Depending on the responses, a determination of 'Unlikely', 'Likely' or 'Known' is provided for the species, and a link to the relevant survey methodology is provided, if applicable. The completed LoOM is appended to this report. The LoOM assessment indicated the following species are 'likely' to occur in the survey area: • Brigalow woodland snail (*Adclarkia cameroni*) 'endangered' under the EPBC and 'vulnerable' under the NCA, • Dunmall's snake (*Furina dunmalli*) 'vulnerable' under the EPBC and NCA, • Glossy black-cockatoo (*Calyptorhynchus lathami*) 'vulnerable' under the EPBC and NCA, • Golden-tailed gecko (*Strophurus taenicauda*) 'near threatened' under the NCA, • Grey snake (*Hemiaspis damelii*) 'endangered' under the EPBC and NCA, Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for the above threatened species is increased to 'known'. The clearing of woodland at the site may require offsetting and any threatened species detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any fauna.
Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site. • If no alternative exists, peg in area of least disturbance and provide justification Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No watercourses were mapped or detected within 100m of the survey area.

<table>
<tr><td>Distance to Wetlands (not including melon holes):
• Complete Wetland Features Report
• Record wetland status and type:
o Referable and Validated (Mapped and ground truthed as a wetland)
o Referable and Not Validated (Mapped and ground truthed as not a wetland)
o Non-referable and Validated (Unmapped ground-truthed wetland)
Refer to EA Conditions Matrix for buffer distances and permitted activities, e.g.:
QCLNG - 200m buffer applies for static, Surat North – HES (200m buffer applies), GES (no buffer)</td><td>Gilgais were present within the non-remnant Polygon #36 (~80% cover of gilgais) and Polygon #7– see appended Map.

The gilgais within Polygon #36 were highly disturbed by heavy grazing and vegetation clearing, resulting in low-quality habitat value (Rating 1&2) regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species.

Polygon #7 comprised a brigalow dominated community (remnant RE 11.4.3) with moderate-quality (Rating 3) gilgais heavily grazed by cattle.

See appended Wetland Features Report for ecological rating value, descriptions, and representative photos.

There were no other types of wetlands mapped or detected were within 200m of linear infrastructure.</td></tr>
<tr><td>Melon Holes (rate on ecological value):
Give details on width, depth, area, vegetation, fauna habitat, disturbance etc</td><td><table><tr><td>1 ✓</td><td>2✓</td><td>3 ✓</td><td>4</td><td>5</td></tr></table>Gilgais present within non-remnant = 1&2; Polygon #7 gilgais = 3</td></tr>
<tr><td>Weeds present (and general abundance):
• Record general composition density & species.
• Survey any Restricted Invasive Weeds</td><td>Biosecurity Act restricted invasive weed velvety tree pear (Opuntia tomentosa) recorded as rarely occurring.

Non-native ground layer species of forbs (e.g., Cirsium vulgare) and grasses (e.g., Melinis repens) present throughout survey area.</td></tr>
<tr><td>Additional Considerations:</td><td>Licenced fauna spotter required before and during clearing activities.</td></tr>
</table>

Ecological Characteristics
Dominant Species: (trees, bushes, grasses)

Trees
Acacia harpophylla (brigalow), *Casuarina cristata* (belah)

Shrubs
Acacia leiocalyx (early flowering black wattle), *Alectryon diversifolius* (boonaree), *Dodonaea viscosa* (sticky hopbush), *Geijera parviflora* (wilga), *Psydrax odorata* (Canthium)

Forbs

Boerhavia dominii (tarvine), *Chrysocephalum apiculatum* (yellow buttons), *Cirsium vulgare** (spear thistle), *Enchylaena tomentosa* (ruby saltbush), *Evolvulus alsinoides* (bindweed), *Juncus usitatus* (common rush), *Sclerolaena anisacanthoides* (yellow burr), *Tetragonia tetragonioides* (New Zealand spinach), *Trianthema portulacastrum* (black pigweed)

Grasses and Associates
Aristida caput-medusae (many-headed wiregrass), *Aristida calycina* (dark wiregrass), *Cyperus sp.* (a cyperus), *Dichanthium sericeum* (Queensland bluegrass), *Eleocharis sp.* (spike rush), *Eragrostis elongata* (clustered lovegrass), *E. sororia* (woodland lovegrass), *Fimbristylis dichotoma* (common fringe-rush), *Lomandra filiformis* (wattle matrush), *Melinis repens** (red natal), *Panicum effusum* (hairy panic), *Paspalidium caespitosum* (brigalow grass), *Walwhalleya subxerophila* (gilgai grass)

Structural Form:	
Average Tree Height (m): 16	Canopy layer (%): 50
Structural Form (Specht 1970[1]): open-forest	

Habitat Description:		
Is a further detailed flora/fauna assessment required?	Y	N
	Y	
If yes, what type and reasons for: Fauna assessments for threatened species is highly likely to be required.		
Logs >30cm Ø (count): 10+ / hectare	Rocks >50cm Ø (count): 0	
Hollow bearing trees (count): 0		
Slope: flat	Aspect of Slope: NA	

Soil:	
Colour:	brown
Texture[2]:	clay
Land Zone:	4
Salinity:	-

Groundcover: (%)	
Bare soil: 40	Grass/Herbs: 25
Shrubs <1m: 5	Other (rocks, logs, weeds): 30

	Environmentally Sensitive Areas (ESA) Tick if site is located within:
	Category A ESA (e.g., national park, conservation park)
✓	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management
Does the proposed development involve vegetation clearing?
that isolates clumps or dissects corridors of vegetation
on dispersible soils
in existing or potential discharge areas
If YES in any of the above, provide justification: Development would involve the clearing of a 1.55 hectare patch of remnant RE 11.4.3.

Disturbance							
Erosion:							
Insignificant		Minor	✓	Moderate		Severe	
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc): Heavily grazed and historically cleared.							

SITE LOCATION RECOMMENDED

Yes ☐ No ☑ Yes with conditions ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity

[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

Photo 1: View of survey area from NE corner towards centre

Photo 2: View of survey area from NW corner towards centre

Photo 3: View of survey area from SE corner towards centre

Photo 4: View of survey area from SW corner towards centre

Photos 5: Polygon #7 comprising remnant RE 11.4.3 / Brigalow TEC.

WETLAND FEATURES - ENVIRONMENTAL SURVEY REPORT

Wetland Features **Note: if wetland is Gilgai (melon holes), rate on ecological value. Refer to *Environmental Constraints Assessment Guideline* for rating system.** 1 2 3 4 5 Nil/Very Low Very High				
Location Details (Gathering / Access / Well) Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	**GPS Coordinates Surveyor Reference #**	**Type of wetland** (e.g. ,Gilgai, mapped Referrable Wetland, discharge area etc.)	***Features Determining Wetland*** (Width, water depth, vegetation, aquatic species, condition, blade ploughed etc)	**Actions Taken**
Example *Well # 179 on Kate*	*Surveyor Ref # 2221*	*Gilgai (Melon Hole) Value Rating 4.*	*50m long and 30m wide, Water to approx. 0.5m depth, many aquatic plants. Previously ploughed for grazing with minor stock trampling. Small fish, frogs and turtle observed.*	*Avoided by 20 metres.* ***Or*** *Could not be avoided as relocation would require clearing of Brigalow TEC or locating within a watercourse buffer. Fauna spotter required during clearing.*
Polygon #36	EV3102 (inside) – northern extent of survey area.	Multiple contiguous and separated shallow gilgais (melon holes). Rating 1&2 (Very low and low quality)	3m – 20m wide and 3m – 20+m long, 0.1-0.3m depth, historical and recent clearing, heavily grazed, some wide and deep cracks, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), non-native flora species also present (e.g. *Cirsium vulgare*), no aquatic fauna observed, ~ 30% cover of gilgais.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.
Polygon #7	EV3102	Multiple contiguous and separated shallow gilgais (melon holes). Rating 3 (Moderate quality)	3m – 10m wide and 3m – 12+m long, 0.1-0.3m depth, within 1.55-hectare remnant RE 11.4.3, heavily grazed, some wide and deep cracks, woody debris and logs present, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), no aquatic fauna observed.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.

Wetland Features – Photography

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comment

	
Photo 1: Typical gilgai within Polygon #36.	Photo 2: Heavily-grazed gilgais within remnant RE 11.4.3 (Polygon #7).

SSMP- Likelihood of Occurrence Matrix - Jammat 34DY94

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** in column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence**(LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Brigalow/Belah in REs 11.3.1, 11.4.3, 11.4.10 and 11.9.5.	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No			Microhabitat features for this species for feeding, survival and egg-laying observed throughout brigalow community in survey area such as decaying logs and woody debris, leaf litter, and dense overstorey cover of shrubs and trees.	Likely	Yes
View Map	Brown treecreeper (south-eastern	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Not in listed vegetation types									Unlikely	No
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Brigalow / Belah in REs 11.3.1, 11.3.16, 11.3.17, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.11, 11.5.16, 11.7.1, 11.9.1, 11.9.4, 11.9.5, 11.9.4, 11.9.5, 11.9.6, 11.9.10, 11.9.11, 11.9.12, 11.11.13, 11.11.14, 11.11.16, 11.11.19 and 11.12.21.	Healthy shrub layer present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types									Unlikely	No
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Brigalow / Belah in REs 11.3.1, 11.4.3, 11.7.1, 11.9.4, 11.9.5, 11.9.6 and 11.9.10	Shelter available from ground debris and features such as logs and bark slabs.	Deep cracking black clay and loam soils.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No			Shelter and other microhabitat features were present including soil cracks,logs and woody debris, leaf litter, and dense overstorey cover of shrubs and trees.	Likely	Yes
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settled areas.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Brigalow / Belah.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Isolated medium to large belah trees containing cones	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No			Mature belah (Casuarina cristata) feed trees present .	Likely	Yes
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Brigalow melon-hole country with woody debris, soil cracks and water.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Not Mapped as Essential Habitat (No)	No			Trees with loose and peeling bark common throughout brigalow patch and water source within vicinity.	Likely	Yes
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Not in listed vegetation types									Unlikely	No
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Not in listed vegetation types									Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Brigalow with woody debris, soil cracks and water.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Not Mapped as Essential Habitat (No)	No			Heavy clay soils with cracks in gilgais <1km from permanent water. Logs and woody debris, leaf litter, and dense overstorey cover of shrubs and trees.	Likely	Yes
View Map	Hooded robin (south-eastern)	The Hooded Robin (south-eastern) occurs in south-eastern Australia from far southern Queensland to Yorke Peninsula,	Not listed in vegetation types									Unlikely	Yes
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Not in listed vegetation types									Unlikely	No
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Brigalow/Belah open forest on clay soils with gilgai present, most containing deeper water. Understory often has wilga and false sandalwood.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Not in listed vegetation types									Unlikely	No
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on plains in Land Zones 3 and 4	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Brigalow melon-hole country with woody debris, soil cracks and water.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 6DY86, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 18.05 hectares (3,610m x 50m) of pipeline Right-of-Way (RoW).		
Lot Plan:	6DY86	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	30/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Rev ii
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration	
☐ Appraisal	☐ Development / Production	☐ Monitoring	
☐ Microseismic	☐ Directional	☐ Tiltmeter Array	
☐ Gravel Pit	☐ Campsite	☐ Access Track	
☐ Seismic	☐ Gathering System	☐ Security Hut	
☐ Trunkline	☐ Gas Pipeline	✓ Water Pipeline	
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond	
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)	
☐ Other:		☐ Frac Pond	

RECOMMENDATIONS:		
☐ No Environmental issues on site	✓ Environmental issues identified & surveyed	☐ EA amendment required
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	✓ Fauna spotter required
☐ Other:		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Fauna

- Biodiversity offsets for koala *Phascolarctos cinereus* may be required.
- Fauna Spotter Catcher required for clearing activities, potential subterranean species within gilgais (eg. burrowing frogs).

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	The property comprised, remnant vegetation associated with Wambo Creek and isolated large woodland patches, advanced regrowth, and non-remnant open paddocks (historically cleared), grazed by cattle, that were dissected by access tracks and encompassed existing CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed: 1. a very small portion at the western extent of survey lies within mapped RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio), 2. an isolated patch of remnant RE 11.5.1a within 200m of the survey area, 3. the remaining area within 200m of the survey area as non-remnant vegetation. Ground truthing determined: • the western extent of the survey area traversed remnant RE 11.5.1 (Polygon #32) and advanced regrowth analogous with RE 11.5.4 (polygon #35). Both RE types are Least Concern [VM Act]; No Concern at Present [BDS]), • the mapped isolated patch of RE 11.5.1a comprised RE 11.5.1 (Polygon #37), the remaining area comprised non-remnant vegetation of historically cleared open currently grazed by cattle (Polygons #33, #5 & #2).
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	A small portion of the survey area lies within two separately mapped Category C ESAs and their Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by mapped remnant RE 11.3.25 (Of Concern [BDS]) as part of the state mapped mixed polygon RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio) and Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. Ground truthing confirmed that the western boundary of the survey area is >200m from the previously surveyed remnant RE 11.3.25 adjoining Wambo Creek to the west and therefore the survey area does not lie within this mapped Category C ESA or PPZ but a small portion would be within the SPZ. Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement. No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report.*	No TECs mapped or recorded the property.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The western extent of the survey area traversed advanced regrowth analogous with RE 11.5.4 (estimated clearing event 10 years ago).
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.

for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Likely', or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable. Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that *Phascolarctos cinereus* (koala) ('endangered' under the EPBC and NCA), *Hirundapus caudacutus* (white-throated needletail) ('vulnerable' under the EPBC and NCA) and *Strophurus taenicauda* (golden-tailed gecko) ('near threatened' under the NCA), are 'likely' to occur in the survey area. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for koala and golden-tailed gecko is increased to 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The results of this LoOm assessment were based on the western extent of the survey area comprising remnant RE 11.5.1 (Polygon #32) and advanced regrowth analogous with RE 11.5.4 (polygon #35). The shallow very low quality microrelief and gilgais within Polygons #2 & #5 (non-remnant areas) were also taken into consideration regarding potential habitat. The clearing of woodland at the site may require offsetting for koala habitat. Any koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.
Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers Attach completed *Water Features Checklist / Wetland Features Report*	No watercourses were mapped or detected within 100m of the survey area. Gilgais were present within the non-remnant Polygons #2 (~30% cover of gilgais) & #5 (~50% cover of gilgais). These gilgais were microrelief and shallow gilgai formations supporting very low-quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species (see appended Wetland Features report for ecological rating value, descriptions, and representative photos). There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	High risk (1). Biosecurity Act restricted invasive weed velvety tree pear (*Opuntia tomentosa*) recorded as rarely occurring.
Additional Considerations:	There were potential habitat features within remnant and advance regrowth including, very sparsely scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.
Attachments Included:	✓ Sketch ✓ QA mark-up map ✓ LoOM ✓ ESPT ☐ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ✓ Wetland Feature Report

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344. This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory. Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.	
Lincoln Smith Gerry Callahan (edits)	27/11/2024 2/02/2025
Completed By	**Date**

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m^2 and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 6DY86, Off-tenure Pipeline Ecology Resurvey
ATP / PL number:	PL278
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	No realignments were necessary due to environmental constraints.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	The property comprised, remnant vegetation associated with Wambo Creek and isolated large woodland patches, advanced regrowth, and non-remnant open paddocks (historically cleared) grazed by cattle that were dissected by access tracks and encompassed CSG infrastructure.

Confirm REs present:
• What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as?
• Survey new/correct extents of REs.
  ○ Fully survey polygons, if practicable;
  ○ Buffer partially-surveyed edges; and
• Provide reference survey points and site photos.
	State mapping showed:
	1. a very small portion at the western extent of survey lies within mapped RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio),
	2. an isolated patch of remnant RE 11.5.1a within 200m of the survey area,
	3. the remaining area within 200m of the survey area as non-remnant vegetation.
	
	Ground truthing determined:
	• the western extent of the survey area traversed remnant RE 11.5.1 (Polygon #32) and advanced regrowth analogous with RE 11.5.4 (polygon #35). Both RE types are Least Concern [VM Act]; No Concern at Present [BDS]),
	• the mapped isolated patch of RE 11.5.1a comprised RE 11.5.1 (Polygon #37),
	• the remaining area comprised non-remnant vegetation of historically cleared open currently grazed by cattle (Polygons #33, #5 & #2).

Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	A small portion of the survey area lies within two separately mapped Category C ESAs and their Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by mapped remnant RE 11.3.25 (Of Concern [BDS]) as part of the state mapped mixed polygon RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio) and Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. Ground truthing confirmed that the western boundary of the survey area is >200m from the previously surveyed remnant RE 11.3.25 adjoining Wambo Creek to the west and therefore the survey area does not lie within this mapped Category C ESA or PPZ but a small portion would be within the SPZ. Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement. No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	No TECs mapped or recorded the property.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora recorded on site.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping?	Site is not in a High-Risk area according to latest Flora Trigger mapping.

If yes, Flora Trigger Survey to be recommended	
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	The completed LoOM is appended to this report. The LoOM assessment indicated that *Phascolarctos cinereus* (koala) ('endangered' under the EPBC and NCA), *Hirundapus caudacutus* (white-throated needletail) ('vulnerable' under the EPBC and NCA) and *Strophurus taenicauda* (golden-tailed gecko) ('near threatened' under the NCA), are 'likely' to occur in the survey area. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for koala and golden-tailed gecko is increased to ''known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The results of this LoOm assessment were based on the western extent of the survey area comprising remnant RE 11.5.1 (Polygon #32) and advanced regrowth analogous with RE 11.5.4 (polygon #35). The shallow, very low quality, microrelief and gilgais within Polygons #2 & #5 (non-remnant areas) were also taken into consideration regarding potential habitat. The clearing of woodland at the site may require offsetting for koala habitat. Any koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No watercourses were mapped or detected within 100m of the survey area. Gilgais were present within the non-remnant Polygons #2 (~30% cover of gilgais) & #5 (~50% cover of gilgais). These gilgais were microrelief and shallow gilgai formations supporting very low-quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species (see appended Wetland Features report for ecological rating value, descriptions, and representative photos). There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Current road access to proposed site: Existing / to be upgraded / new	Access is via Montrose Road.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	* Denotes non-native species **Trees** (within remnant and advanced regrowth) *Allocasuarina luehmannii* (bull oak) *Angophora leiocarpa* (smooth-barked apple) *Callitris glaucophylla* (white cypress pine) *Eucalyptus chloroclada* (Dawson's gum) *Eucalyptus crebra* (narrow-leaved ironbark) *E. populnea* (poplar box) *Melaleuca decora* (white feather honey myrtle) **Shrubs** *Acacia ixiophylla* (sticky wattle) *A. deanii* (Deane's wattle) *A. leiocalyx* (early flowering black wattle) *A. spectabilis* (glory wattle) *Dodonaea viscosa* (sticky hopbush) **Forbs** *Brunoniella australis* (blue trumpet) *Chrysocephalum apiculatum* (yellow buttons) *Evolvulus alsinoides* (bindweed) *Juncus usitatus* (common rush) *Murdannea graminea* (grass lily) **Grasses and Associates** *Aristida caput-medusae* (many-headed wiregrass) *A. leichhardtiana* (a wiregrass) *A. ramosa* (cane speargrass) *Cyperus sp.* (a cyperus) *Dianella sp.* (a flax lily)

	Dichanthium sericeum (Queensland bluegrass) *Eleocharis sp.* (spike rush) *Entolasia stricta* (wiry panic) *Eragrostis lacunaria* (purple lovegrass) *E. elongata* (clustered lovegrass) *E. sororia* (woodland lovegrass) *Fimbristylis dichotoma* (common fringe-rush) *Gahnia aspera* (rough saw-sedge) *Laxmannia gracilis* (wire lily) *Lomandra filiformis* (wattle matrush) *Lomandra longifolia* (spiny-head matrush) *Melinis repens** (red natal) *Panicum decompositum* (native millet) *Panicum effusum* (hairy panic) *Panicum larcomianum* (a panic grass) *Paspalidium caespitosum* (brigalow grass) *Walwhalleya subxerophila* (gilgai grass)
Vegetation disturbance size: *(Area – m^2)*	Disturbance would be as per the final sketch. Approximately 18.05 hectares (3,610m x 50m) surveyed.
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	Within remnant and advanced regrowth: • Trees; 0-25, • Shrubs; 0-25, • Ground cover species; 25-50.
Soil type & erodibility (Sodic: Y/N):	Sandy clay loam; moderate erodibility. Clay within areas containing gilgais and microrelief.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	No significant erosion zones noted; relatively flat site.
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	Relatively flat ~ 1%.
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds * Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High risk (1). Biosecurity Act restricted invasive weed velvety tree pear (*Opuntia tomentosa*) recorded as rarely occurring.
Notes:	There were potential habitat features within remnant and advance regrowth including, very sparsely scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Nil

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
See Wetland Feature report appended for Polygons #2 & #5.				

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Likely fauna habitat within wooded vegetation areas and potential habitat within shallow gilgais. Restricted invasive weeds present at low densities.				

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

Photo 1: Typical remnant RE 11.5.1 within western extent of survey area (Polygon #32).

Photo 2: Advanced regrowth of vegetation analogous with RE 11.5.4 (Polygon #35).

Photo 3: Recently-cleared open paddock (Polygon #33).

Photos 4: Isolated patch of remnant RE 11.5.1 within 200m of survey area (Polygon #37).

Photo 5: Non-remnant with moderately-dense grassy ground layer cover, gilgais were absent (Polygon #33).

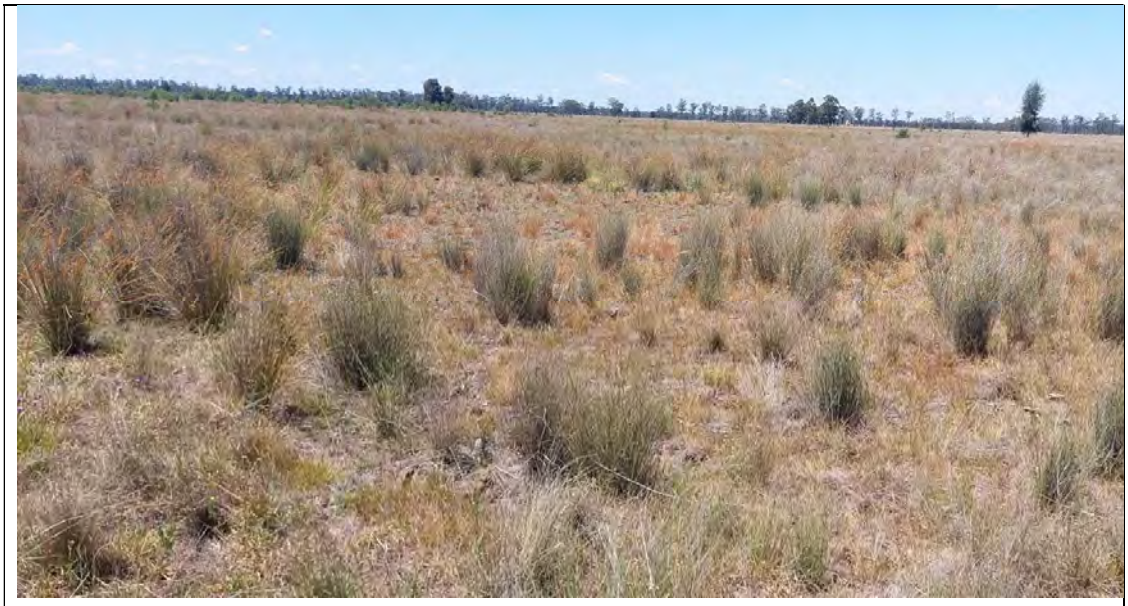

Photo 6: Typical non-remnant vegetation with ~30% cover of shallow gilgais (Polygon #5).

Photo 7: Typical non-remnant vegetation with ~50% cover of shallow gilgais (Polygon #2).

WETLAND FEATURES - ENVIRONMENTAL SURVEY REPORT

Wetland Features **Note: if wetland is Gilgai (melon holes), rate on ecological value. Refer to *Environmental Constraints Assessment Guideline* for rating system.** 1 2 3 4 5 Nil/Very Low Very High				
Location Details (Gathering / Access / Well) Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	**GPS Coordinates Surveyor Reference #**	**Type of wetland** (e.g,Gilgai, mapped Referrable Wetland, discharge area etc.)	***Features Determining Wetland*** (Width, water depth, vegetation, aquatic species, condition, blade ploughed etc)	**Actions Taken**
Example *Well # 179 on Kate*	*Surveyor Ref # 2221*	*Gilgai (Melon Hole) Value Rating 4.*	*50m long and 30m wide, Water to approx. 0.5m depth, many aquatic plants. Previously ploughed for grazing with minor stock trampling. Small fish, frogs and turtle observed.*	*Avoided by 20 metres.* ***Or*** *Could not be avoided as relocation would require clearing of Brigalow TEC or locating within a watercourse buffer. Fauna spotter required during clearing.*
Polygon 5	EV3010 – EV3011	Multiple shallow gilgais (melon holes) and microrelief. Rating 1 (Very low quality)	3m – 10m wide and 3m – 10m long, 0.1-0.2m depth, some wide but relatively shallow cracks, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), no aquatic fauna observed, ~ 30% cover of gilgais.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.
Polygon 2	EV3011= southern boundary	Multiple contiguous and separated shallow gilgais (melon holes). Rating 1&2 (Very low and low quality)	3m – 10m wide and 3m – 25m long, 0.1-0.2m depth, some wide but relatively shallow cracks, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), no aquatic fauna observed, ~ 50% cover of gilgais.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.

Wetland Features – Photography

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comment

Photo 1: Typical gilgai within Polygon #5.

Photo 2: Gilgai within Polygon #2.

Photo 3: Cracking clays within gilgai.

Photo 4: Showing broad area with *Juncus usitatus* indicating locations of gilgais.

SSMP- Likelihood of Occurrence Matrix - Jammat 6DY86

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence**(LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Poplar box/gum, cypress pine and bull-oak country in REs 11.3.2, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.5.1, 11.5.4 and 11.5.20.	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Brown treecreeper (south-eastern	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Not in listed vegetation types									Unlikely	No
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types									Unlikely	No
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types									Unlikely	No
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settled areas.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No			Trees with loose and peeling bark common throughout	Likely	Yes
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types									Unlikely	No
View Map	Hooded robin (south-eastern)	The Hooded Robin (south-eastern) occurs in south-eastern Australia from far southern Queensland to Yorke Peninsula,	Not listed in vegetation types									Unlikely	No
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypt/box woodlands and semi-arid areas with gum/box.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #32, #37	Canopy dominated Eucalyptus crebra (sencondary food tree); contiguous with large patch of intact vegetation; permant water source within 1km	Likely	Yes
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Bull-oak Woodland on in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types									Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Dry ironbark and cypress pine, bull-oak or gum/box country in REs 11.4.7, 11.5.1, 11.5.4, 11.5.5, 11.5.20, 11.5.21, 11.9.9 and 11.9.10	Poplar box, ironbark, cypress pine, buloke woodlands.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on sand plains in Land Zone 5	High, open spaces above open wooded areas	Large tracts of native vegetation	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #32, #35, #37.	As this is a fly over species, it was assessed that the proposed disturbance would have negligible impact on the white-troated needletail in the local context.	Likely	Yes
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Dry ironbark and cypress pine scrub or gum/box country.	Log piles, scattered large hollow logs associated with fallen trees, dense woody debris, stick-raked windrows and abandoned animal burrows.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 10RP190982, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 6.4 hectares (1,280m x 50m) surveyed of pipeline Right-of-Way (RoW).		
Lot Plan:	10RP190982	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	30&31/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Rev ii
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration	
☐ Appraisal	☐ Development / Production	☐ Monitoring	
☐ Microseismic	☐ Directional	☐ Tiltmeter Array	
☐ Gravel Pit	☐ Campsite	☐ Access Track	
☐ Seismic	☐ Gathering System	☐ Security Hut	
☐ Trunkline	☐ Gas Pipeline	✓ Water Pipeline	
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond	
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)	
☐ Other:		☐ Frac Pond	

RECOMMENDATIONS:		
☐ No Environmental issues on site	✓ Environmental issues identified & surveyed	✓ EA amendment required (may)?
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	✓ Fauna spotter required
☐ Other:		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Significant Vegetation – Category B ESA

- **An EA amendment may be required** for disturbance within a Category B ESA Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by field verified remnant RE 11.4.3 (Endangered [BDS]). This patch of vegetation (Polygon #38) also met the criteria of a Brigalow Threatened Ecological Community (TEC) (***Brigalow*** [***Acacia harpophylla*** **dominant and co-dominant] ecological community**).

Fauna

- Fauna Spotter Catcher required for clearing activities, potential subterranean species within gilgais (eg. burrowing frogs).

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	The property comprised, remnant vegetation associated with Wambo Creek and isolated large woodland patches, advanced regrowth, and non-remnant open paddocks (historically cleared) grazed by cattle that were dissected by access tracks and encompassed CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed predominantly non-remnant vegetation with an isolated remnant patch within 200m of the survey area of RE 11.4.3 (Endangered [VM Act] and [BDS]), and RE 11.5.1a (Least Concern [VM Act]; No Concern at Present [BDS]) The western edge of the isolated patch (Polygon #38) was ground truthed and comprised remnant RE 11.4.3.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	A portion of the survey area lies within a mapped Category B ESA Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by mapped remnant RE 11.4.3 (Endangered [BDS]). Ground truthing confirmed that the western boundary of the isolated patch (Polygon #38) comprised remnant RE 11.4.3 (Endangered [BDS]), and the survey area lies within the PPZ and SPZ of this Category B ESA. ○ **An EA amendment may be required for disturbance within a Category B ESA PPZ and SPZ.** No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report.*	The isolated patch shown as Polygon #38 was ground truthed as a Brigalow TEC (***Brigalow*** [***Acacia harpophylla*** **dominant and co-dominant] ecological community**) comprising remnant RE 11.4.3 and by meeting the diagnostic characteristics and condition thresholds. No TECs mapped or recorded within the survey area.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	Non-remnant vegetation supported recent and historical clearing establishing very sparsely scattered low woody regrowth.
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 30 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that no threatened species were 'likely' to occur in the survey area. A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing.

4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable. Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	
Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers Attach completed *Water Features Checklist / Wetland Features Report*	No watercourses were mapped or detected within 100m of the survey area. Gilgais were present within the non-remnant Polygons #2 (~50% cover of gilgais) & #36 (~80% cover of gilgais). These gilgais were highly disturbed by heavy grazing and vegetation clearing establishing low-quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species (see appended Wetland Features report for ecological rating value, descriptions, and representative photos). Gilgai boundaries were delineated over a 1hectare area within Polygon #36 to indicate the size, shape, and coverage of gilgais within this area which continued to the northern extent of the survey area. There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	High risk (1). Biosecurity Act restricted invasive weed velvety tree pear (*Opuntia tomentosa*) recorded as rarely occurring.
Additional Considerations:	Gilgais and pushed timber should be inspected by a licenced fauna spotter before and during clearing.
Attachments Included:	✓ Sketch ✓ QA mark-up map ✓ LoOM ✓ ESPT ☐ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ✓ Wetland Feature Report

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344.
This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.
Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.

Completed By	Date
Lincoln Smith Gerry Callahan (edits)	28/11/2024 2/02/2025

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m^2 and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 10RP190982, Off-tenure Pipeline Ecology Resurvey
ATP / PL number:	PL278
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	No realignments were necessary due to environmental constraints.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	The property comprised, remnant vegetation associated with Wambo Creek and isolated large woodland patches, advanced regrowth, and non-remnant open paddocks (historically cleared) grazed by cattle that were dissected by access tracks and encompassed CSG infrastructure.

Confirm REs present:
• What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as?
• Survey new/correct extents of REs.
  ○ Fully survey polygons, if practicable;
  ○ Buffer partially-surveyed edges; and
• Provide reference survey points and site photos.
	State mapping showed predominantly non-remnant vegetation with an isolated remnant patch within 200m of the survey area of RE 11.4.3 (Endangered [VM Act] and [BDS]), and RE 11.5.1a (Least Concern [VM Act]; No Concern at Present [BDS])
	
	The western edge of the isolated patch (Polygon #38) was ground truthed and comprised remnant RE 11.4.3.

Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	A portion of the survey area lies within a mapped Category B ESA Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by mapped remnant RE 11.4.3 (Endangered [BDS]). Ground truthing confirmed that the western boundary of the isolated patch (Polygon #38) comprised remnant RE 11.4.3 (Endangered [BDS]), and the survey area lies within the PPZ and SPZ of this Category B ESA. ○ **An EA amendment may be required for disturbance within a Category B ESA PPZ and SPZ.** No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	The isolated patch shown as Polygon #38 was ground truthed as a Brigalow TEC (***Brigalow*** [***Acacia harpophylla* dominant and co-dominant] ecological community**) comprising remnant RE 11.4.3 and by meeting the diagnostic characteristics and condition thresholds. No TECs mapped or recorded within the survey area.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora recorded on site.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	Site is not in a High-Risk area according to latest Flora Trigger mapping.

EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that no threatened species were 'likely' to occur in the survey area. A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No watercourses were mapped or detected within 100m of the survey area. Gilgais were present within the non-remnant Polygons #2 (~50% cover of gilgais) & #36 (~80% cover of gilgais). These gilgais were highly disturbed by heavy grazing and vegetation clearing establishing low-quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species (see appended Wetland Features report for ecological rating value, descriptions, and representative photos). Gilgai boundaries were delineated over a 1hectare area within Polygon #36 to indicate the size, shape, and coverage of gilgais within this area which continued to the northern extent of the survey area. There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Current road access to proposed site: Existing / to be upgraded / new	Access is via Montrose Road.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	**Shrubs** *Acacia ixiophylla* (sticky wattle) *A. deanii* (Deane's wattle) *A. harpophylla* (brigalow) *A. leiocalyx* (early flowering black wattle) *A. spectabilis* (glory wattle) *Casuarina cristata* (belah) *Dodonaea viscosa* (sticky hopbush) *Eucalyptus cambageana* (Dawson gum) regrowth *E. populnea* (poplar box) regrowth *Geijera parviflora (wilga)* **Forbs** *Boerhavia dominii* (tarvine) *Chrysocephalum apiculatum* (yellow buttons) *Cirsium vulgare** (spear thistle) *Enchylaena tomentosa* (ruby saltbush) *Evolvulus alsinoides* (bindweed) *Juncus usitatus* (common rush) *Sclerolaena anisacanthoides* (yellow burr) *Tetragonia tetragionoides* (New Zealand spinach) **Grasses and Associates** *Aristida caput-medusae* (many-headed wiregrass) *A. leichhardtiana* (a wiregrass) *A. ramosa* (cane speargrass) *Cyperus sp.* (a cyperus) *Dianella sp.* (a flax lily) *Dichanthium sericeum (Queensland bluegrass)* *Eleocharis sp.* (spike rush) *Eragrostis lacunaria* (purple lovegrass) *E. elongata* (clustered lovegrass) *E. sororia* (woodland lovegrass) *Fimbristylis dichotoma* (common fringe-rush) *Gahnia aspera* (rough saw-sedge) *Lomandra filiformis* (wattle matrush) *Lomandra longifolia* (spiny-head matrush) *Melinis repens** (red natal)

	Panicum decompositum (native millet) *Panicum effusum* (hairy panic) *Panicum larcomianum* (a panic grass) *Paspalidium caespitosum* (brigalow grass) *Sporobolus actinocladus* (ray grass) *Trianthema portulacastrum* (black pigweed) *Walwhalleya subxerophila* (gilgai grass)
Vegetation disturbance size: *(Area – m^2)*	Disturbance would be as per the final sketch. Approximately 6.4 hectares (1,280m x 50m) surveyed.
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	Trees; Absent, Shrubs; 0-25, Ground cover species; 25-50.
Soil type & erodibility (Sodic: Y/N):	Clay loam
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	No significant erosion zones noted; relatively flat site.
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	Relatively flat ~ 1%.
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds * Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High risk (1). Biosecurity Act restricted invasive weed velvety tree pear (*Opuntia tomentosa*) recorded as rarely occurring.
Notes:	Gilgais and pushed timber should be inspected by a licenced fauna spotter before and during clearing.

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

DETAILS OF WATERCOURSES AND WETLANDS

Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
See Wetland Feature report appended for Polygons #2 & #36.				

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Potential fauna habitat within gilgais. Restricted invasive weed velvety tree pear very sparsely scattered.				

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

Photo 1: Typical of survey area showing non-remnant vegetation with gilgais present.

Photo 2: Isolated patch of Remnant RE 11.4.3/ Brigalow TEC (Polygon #38).

Photos 3: Low quality gilgai delineated in Polygon #36 and shown on map, representative of gilgais present within survey area.

WETLAND FEATURES - ENVIRONMENTAL SURVEY REPORT

Wetland Features **Note: if wetland is Gilgai (melon holes), rate on ecological value. Refer to *Environmental Constraints Assessment Guideline* for rating system.** 1 2 3 4 5 Nil/Very Low Very High				
Location Details (Gathering / Access / Well) Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	**GPS Coordinates Surveyor Reference #**	**Type of wetland** (e.g ,Gilgai, mapped Referrable Wetland, discharge area etc.)	***Features Determining Wetland*** (Width, water depth, vegetation, aquatic species, condition, blade ploughed etc)	**Actions Taken**
Example *Well # 179 on Kate*	*Surveyor Ref # 2221*	*Gilgai (Melon Hole) Value Rating 4.*	*50m long and 30m wide, Water to approx. 0.5m depth, many aquatic plants. Previously ploughed for grazing with minor stock trampling. Small fish, frogs and turtle observed.*	*Avoided by 20 metres.* ***Or*** *Could not be avoided as relocation would require clearing of Brigalow TEC or locating within a watercourse buffer. Fauna spotter required during clearing.*
Polygon #36	EV3102 – northern extent of survey area.	Multiple contiguous and separated shallow gilgais (melon holes). Rating 1&2 (Very low and low quality)	3m – 20m wide and 3m – 20+m long, 0.1-0.3m depth, historical and recent clearing, heavily grazed, some wide and deep cracks, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), non-native flora species also present (e.g *Cirsium vulgare*), no aquatic fauna observed, ~ 80% cover of gilgais.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.

Wetland Features – Photography

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comment

Photo 1: Typical gilgai within demarcated area showing gilgais within Polygon #36.

Photo 2: Long and wide gilgai within Polygon #36.

Photo 3: Cracking clays within gilgai.

Photo 4: Undisturbed gilgais within remnant RE 11.4.3 (Polygon #38).

SSMP- Likelihood of Occurrence Matrix - Jammat 10RP190982

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **entry** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** [LoO] is displayed in column 'L'; (6) **Is Further Action Required?** For a LoO of 'Potential', 'Highly Likely', or 'Known', a 'Yes' will appear in column 'N' . The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team**. (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Not in listed vegetation types									Unlikely	No
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types									Unlikely	No
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over cleared or sparsely wooded land, including farmland, inland open plains and settled areas (e.g. towns, roads). Also recorded over parks and gardens, plantations and heavily populated areas (large towns and cities).	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settled areas.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types									Unlikely	No
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Not in listed vegetation types									Unlikely	No
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Not in listed vegetation types									Unlikely	No
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Not in listed vegetation types									Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types									Unlikely	No
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south, west to about Quilpie	Not in listed vegetation types									Unlikely	No
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types									Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	In Queensland, their current predicted distribution is limited to the south-east at scattered sites including the Brisbane region, Bribie Island and several sites in the Granite Belt from Warwick, west to Gore and south to Sundown National Park. The BAAM habitat modelling extends as far west as Miles.	Not in listed vegetation types									Unlikely	No
View Map	Rufous fantail	Can potentially occur as a non-breeding visitor to many of the QGC tenements and widely across the Gas Field. The species probably occur as an uncommon or rare non-breeding visitor (from autumn to spring) to the Darling Downs, occasionally extending west of Dalby	Not in listed vegetation types									Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Not in listed vegetation types									Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Not in listed vegetation types									Unlikely	No
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types									Unlikely	No

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 11RP190982, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 7.15 hectares (1,430m x 50m) of pipeline Right-of-Way (RoW).		
Lot Plan:	11RP190982	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	31/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Rev ii
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration	
☐ Appraisal	☐ Development / Production	☐ Monitoring	
☐ Microseismic	☐ Directional	☐ Tiltmeter Array	
☐ Gravel Pit	☐ Campsite	☐ Access Track	
☐ Seismic	☐ Gathering System	☐ Security Hut	
☐ Trunkline	☐ Gas Pipeline	✓ Water Pipeline	
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond	
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)	
☐ Other:		☐ Frac Pond	

RECOMMENDATIONS:		
☐ No Environmental issues on site	✓ Environmental issues identified & surveyed	✓ EA amendment required (may)?
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	✓ Fauna spotter required
☐ Other:		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Significant Vegetation – Category B ESA

- **An EA amendment may be required** for disturbance within a Category B ESA Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by field verified remnant RE 11.4.3 (Endangered [BDS]). This patch of vegetation (Polygon #39) also met the criteria of a Brigalow Threatened Ecological Community (TEC) (***Brigalow*** [***Acacia harpophylla*** **dominant and co-dominant**] **ecological community**).
- Fauna Spotter Catcher required for clearing activities.

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	The property comprised, remnant vegetation associated with Wambo Creek and isolated woodland patches, advanced regrowth, and non-remnant open paddocks (historically and recently cleared) grazed by cattle, that were dissected by access tracks and encompassed CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed predominantly non-remnant vegetation with a large, isolated remnant patch within 200m of the survey area of RE 11.9.5 (Endangered [VM Act] and [BDS]). The western edge of the isolated patch (Polygon #39) was ground truthed and comprised remnant RE 11.4.3 (Endangered [VM Act] and [BDS]). The remaining survey area supported non-remnant vegetation (open paddocks).
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	A portion of the survey area lies within a mapped Category B ESA Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by mapped remnant RE 11.9.5 (Endangered [BDS]). Ground truthing confirmed that the western boundary of the isolated patch (Polygon #39) comprised remnant RE 11.4.3 (Endangered [BDS]), and the survey area lies within the PPZ and SPZ of this Category B ESA. ○ **An EA amendment may be required for disturbance within a Category B ESA PPZ and SPZ.** No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report.*	The isolated patch shown as Polygon #39 was ground truthed as a Brigalow TEC (***Brigalow*** [***Acacia harpophylla*** **dominant and co-dominant] ecological community**) comprising remnant RE 11.4.3 and by meeting the diagnostic characteristics and condition thresholds. No TECs mapped or recorded within the survey area.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	Non-remnant vegetation has been subjected to recent and historical clearing establishing very sparsely scattered low woody regrowth.
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that no threatened species were likely to occur in the survey area. A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing.

4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable. Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	

Watercourses and Wetlands:
 	
Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted
 	
Assessment information to include:
• any downgrades of mapped watercourses to drainage features
• infrastructure in buffers
• Details on wetlands:
  ○ Mapped referrable HES or GES
  ○ Unmapped
  ○ Impacts in buffers
 	
Attach completed *Water Features Checklist / Wetland Features Report*
	No watercourses were mapped or detected within 100m of the survey area.
	
	Gilgais were present within the non-remnant Polygon #36 (~80% cover of gilgais). These gilgais were highly disturbed by heavy grazing and vegetation clearing establishing low-quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species (see appended Wetland Features report for ecological rating value, descriptions, and representative photos).
	
	There were no other types of wetlands mapped or detected within 200m of linear infrastructure.

Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	High risk (1). Biosecurity Act restricted invasive weed velvety tree pear (*Opuntia tomentosa*) recorded as rarely occurring.
Additional Considerations:	Gilgais and pushed timber should be inspected by a licenced fauna spotter before and during clearing.
Attachments Included:	✓ Sketch ✓ QA mark-up map ✓ LoOM ✓ ESPT ☐ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ✓ Wetland Feature Report

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344.
This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.
Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.

Completed By	Date
Lincoln Smith Gerry Callahan (edits)	28/11/2024 2/02/2025

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m^2 and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat, 11RP190982, Off-tenure Pipeline Ecology Resurvey
ATP / PL number:	PL443
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	No realignments were necessary due to environmental constraints.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	The property comprised, remnant vegetation associated with Wambo Creek and isolated large woodland patches, advanced regrowth, and non-remnant open paddocks (historically and recently cleared) grazed by cattle that were dissected by access tracks and encompassed CSG infrastructure.

Confirm REs present:
• What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as?
• Survey new/correct extents of REs.
  ○ Fully survey polygons, if practicable;
  ○ Buffer partially-surveyed edges; and
• Provide reference survey points and site photos.
	State mapping showed predominantly non-remnant vegetation with a large, isolated remnant patch within 200m of the survey area of RE 11.9.5 (Endangered [VM Act] and [BDS]).
	
	The western edge of the isolated patch (Polygon #39) was ground truthed and comprised remnant RE 11.4.3 (Endangered [VM Act] and [BDS]).
	
	The remaining survey area supported non-remnant vegetation (open paddocks).

Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	A portion of the survey area lies within a mapped Category B ESA Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ) buffers triggered by mapped remnant RE 11.9.5 (Endangered [BDS]). Ground truthing confirmed that the western boundary of the isolated patch (Polygon #39) comprised remnant RE 11.4.3 (Endangered [BDS]), and the survey area lies within the PPZ and SPZ of this Category B ESA. ○ **An EA amendment may be required for disturbance within a Category B ESA PPZ and SPZ.** No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	The isolated patch shown as Polygon #39 was ground truthed as a Brigalow TEC (***Brigalow*** [***Acacia harpophylla* dominant and co-dominant] ecological community**) comprising remnant RE 11.4.3 and by meeting the diagnostic characteristics and condition thresholds. No TECs mapped or recorded within the survey area.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora recorded on site.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	Site is not in a High-Risk area according to latest Flora Trigger mapping.

EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that no threatened species were likely to occur in the survey area. A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No watercourses were mapped or detected within 100m of the survey area. Gilgais were present within the non-remnant Polygon #36 (~80% cover of gilgais). These gilgais were highly disturbed by heavy grazing and vegetation clearing establishing low-quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species (see appended Wetland Features report for ecological rating value, descriptions, and representative photos). There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Current road access to proposed site: Existing / to be upgraded / new	Access is via Montrose Road.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	**Shrubs** *Acacia ixiophylla* (sticky wattle) *Ac. deanii (*Deane's wattle) *Ac. harpophylla* (brigalow) *Ac. leiocalyx* (early flowering black wattle) *Ac. spectabilis* (glory wattle) *Casuarina cristata* (belah) *Dodonaea viscosa* (sticky hopbush) *Eucalyptus cambageana* (Dawson gum) regrowth *E. populnea* (poplar box) regrowth *Geijera parviflora (wilga)* **Forbs** *Boerhavia dominii* (tarvine) *Chrysocephalum apiculatum* (yellow buttons) *Cirsium vulgare** (spear thistle) *Enchylaena tomentosa* (ruby saltbush) *Evolvulus alsinoides* (bindweed) *Juncus usitatus* (common rush) *Sclerolaena anisacanthoides* (yellow burr) *Tetragonia tetragionoides* (New Zealand spinach) **Grasses and Associates** *Aristida caput-medusae* (many-headed wiregrass) *A. leichhardtiana* (a wiregrass) *A. ramosa* (cane speargrass) *Cyperus sp.* (a cyperus) *Dianella sp.* (a flax lily) *Dichanthium sericeum (Queensland bluegrass)* *Eleocharis sp.* (spike rush) *Eragrostis lacunaria* (purple lovegrass) *E. elongata* (clustered lovegrass) *E. sororia* (woodland lovegrass) *Fimbristylis dichotoma* (common fringe-rush) *Gahnia aspera* (rough saw-sedge) *Lomandra filiformis* (wattle matrush) *Lomandra longifolia* (spiny-head matrush) *Melinis repens** (red natal) *Panicum decompositum* (native millet) *Panicum effusum* (hairy panic) *Panicum larcomianum* (a panic grass)

	Paspalidium caespitosum (brigalow grass) *Sporobolus actinocladus* (ray grass) *Trianthema portulacastrum* (black pigweed) *Walwhalleya subxerophila* (gilgai grass)
Vegetation disturbance size: *(Area – m^2)*	Disturbance would be as per the final sketch. Approximately 7.15 hectares (1,430m x 50m) surveyed.
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	Trees; Absent, Shrubs; 0-25, Ground cover species; 25-50.
Soil type & erodibility (Sodic: Y/N):	Clay loam.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	No significant erosion zones noted; relatively flat site.
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	Relatively flat ~ 1%.
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds * Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High risk (1). Biosecurity Act restricted invasive weed velvety tree pear (*Opuntia tomentosa*) recorded as rarely occurring.
Notes:	Gilgais and pushed timber should be inspected by a licenced fauna spotter before and during clearing.

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
See Wetland Feature report appended for Polygon #36.				

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Potential fauna habitat within gilgais. Restricted invasive weed velvety tree pear very sparsely scattered.				

Photography - Linear Infrastructure

Photo 1: Typical of survey area showing non-remnant vegetation with gilgais present.

Photo 2: Western edge of isolated patch of Remnant RE 11.4.3/ Brigalow TEC (Polygon #39).

Photos 3: Low quality gilgai in Polygon #36 representative of gilgais present within survey area.

WETLAND FEATURES - ENVIRONMENTAL SURVEY REPORT

Wetland Features **Note: if wetland is Gilgai (melon holes), rate on ecological value. Refer to *Environmental Constraints Assessment Guideline* for rating system.** 1 2 3 4 5 Nil/Very Low Very High				
Location Details (Gathering / Access / Well) Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	**GPS Coordinates Surveyor Reference #**	**Type of wetland** (e.g ,Gilgai, mapped Referrable Wetland, discharge area etc.)	***Features Determining Wetland*** (Width, water depth, vegetation, aquatic species, condition, blade ploughed etc)	**Actions Taken**
Example *Well # 179 on Kate*	*Surveyor Ref # 2221*	*Gilgai (Melon Hole) Value Rating 4.*	*50m long and 30m wide, Water to approx. 0.5m depth, many aquatic plants. Previously ploughed for grazing with minor stock trampling. Small fish, frogs and turtle observed.*	*Avoided by 20 metres.* ***Or*** *Could not be avoided as relocation would require clearing of Brigalow TEC or locating within a watercourse buffer. Fauna spotter required during clearing.*
Polygon #36	EV3102 – northern extent of survey area.	Multiple contiguous and separated shallow gilgais (melon holes). Rating 1&2 (Very low and low quality)	3m – 20m wide and 3m – 20+m long, 0.1-0.3m depth, historical and recent clearing, heavily grazed, some wide and deep cracks, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), non-native flora species also present (e.g *Cirsium vulgare*), no aquatic fauna observed, ~ 80% cover of gilgais.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.

Wetland Features – Photography

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comment

	
Photo 1: Typical gilgai within Polygon #36.	Photo 2: Undisturbed gilgais within remnant RE 11.4.3 (Polygon #39).

SSMP- Likelihood of Occurrence Matrix - Jammat 11RP190982

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence**(LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in clouмns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Not in listed vegetation types									Unlikely	No
View Map	Brown treecreeper (south-eastern	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Not in listed vegetation types									Unlikely	No
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types									Unlikely	No
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types									Unlikely	No
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over cleared or sparsely wooded land, including farmland, inland open plains and settled areas (e.g. towns, roads). Also recorded over parks and gardens, plantations and heavily populated areas (large towns and cities).	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settled areas.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types									Unlikely	No
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Not in listed vegetation types									Unlikely	No
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Not in listed vegetation types									Unlikely	No
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Not in listed vegetation types									Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types									Unlikely	No
View Map	Hooded robin (south-eastern)	The Hooded Robin (south-eastern) occurs in south-eastern Australia from far southern Queensland to Yorke Peninsula,	Not listed in vegetation types									Unlikely	No
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Not in listed vegetation types									Unlikely	No
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types									Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Not in listed vegetation types									Unlikely	No
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Not in listed vegetation types									Unlikely	No
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types									Unlikely	No
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 27DY81, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 2,388m x 50m (11.94 hectares) of pipeline Right-of-Way (RoW).		
Lot Plan:	27DY81	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	29,30/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Rev i
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration	
☐ Appraisal	☐ Development / Production	☐ Monitoring	
☐ Microseismic	☐ Directional	☐ Tiltmeter Array	
☐ Gravel Pit	☐ Campsite	☐ Access Track	
☐ Seismic	☐ Gathering System	☐ Security Hut	
☐ Trunkline	☐ Gas Pipeline	✓ Water Pipeline	
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond	
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)	
☐ Other:		☐ Frac Pond	

RECOMMENDATIONS:		
☐ No Environmental issues on site	✓ Environmental issues identified & surveyed	☐ EA amendment required
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	✓ Fauna spotter required
☐ Other:		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Fauna

- Additional fauna surveys may be required for fauna species shown as “potential” to occur by the LoOM process.
- Offsets for Koala *Phascolarctos cinereus* may be required.
- Fauna Spotter Catcher required for clearing activities.

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	From aerial imagery analysis, the property predominantly comprised remnant vegetation dissected by access tracks and encompassing CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed the entire survey area is non-remnant vegetation. Ground truthing recorded linear infrastructure predominantly traversed remnant vegetation that are (Least Concern [VM Act]; No Concern at Present [BDS]) vegetation communities of the following RE types: • RE 11.5.20 (Polygon #22), • RE 11.5.4 (Polygon #23), • RE 11.5.1 (Polygons #24, #26). Non-remnant vegetation adjoining existing access track was recorded at Polygons #25 and #27. Varying levels of disturbance by fire, selective clearing and broadscale clearing were observed throughout the remnant vegetation communities.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	Large portions of the eastern and western survey area lie within mapped Category C ESA or buffers (PPZ, SPZ) triggered by Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement. No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report*.	No TECs mapped or recorded on or near site.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	There were areas of non-remnant regrowth in the survey area with the floristic assemblage of the RE types present (estimated clearing events1-12 years).
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 30 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that *Phascolarctos cinereus* (koala) ('endangered' under the EPBC and NCA), *Hirundapus caudacutus* (white-throated needletail) ('vulnerable' under the EPBC and NCA) and *Strophurus taenicauda* (golden-tailed gecko) ('near threatened' under the NCA), have

indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable. Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	'potential' likelihood of occurring in the survey area. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for koala and golden-tailed gecko is increased to 'likely' or 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The clearing of woodland at the site may require offsetting for koala habitat. Any koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.
Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers Attach completed *Water Features Checklist / Wetland Features Report*	The Stream Order 1 (SO1) watercourse mapped at the western extent of the survey area to be crossed by the proposed linear infrastructure was downgraded to a drainage feature, see appended Water Feature Checklist report. Gilgais were present within Polygons #22 (remnant RE 11.5.20) and #23 (remnant RE 11.5.4). These gilgais were mostly a series of contiguous microrelief and shallow gilgai formations supporting very low – low quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species, see appended Wetland Features report for ecological rating value, descriptions, and representative photos. There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations occasionally occurring.
Additional Considerations:	There were potential habitat features recorded including, scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.
Attachments Included:	✓ Sketch ✓ QA mark-up map ✓ LoOM ✓ ESPT ✓ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ✓ Wetland Feature Report

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344.
This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.
Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.

Lincoln Smith	26/11/2024
Completed By	**Date**

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m^2 and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 27DY81, Off-tenure Pipeline Ecology Resurvey
ATP / PL number:	PL278
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	No realignments were necessary due to environmental constraints.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	From aerial imagery analysis, the property predominantly comprised remnant vegetation dissected by access tracks and encompassing CSG infrastructure.

Confirm REs present:
• What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as?
• Survey new/correct extents of REs.
  ○ Fully survey polygons, if practicable;
  ○ Buffer partially-surveyed edges; and
• Provide reference survey points and site photos.
	State mapping showed the entire survey area is non-remnant vegetation.
	
	Ground truthing recorded linear infrastructure predominantly traversed remnant vegetation that are (Least Concern [VM Act]; No Concern at Present [BDS]) vegetation communities of the following RE types:
	• RE 11.5.20 (Polygon #22),
	• RE 11.5.4 (Polygon #23),
	• RE 11.5.1 (Polygons #24, #26).
	
	Non-remnant vegetation adjoining existing access track was recorded at Polygons #25 and #27.
	
	Varying levels of disturbance by fire, selective clearing and broadscale clearing were observed throughout the remnant vegetation communities.

Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	Large portions of the eastern and western survey area lie within mapped Category C ESA or buffers (PPZ, SPZ) triggered by Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement. No Significant Vegetation was recorded within the survey area.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	No TECs mapped or recorded on or near site.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora recorded on site.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	Site is not in a High-Risk area according to latest Flora Trigger mapping.

EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 30 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that *Phascolarctos cinereus* (koala) ('endangered' under the EPBC and NCA), *Hirundapus caudacutus* (white-throated needletail) ('vulnerable' under the EPBC and NCA) and *Strophurus taenicauda* (golden-tailed gecko) ('near threatened' under the NCA), have 'potential' likelihood of occurring in the survey area. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for koala and golden-tailed gecko is increased to 'likely' or 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The clearing of woodland at the site may require offsetting for koala habitat. Any koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The Stream Order 1 (SO1) watercourse mapped at the western extent of the survey area to be crossed by the proposed linear infrastructure was downgraded to a drainage feature, see appended Water Feature Checklist report. Gilgais were present within Polygons #22 (remnant RE 11.5.20) and #23 (remnant RE 11.5.4). These gilgais were mostly a series of contiguous microrelief and shallow gilgai formations supporting very low – low quality habitat value regarding structure, vegetation, and suitable habitat attributes for aquatic fauna species, see appended Wetland Features report for ecological rating value, descriptions, and representative photos. There were no other types of wetlands mapped or detected within 200m of linear infrastructure.
Current road access to proposed site: Existing / to be upgraded / new	Access is via Montrose Road.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	**Trees** *Allocasuarina luehmannii* (bull oak) *Angophora leiocarpa* (smooth-barked apple) *Callitris glaucophylla* (white cypress pine) *Eucalyptus crebra* (narrow-leaved ironbark) *Eucalyptus woollsiana* (grey box) *Melaleuca decora* (white feather honey myrtle) **Shrubs** *Acacia ixiophylla* (sticky wattle) *Ac. deanii (*Deane's wattle) *Ac. leiocalyx* (early flowering black wattle) *Ac. spectabilis* (glory wattle) *Petalostigma pubescens* (quinine bush) **Forbs** *Brunoniella australis* (blue trumpet) *Cheilanthes sieberi* (rock fern) *Chrysocephalum apiculatum* (yellow buttons) *Evolvulus alsinoides* (bindweed) *Juncus usitatus* (common rush) *Murdannea graminea* (grass lily) **Grasses and Associates** *Aristida caput-medusae* (many-headed wiregrass) *A. leichhardtiana* (a wiregrass) *A. ramosa* (cane speargrass) *A. vagans* (wire grass) *Chrysopogon fallax* (golden-beard grass *Cymbopogon refractus* (barb-wire grass) *Cyperus sp.* (a cyperus) *Dianella sp.* (a flax lily) *Eleocharis sp.* (spike rush) *Entolasia stricta* (wiry panic) *Eragrostis lacunaria* (purple lovegrass) *E. elongata* (clustered lovegrass) *E. sororia* (woodland lovegrass)

	Fimbristylis dichotoma (common fringe-rush) *Gahnia aspera* (rough saw-sedge) *Laxmannia gracilis* (wire lily) *Lomandra filiformis* (wattle matrush) *Lomandra longifolia* (spiny-head matrush) *Melinis repens** (red natal) *Murdannea graminea* (grass lily) *Panicum decompositum* (native millet) *Panicum effusum* (hairy panic) *Panicum larcomianum* (a panic grass) *Paspalidium caespitosum* (brigalow grass) *Walwhalleya subxerophila* (gilgai grass)
Vegetation disturbance size: *(Area – m^2)*	Disturbance would be as per the final sketch. Approximately 11.94 hectares (2,388m x 50m) surveyed.
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	Trees; 25-50, Shrubs; 0-25, Ground cover species; 25-50.
Soil type & erodibility (Sodic: Y/N):	Sandy clay loam; moderate erodibility. Clay within areas containing gilgais and microrelief.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	No significant erosion zones noted; relatively flat site.
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	Relatively flat ~ 1%.
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds * Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High risk (1). Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations occasionally occurring.
Notes:	There were potential habitat features recorded including, scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES

Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
See Water Feature Checklist report for details of mapped S01 watercourse downgraded to a drainage feature and Wetland Feature report appended.				

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Potential fauna habitat throughout survey area and restricted invasive weeds present at low densities (see below photos for examples).				

Photography - Linear Infrastructure

Photo 1: Typical remnant RE 11.5.20.

Photo 2: Remnant RE 11.5.4 with shallow gilgais and microrelief.

Photo 3: Gilgai and microrelief within RE 11.5.20.

Photos 4: Gilgai within remnant RE 11.5.4.

Photo 5: Non-remnant vegetation adjoining track and windrow of felled timber providing potential fauna habitat.

Photo 6 and 7: Dead tree bearing hollows and mature velvety tree pear fruiting.

Photo 8: Typical non-remnant vegetation, historically cleared with woody regrowth.

WATER FEATURE CHECKLIST - ENVIRONMENTAL SURVEY REPORT

Field Assessment				
Block – PACR Name: (Survey Title from invite)	Kenya East, 27DY81, Off-tenure Pipeline Ecology Resurvey			
Infrastructure impact on water feature (Provide details) **Is it:** • Crossed by access? (bed-level crossing) • Crossed by gathering? • In proximity to static infrastructure? (well, camp, gravel pit, STP effluent area) *Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	Drainage feature crossed by water pipeline.			
Lot Plan:	27DY81	**Crossing type:**	Existing Crossing / No Upgrade Required: Existing Crossing / Upgrade Required: New Crossing in previously disturbed area: New Crossing in undisturbed area:	☐ ☐ ☐ ✓
Survey sketch point #:	#2253	**Bank full width**	1m, very difficult to determine	
		Bank width	0.5m, very difficult to determine	
		Bed width	0.2m, very difficult to determine	
		Bank height from bed	0.1m, very difficult to determine	
Instructions for Assessment	1. A separate checklist shall be completed where there is deemed to be a change in hydrological or topographic conditions, which may change the outcome of any of the below questions: (e.g. area of permanent flow, occurrence of contiguous riparian vegetation, obvious changes in landscape such as the occurrence of beds or banks) 2. This checklist should be accompanied by mapping, which indicates the location of each individual assessment. Each assessment should be numbered and reflected and/or identified on the map. 3. A work sheet is to be completed for all water features encountered during the survey.			

This Assessment worksheet has been prepared to assist with ensuring QGC reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which QGC operates.

Question to determine if the feature is a watercourse	Y/N	Justification	Comments
Is the feature mapped within the state mapping data set? If so, what is the stream order number? Is the feature named?	Y	Mapped as Stream Order 1 Not named	
A non-watercourse drainage feature is defined as having all of the following attributes; assessor to complete assessment of the following parameters: a) is the feature formed by the concentration of, or operates to confine or concentrate overland flow water only during and immediately after rainfall events; and	Y	If **YES** to <u>all</u> of these questions the feature is only a drainage feature, the feature doesn't constitute a mappable watercourse and no further assessment is required. If **NO** to <u>any</u> of these continue with the assessment	Drainage feature was a very shallow and narrow depression within the landscape with no watercourse attributes.
b) appears to flow for only a short duration after a rainfall event, regardless of the frequency of flow events; and	Y		
c) does not appear to have enough continuing flow to create a riverine environment.	Y		
Is there a presence of defined bed and banks? (The bed and banks must be continuous rather than isolated and broken sections of a depression).		If **YES** to all, the feature is a watercourse.	
Does the feature have sufficient flow adequacy: the flow needs to be sufficient to sustain basic ecological processes and to maintain additional biodiversity, than that of the surrounding landscape, within the feature		If **NO** to any of these, the feature doesn't constitute a mappable watercourse and no further assessment is required under the *Fisheries Act*. Construct the watercourse crossing under the Environmental Authority. No DAFF notification is required.	

<u>Summary is required for how determination was made of the water feature:</u>

The mapped Stream Order 1 watercourse was downgraded to a drainage feature. Watercourse attributes were absent.

This Assessment worksheet has been prepared to assist with ensuring QGC reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which QGC operates.

Water Features – Pre-works Notification Photos

5 photos required for each bed-level access crossing. Photos to be taken as per instructions below.

Survey sketch point #: DR2905
[
Photo (A) – Looking up the very shallow narrow drainage feature.

This Assessment worksheet has been prepared to assist with ensuring QGC reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which QGC operates.

WETLAND FEATURES - ENVIRONMENTAL SURVEY REPORT

Wetland Features **Note: if wetland is Gilgai (melon holes), rate on ecological value. Refer to *Environmental Constraints Assessment Guideline* for rating system.** 1 2 3 4 5 Nil/Very Low Very High				
Location Details (Gathering / Access / Well) Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	**GPS Coordinates Surveyor Reference #**	**Type of wetland** (e.g ,Gilgai, mapped Referrable Wetland, discharge area etc.)	***Features Determining Wetland*** (Width, water depth, vegetation, aquatic species, condition, blade ploughed etc)	**Actions Taken**
Example *Well # 179 on Kate*	*Surveyor Ref # 2221*	*Gilgai (Melon Hole) Value Rating 4.*	*50m long and 30m wide, Water to approx. 0.5m depth, many aquatic plants. Previously ploughed for grazing with minor stock trampling. Small fish, frogs and turtle observed.*	*Avoided by 20 metres.* ***Or*** *Could not be avoided as relocation would require clearing of Brigalow TEC or locating within a watercourse buffer. Fauna spotter required during clearing.*
Polygon #22	EV2909 – EV2911	Multiple contiguous and separated shallow gilgais (melon holes) and microrelief. Rating 1&2	3m – 10m wide and 3m – 15m long, 0.1-0.2m depth, some wide but relatively shallow cracks, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), no aquatic fauna observed, within remnant RE 11.5.20.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.
Polygon #23	EV2911 – EV2912	Multiple contiguous and separated shallow gilgais (melon holes). Rating 1&2	3m – 10m wide and 3m – 25m long, 0.1-0.2m depth, some wide but relatively shallow cracks, semi aquatic flora species present (*Juncus usitatus*, *Walwhalleya subxerophila*, *Lomandra longifolia, Cyperus spp., Eleocharis sp., Cynodon dactylon, Carex inversa*), no aquatic fauna observed, within remnant RE 11.5.4.	Unavoidable due to being widespread over area. Fauna spotter required during clearance activities.

Wetland Features – Photography

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comment

Photo 1: Polygon #22 with shallow contiguous microrelief.

Photo 2: GPS #2479, Gilgai with cracking clays within remnant RE 11.5.20.

Photo 3: Cracking clays within gilgai.

Photo 4: Polygon #23 showing contiguous gilgai with typical habitat attributes within remnant RE 11.5.4.

SSMP- Likelihood of Occurrence Matrix - Kenya East 27DY81

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Potential', 'Highly Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Poplar box/gum, cypress pine and bull-oak country in REs 11.3.2, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.5.1, 11.5.4 and 11.5.20.	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types									Unlikely	No
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #22, #23, #24, #26.	Trees with loose and peeling bark common throughout.	Potential	Yes
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types									Unlikely	No
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypt/box woodlands and semi-arid areas with gum/box.	Secondary feed trees, being, E. cabagoana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #22, #23, #24, #26.	Canopy dominated by Eucalyptus crebra (secondary feed tree); located within large tract of intact vegetation; permanent water source within 1km.	Potential	Yes
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Bull-oak Woodland on in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types									Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	In Queensland, their current predicted distribution is limited to the south-east at scattered sites including the Brisbane region, Bribie Island and several sites in the Granite Belt from Warwick, west to Gore and south to Sundown National Park. The BAAM habitat modelling extends as far west as Miles.	Ironbark / sheoak woodland in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Rufous fantail	Can potentially occur as a non-breeding visitor to many of the QGC tenements and widely across the Gas Field. The species probably occur as an uncommon or rare non-breeding visitor (from autumn to spring) to the Darling Downs, occasionally extending west of Dalby	Mixed Eucalypt woodland or open forest, especially in gullies or shaded areas of dense or damp understory vegetation; potentially in RE's 11.3.2, 11.3.3, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.4.12, 11.5.1, 11.5.2, 11.5.4, 11.5.5, 11.5.20, 11.7.6, 11.7.7, 11.9.7, 11.10.1 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Dry ironbark and cypress pine, bull-oak or gum/box country in REs 11.4.7, 11.5.1, 11.5.4, 11.5.5, 11.5.20, 11.5.21, 11.9.9 and 11.9.10	Poplar box, ironbark, cypress pine, bulokе woodlands.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on sand plains in Land Zone 5	High, open spaces above open wooded areas	Large tracts of native vegetation	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Entire survey area within this property.	As this is a fly over species, it was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context.	Potential	Yes
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Dry ironbark and cypress pine scrub or gum/box country.	Log piles, scattered large hollow logs associated with fallen trees, dense woody debris, stick-raked windrows and abandoned animal burrows.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 30DY81, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 1,250m x 50m (6.25 hectares) of pipeline Right-of-Way (RoW).		
Lot Plan:	30DY81	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	28,29/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Rev i
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration	
☐ Appraisal	☐ Development / Production	☐ Monitoring	
☐ Microseismic	☐ Directional	☐ Tiltmeter Array	
☐ Gravel Pit	☐ Campsite	☐ Access Track	
☐ Seismic	☐ Gathering System	☐ Security Hut	
☐ Trunkline	☐ Gas Pipeline	✓ Water Pipeline	
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond	
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)	
☐ Other:		☐ Frac Pond	

RECOMMENDATIONS:		
☐ No Environmental issues on site	✓ Environmental issues identified & surveyed	☐ EA amendment required
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	✓ Fauna spotter required
☐ Other:		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Fauna

- Additional fauna surveys may be required for fauna species shown as “potential” to occur by the LoOM process.
- Offsets for Koala *Phascolarctos cinereus* may be required.
- Fauna Spotter Catcher required for clearing activities.

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	The property predominantly comprised remnant woodland vegetation dissected by access tracks and encompassing CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed the linear infrastructure lies within remnant RE 11.5.1 / 11.5.20 in 70:30 ratio (Least Concern [VM Act]; No Concern at Present [BDS]). The vegetation within the linear infrastructure was ground truthed and demarcated into separate polygons of remnant RE 11.5.1 and RE 11.5.20. Ecotonal areas of the two RE types were also observed. Non-remnant vegetation was recorded in areas associated with an existing cleared corridor and access tracks shown by Polygons #3, #12 & #16.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	The site lies within the Primary Protection Zone of a mapped Category C ESA associated with Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the subject tenement EA. No significant vegetation was recorded within survey area.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report.*	No TECs mapped or recorded on or near site.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	There were areas of non-remnant regrowth in the survey area with the floristic assemblage of the RE types present (estimated clearing events 5+ years).
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 30 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that *Phascolarctos cinereus* (koala) ('endangered' under the EPBC and NCA), *Hirundapus caudacutus* (white-throated needletail) ('vulnerable' under the EPBC and NCA) and *Strophurus taenicauda* (golden-tailed gecko) ('near threatened' under the NCA), have 'potential' likelihood of occurring in the survey area. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for koala and golden-tailed gecko is increased to 'likely' or 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context.

Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	The clearing of woodland at the site may require offsetting for koala habitat. Any koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.

Watercourses and Wetlands:
 	
Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted
 	
Assessment information to include:
• any downgrades of mapped watercourses to drainage features
• infrastructure in buffers
• Details on wetlands:
  ○ Mapped referrable HES or GES
  ○ Unmapped
  ○ Impacts in buffers
 	
Attach completed *Water Features Checklist / Wetland Features Report*
	A Stream Order 1 (SO1) watercourse was mapped within 100m to a portion of proposed linear infrastructure. The mapped and immediate adjoining areas were surveyed, and no watercourses or drainage features were detected.
	
	There were no wetlands mapped or detected within 200m of the linear infrastructure.

Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations occasionally occurring.
Additional Considerations:	There were potential habitat features recorded including, scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.
Attachments Included:	☑ Sketch ☑ QA mark-up map ☑ LoOM ☑ ESPT ☐ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ☐ Other:

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344.
This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.
Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.

Lincoln Smith	25/11/2024
Completed By	**Date**

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m^2 and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 30DY81, Off-tenure Pipeline Ecology Resurvey
ATP / PL number:	PL278
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	No realignments were necessary due to environmental constraints.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	The property predominantly comprised remnant woodland vegetation dissected by access tracks and encompassing CSG infrastructure.

Confirm REs present:
• What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as?
• Survey new/correct extents of REs.
  ○ Fully survey polygons, if practicable;
  ○ Buffer partially-surveyed edges; and
• Provide reference survey points and site photos.
	State mapping showed the linear infrastructure lies within remnant RE 11.5.1 / 11.5.20 in 70:30 ratio (Least Concern [VM Act]; No Concern at Present [BDS]).
	
	The vegetation within the linear infrastructure was ground truthed and demarcated into separate polygons of remnant RE 11.5.1 (Polygons #18 & #19) and RE 11.5.20 (Polygons #6 & #10). Ecotonal areas of the two RE types were also observed.
	
	Non-remnant vegetation was recorded in areas associated with existing cleared corridor and access tracks shown by Polygons #3, #12 & #16.

Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The site lies within the Primary Protection Zone (PPZ) of a mapped Category C ESA associated with Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement No significant vegetation was recorded within survey area.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	No TECs mapped or recorded on or near site.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora recorded on site.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	Site is not in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following:	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 30 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report.

• Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	The LoOM assessment indicated that *Phascolarctos cinereus* (koala) ('endangered' under the EPBC and NCA), *Hirundapus caudacutus* (white-throated needletail) ('vulnerable' under the EPBC and NCA) and *Strophurus taenicauda* (golden-tailed gecko) ('near threatened' under the NCA), have 'potential' likelihood of occurring in the survey area. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for koala and golden-tailed gecko is increased to 'likely' or 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The clearing of woodland at the site may require offsetting for koala habitat. Any koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	A Stream Order 1 (SO1) watercourse was mapped within 100m to a portion of proposed linear infrastructure. The mapped and immediate adjoining areas were surveyed, and no watercourses or drainage features were detected. There were no wetlands mapped or detected within 200m of the linear infrastructure.
Current road access to proposed site: Existing / to be upgraded / new	Access is via Montrose Road.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	* Denotes non-native species **Trees** *Allocasuarina luehmannii* (bull oak) *Angophora leiocarpa* (smooth-barked apple) *Callitris glaucophylla* (white cypress pine) *Eucalyptus crebra* (narrow-leaved ironbark) *E. populnea* (poplar box) *E. woollsiana* (grey box) *Melaleuca decora* (white feather honey myrtle) **Shrubs** *Acacia ixiophylla* (sticky wattle) *Ac. deanii (*Deane's wattle) *Ac. leiocalyx* (early flowering black wattle) *Ac. spectabilis* (glory wattle) *Petalostigma pubescens* (quinine bush) **Forbs** *Brunoniella australis* (blue trumpet) *Cheilanthes sieberi* (rock fern) *Chrysocephalum apiculatum* (yellow buttons) *Evolvulus alsinoides* (bindweed) *Goodenia glabra* (smooth goodenia) *Murdannea graminea* (grass lily) **Grasses and Associates** *Aristida caput-medusae* (many-headed wiregrass), *A. leichhardtiana* (a wiregrass), *A. ramosa* (cane speargrass), *A. vagans* (wire grass), *Cymbopogon refractus* (barb-wire grass), *Dianella sp.* (a flax lily), *Entolasia stricta* (wiry panic), *Eragrostis lacunaria* (purple lovegrass), *E. elongata* (clustered lovegrass), *E. sororia* (woodland lovegrass), *Fimbristylis dichotoma* (common fringe-rush), *Gahnia aspera* (rough saw-sedge), *Laxmannia gracilis* (wire lily), *Lomandra filiformis* (wattle matrush), *Melinis repens** (red natal), *Murdannea graminea* (grass lily), *Panicum decompositum* (native millet), *Panicum effusum* (hairy panic), *Paspalidium caespitosum* (brigalow grass)
Vegetation disturbance size: *(Area – m^2)*	Disturbance would be as per the final sketch. Approximately 6.25 hectares (1,250m x 50m) surveyed.
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	Trees and shrubs; 25-50 Ground cover species; 25-50.

Soil type & erodibility (Sodic: Y/N):	Sandy clay loam; moderate erodibility.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	No significant erosion zones noted; relatively flat site.
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	Relatively flat ~ 1%.
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds * Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High risk (1). Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations occasionally occurring.
Notes:	There were potential habitat features recorded including, scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
No watercourses or drainage features detected near mapped SO1.				

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Potential fauna habitat throughout survey area and restricted invasive weeds present at low densities (see below photos for examples).				

Photography - Linear Infrastructure

Photo 1: Remnant RE 11.5.1 (Polygon #19).

Photo 2: Typical remnant RE 11.5.20 dominated by grey box (Polygon #6).

Photo 3: Large woodpile providing potential fauna habitat (GPS #2018).

Photos 4 and 5: Tree with stick nest (GPS #2013) and dead tree bearing hollows (GPS #2009).

Photo 6: Large hollow log (GPS #2002) and moderate density of vegetated ground layer cover with leaf litter.

Photo 7: Trees with decorticating and stripping bark, providing potential Golden-tailed Gecko habitat, were common.

Photo 8: Mother-of-millions infestation occasionally occurring.

SSMP- Likelihood of Occurrence Matrix - Kenya East 30DY81

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Potential', 'Highly Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular LoO/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Poplar box/gum, cypress pine and bull-oak country in REs 11.3.2, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.5.1, 11.5.4 and 11.5.20.	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types									Unlikely	No
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #6, #10, #18, #19	Trees with loose and peeling bark common throughout.	Potential	Yes
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types									Unlikely	No
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypt/box woodlands and semi-arid areas with gum/box.	Secondary feed trees, being, E. cabagoana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #6, #10, #18, #19	Canopy dominated by Eucalyptus crebra (secondary feed tree); located within large tract of intact vegetation; permanent water source within 1km.	Potential	Yes
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Bull-oak Woodland on in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types									Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	In Queensland, their current predicted distribution is limited to the south-east at scattered sites including the Brisbane region, Bribie Island and several sites in the Granite Belt from Warwick, west to Gore and south to Sundown National Park. The BAAM habitat modelling extends as far west as Miles.	Ironbark / sheoak woodland in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Rufous fantail	Can potentially occur as a non-breeding visitor to many of the QGC tenements and widely across the Gas Field. The species probably occur as an uncommon or rare non-breeding visitor (from autumn to spring) to the Darling Downs, occasionally extending west of Dalby	Mixed Eucalypt woodland or open forest, especially in gullies or shaded areas of dense or damp understory vegetation; potentially in RE's 11.3.2, 11.3.3, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.4.12, 11.5.1, 11.5.2, 11.5.4, 11.5.5, 11.5.20, 11.7.6, 11.7.7, 11.9.7, 11.10.1 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Dry ironbark and cypress pine, bull-oak or gum/box country in REs 11.4.7, 11.5.1, 11.5.4, 11.5.5, 11.5.20, 11.5.21, 11.9.9 and 11.9.10	Poplar box, ironbark, cypress pine, bulokе woodlands.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on sand plains in Land Zone 5	High, open spaces above open wooded areas	Large tracts of native vegetation	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Entire survey area on this property	As this is a fly over species, it was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context.	Potential	Yes
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Dry ironbark and cypress pine scrub or gum/box country.	Log piles, scattered large hollow logs associated with fallen trees, dense woody debris, stick-raked windrows and abandoned animal burrows.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 37DY81, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 600m x 50m (3 hectares) of pipeline Right-of-Way (RoW).		
Lot Plan:	37DY81	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	30/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Rev iii
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration
☐ Appraisal	☐ Development / Production	☐ Monitoring
☐ Microseismic	☐ Directional	☐ Tiltmeter Array
☐ Gravel Pit	☐ Campsite	☐ Access Track
☐ Seismic	☐ Gathering System	☐ Security Hut
☐ Trunkline	☐ Gas Pipeline	✓ Water Pipeline
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)
☐ Other:		☐ Frac Pond

RECOMMENDATIONS:		
☐ No Environmental issues on site	✓ Environmental issues identified & surveyed	✓ EA amendment required
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	✓ Fauna spotter required
☐ Other:		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Significant Vegetation - Environmental Sensitive Area (ESA)

- Under-boring of Category C ESA recommended to avoid major disturbance or an EA amendment may be required for disturbance within a Category C ESA and buffers associated with an “Of Concern” RE type (Polygon #29).

Water

- Recommend under-boring of Stream Order 4 (SO4) watercourse “Wambo Creek” shown as Polygon #30 to avoid major, erosion issues and disturbance to watercourse.

Fauna

- Biodiversity offsets for some threatened species may be required.
- Fauna Spotter Catcher required for clearing activities.

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	The property comprised remnant vegetation including tall woodland riparian vegetation associated with Wambo Creek. The property is dissected by a cleared construction Right-of-Way (RoW) for underground CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed most of the survey area lies within mixed remnant vegetation including RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio). Ground truthing recorded that the linear infrastructure traversed non-remnant vegetation (Polygons #31 & #33), advanced regrowth RE 11.5.4 (Polygon #35) and the following remnant vegetation communities: • Mixed remnant RE 11.3.18/ 11.5.1 (both Least Concern [VM Act]; No Concern at Present [BDS]) as shown by Polygon #14, • RE 11.5.1 (Least Concern [VM Act]; No Concern at Present [BDS]) as shown by Polygon #32, • RE 11.3.25 (Least Concern [VM Act]; Of Concern [BDS]) as shown by Polygon #29.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	The entire survey area lies within mapped Category C ESA, associated with remnant RE 11.3.25 (Of Concern [BDS]) as part of the state mapped mixed polygon RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio). • Ground truthing confirmed remnant RE 11.3.25 riparian vegetation associated with Wambo Creek (DAFF mapped Stream Order 4 watercourse [S04]). o Under-boring of Category C ESA recommended to avoid major disturbance or an EA amendment may be required for disturbance within a Category C ESA and buffers associated with an "Of Concern" RE type (Polygon #29). The survey area also lies within mapped Significant Vegetation or their buffers, associated with mapped Category C ESA triggered by Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. • Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report.*	No TECs mapped or recorded on or near site.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	There were areas of non-remnant regrowth in the survey area with the floristic assemblage of the RE types present (recently cleared <2 years).
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.

EVNT Fauna – Does the area contain Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable. Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated the following species are likely to occur in the survey area: • Brigalow woodland snail (*Adclarkia cameroni*) 'endangered' under the EPBC and 'vulnerable' under the NCA; • Brown treecreeper (*Climacteris picumnus victoriae*) 'vulnerable' under the EPBC and the NCA; • Glossy black-cockatoo (*Calyptorhynchus lathami*) 'vulnerable' under the EPBC and NCA; • Golden-tailed gecko (*Strophurus taenicauda*) 'near threatened' under the NCA, 'Known' to occur within 1km; • Greater glider (*Petauroides Volans*) 'endangered' under the EPBC and NCA; • Koala (*Phascolarctos cinereus*) 'endangered' under the EPBC and NCA, • White-throated needletail (*Hirundapus caudacutus*) 'vulnerable' under the EPBC and NCA. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for the above threatened species is increased to 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The clearing of woodland at the site may require offsetting and any threatened species detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any fauna.
Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers Attach completed *Water Features Checklist / Wetland Features Report*	The Stream Order 4 (SO4) watercourse "Wambo Creek" mapped crossing the survey area was confirmed as a watercourse (see appended Water Feature Checklist report). • Recommend under-boring of Stream Order 4 (SO4) watercourse "Wambo Creek" shown as Polygon #30 to avoid major, erosion issues and disturbance to watercourse. There were no wetlands mapped or detected within 200m of linear infrastructure. A DEHP wetland is mapped > 400m north of the survey area.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	High risk (1). Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations commonly occurring.
Additional Considerations:	There were numerous potential habitat features recorded and observed including, watercourse attributes (pools, beds, banks) and riparian vegetation, multiple large mature trees bearing hollows, trees with decorticating bark, hollow logs, course woody debris, moderate-dense leaf litter. Where practicable, these

	features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.
Attachments Included:	✓ Sketch ✓ QA mark-up map ✓ LoOM ✓ ESPT ✓ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ☐ Wetland Feature Report

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344.
This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.
Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.

Completed By	Date
Lincoln Smith Gerry Callahan (edits)	15/02/2025 reviii 2/02/2025

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m^2 and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 37DY81, Off-tenure Pipeline Ecology Resurvey
ATP / PL number:	PL278
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	No realignments were undertaken due to environmental constraints.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	The property comprised remnant vegetation including tall woodland riparian vegetation associated with Wambo Creek. The property is dissected by a cleared construction Right-of-Way (RoW) for underground CSG infrastructure.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	State mapping showed most of the survey area lies within mixed remnant vegetation including RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio). Ground truthing recorded that the linear infrastructure traversed non-remnant vegetation (Polygons #31 & #33), advanced regrowth RE 11.5.4 (Polygon #35) and the following remnant rvegetation communities: • Mixed remnant RE 11.3.18/ 11.5.1 (both Least Concern [VM Act]; No Concern at Present [BDS]) as shown by Polygon #14, • RE 11.5.1 (Least Concern [VM Act]; No Concern at Present [BDS]) as shown by Polygon #32, • RE 11.3.25 (Least Concern [VM Act]; Of Concern [BDS]) as shown by Polygon #29.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The entire survey area lies within mapped Category C ESA, associated with remnant RE 11.3.25 (Of Concern [BDS]) as part of the state mapped mixed polygon RE 11.3.18/ 11.5.1/ 11.3.25 (40:40:20 ratio). • Ground truthing confirmed remnant RE 11.3.25 riparian vegetation associated with Wambo Creek (DAFF mapped Stream Order 4 watercourse [S04]). o Under-boring of Category C ESA recommended to avoid major disturbance or an EA amendment may be required for disturbance within a Category C ESA and buffers associated with an "Of Concern" RE type (Polygon #29). The survey area also lies within mapped Significant Vegetation or their buffers, associated with mapped Category C ESA triggered by Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. • Whilst the golden-tailed gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	No TECs mapped or recorded on or near site.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora recorded on site.

Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	Site is not in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated the following species are likely to occur in the survey area: • Brigalow woodland snail (*Adclarkia cameroni*) 'endangered' under the EPBC and 'vulnerable' under the NCA; • Brown treecreeper (*Climacteris picumnus victoriae*) 'vulnerable' under the EPBC and the NCA; • Glossy black-cockatoo (*Calyptorhynchus lathami*) 'vulnerable' under the EPBC and NCA; • Golden-tailed gecko (*Strophurus taenicauda*) 'near threatened' under the NCA, 'Known' to occur within 1km; • Greater glider (*Petauroides Volans*) 'endangered' under the EPBC and NCA; • Koala (*Phascolarctos cinereus*) 'endangered' under the EPBC and NCA, • White-throated needletail (*Hirundapus caudacutus*) 'vulnerable' under the EPBC and NCA. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for the above threatened species is increased to 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The clearing of woodland at the site may require offsetting and any threatened species detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any fauna.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The Stream Order 4 (SO4) watercourse "Wambo Creek" mapped crossing the survey area was confirmed as a watercourse (see appended Water Feature Checklist report). • Recommend under-boring of Stream Order 4 (SO4) watercourse "Wambo Creek" shown as Polygon #30 to avoid major, erosion issues and disturbance to watercourse. There were no wetlands mapped or detected within 200m of linear infrastructure. A DEHP wetland is mapped > 400m north of the survey area.
Current road access to proposed site: Existing / to be upgraded / new	Access is via Montrose Road.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	* Denotes non-native species **Trees** *Allocasuarina luehmannii* (bull oak) *Angophora fibrosa* (rough-barked apple) *Angophora leiocarpa* (smooth-barked apple) *Callitris endlicheri* (black cypress pine) *Callitris glaucophylla* (white cypress pine) *Eucalyptus chloroclada* (Dawson's gum) *E. crebra* (narrow-leaved ironbark) *E. populnea* (poplar box) *E. tereticornis* (bluegum) *E. woollsiana* (grey box) *Melaleuca decora* (white feather honey myrtle) **Shrubs** *Acacia ixiophylla* (sticky wattle) *A. deanii* (Deane's wattle) *A. leiocalyx* (early flowering black wattle)

	A. spectabilis (glory wattle) *Petalostigma pubescens* (quinine bush) **Forbs** *Brunoniella australis* (blue trumpet) *Bryophyllum delagoense** (mother-of-millions) *Cheilanthes sieberi* (rock fern) *Chrysocephalum apiculatum* (yellow buttons) *Evolvulus alsinoides* (bindweed) *Glandularia aristigera** (Mayne's pest) *Juncus usitatus* (common rush) *Podolepsis jaceoides* (showy copper-wire daisy) **Grasses and Associates** *Aristida caput-medusae* (many-headed wiregrass) *A. leichhardtiana* (a wiregrass) *A. ramosa* (cane speargrass) *Arundinella nepalensis* (reed grass) *Chrysopogon fallax* (golden-beard grass *Cymbopogon refractus* (barb-wire grass) *Cyperus sp.* (a cyperus) *Dianella sp.* (a flax lily) *Eleocharis sp.* (spike rush) *Entolasia stricta* (wiry panic) *Eragrostis lacunaria* (purple lovegrass) *E. elongata* (clustered lovegrass) *E. sororia* (woodland lovegrass) *Fimbristylis dichotoma* (common fringe-rush) *Gahnia aspera* (rough saw-sedge) *Laxmannia gracilis* (wire lily) *Lomandra filiformis* (wattle matrush) *Lomandra longifolia* (spiny-head matrush) *Melinis repens** (red natal) *Murdannea graminea* (grass lily) *Panicum decompositum* (native millet) *Panicum effusum* (hairy panic) *Panicum larcomianum* (a panic grass) *Paspalidium caespitosum* (brigalow grass) *Walwhalleya subxerophila* (gilgai grass)
Vegetation disturbance size: *(Area – m^2)*	Disturbance would be as per the final sketch. Approximately 3 hectares (600m x 50m) surveyed.
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	Trees; 75-100, Shrubs; 0-25, Ground cover species; 50-75.
Soil type & erodibility (Sodic: Y/N):	Sandy with clay; moderate erodibility. Dense ground layer cover of vegetation and organic material.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	Constructed RoW for underground CSG infrastructure susceptible to erosion, particularly where channelling between the outer banks of the watercourse occurs.
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	Relatively flat ~ 1%, with ~ 4% slope from western edge of floodplain to Clynes Road.
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds * Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site	High risk (1). Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations commonly occurring.

3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	
Notes:	There were numerous potential habitat features recorded and observed including, watercourse attributes (pools, beds, banks) and riparian vegetation, multiple large mature trees bearing hollows, trees with decorticating bark, hollow logs, course woody debris, moderate-dense leaf litter. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Non-remnant vegetation areas shown as Polygons #31 & #33 with exposed soils from previous disturbance (clearing).				

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
See Water Feature Checklist report appended for details of mapped S04 "Wambo Creek" confirmed as a watercourse.				

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
High abundance of potential fauna habitat throughout survey area (particularly within remnant RE 11.3.25). Infestations of the restricted invasive weed mother-of-millions was recorded and observed throughout entire survey area. Velvety tree pear recorded as occasionally occurring.				

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

Photo 1: Mixed remnant RE 11.3.18/ 11.5.1 (Polygon #14).

Photo 2: Top of western outer bank facing south showing edge of remnant RE 11.3.25 and ecotone with RE 11.3.18.

Photo 3: Remnant RE 11.3.25 within island between outer banks of watercourse (Polygon #29)

Photos 4: Remnant RE 11.5.1 (Polygon #32).

Photo 6: Windrow of felled timber providing potential fauna habitat and showing existing RoW with non-remnant vegetation.

Photo 7 and 8: Mature trees bearing hollows abundant within remnant RE 11.3.25.

Photo 8: Ground layer habitat including logs, woody debris, leaf litter, sedges and rushes.

Photo 9: Infestations of mother-of-millions were common throughout areas on alluvium.

Photo 10: Facing north on western outer bank of Wambo Creek.

Photo 11: Facing upstream on eastern outer bank of Wambo Creek.

WATER FEATURE CHECKLIST - ENVIRONMENTAL SURVEY REPORT

Field Assessment				
Block – PACR Name: (Survey Title from invite)	Kenya East, 37DY81, Off-tenure Pipeline Ecology Resurvey			
Infrastructure impact on water feature (Provide details) **Is it:** • Crossed by access? (bed-level crossing) • Crossed by gathering? • In proximity to static infrastructure? (well, camp, gravel pit, STP effluent area) *Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	Pipeline RoW crossing of mapped Stream Order 4 "Wambo Creek" verified as a watercourse. • Recommend under-boring of Stream Order 4 (SO4) watercourse "Wambo Creek" shown as Polygon #30 to avoid major, erosion issues and disturbance to watercourse. Watercourse within Category C ESA.			
Lot Plan:	37DY81	**Crossing type:**	Existing Crossing / No Upgrade Required:	☐
			Existing Crossing / Upgrade Required:	☐
			New Crossing in previously disturbed area:	☐
			New Crossing in undisturbed area:	✓
Survey sketch point #:	Polygon #30 (TB3001 – TB3003)	**Bank full width**	120m between outer banks of main channel (east side) and local anabranch (west side).	
		Bank width	15m for main and 13m for anabranch channel	
		Bed width	7m for main and 5m for anabranch channel	
		Bank height from bed	3m for main channel and 1-2.2 m for anabranch channel	
Instructions for Assessment	1. A separate checklist shall be completed where there is deemed to be a change in hydrological or topographic conditions, which may change the outcome of any of the below questions: (e.g. area of permanent flow, occurrence of contiguous riparian vegetation, obvious changes in landscape such as the occurrence of beds or banks) 2. This checklist should be accompanied by mapping, which indicates the location of each individual assessment. Each assessment should be numbered and reflected and/or identified on the map. 3. A work sheet is to be completed for all water features encountered during the survey.			

This Assessment worksheet has been prepared to assist with ensuring QGC reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which QGC operates.

Question to determine if the feature is a watercourse	Y/N	Justification	Comments
Is the feature mapped within the state mapping data set? If so, what is the stream order number? Is the feature named?	Y	No option for alternative route. Enable RoW to cross perpendicular to watercourse.	Mapped as Stream Order 4 and ground truthed as a watercourse. Named Wambo Creek.
A non-watercourse drainage feature is defined as having all of the following attributes; assessor to complete assessment of the following parameters: a) is the feature formed by the concentration of, or operates to confine or concentrate overland flow water only during and immediately after rainfall events; and	N	If **YES** to <u>all</u> of these questions the feature is only a drainage feature, the feature doesn't constitute a mappable watercourse and no further assessment is required. If **NO** to <u>any</u> of these continue with the assessment	Watercourse is ephemeral but supports a riverine environment.
b) appears to flow for only a short duration after a rainfall event, regardless of the frequency of flow events; and	N		
c) does not appear to have enough continuing flow to create a riverine environment.	N		
Is there a presence of defined bed and banks? (The bed and banks must be continuous rather than isolated and broken sections of a depression).	Y	If **YES** to all, the feature is a watercourse.	Continuous bed and banks in for main and secondary channel.
Does the feature have sufficient flow adequacy: the flow needs to be sufficient to sustain basic ecological processes and to maintain additional biodiversity, than that of the surrounding landscape, within the feature		If **NO** to any of these, the feature doesn't constitute a mappable watercourse and no further assessment is required under the *Fisheries Act*. Construct the watercourse crossing under the Environmental Authority. No DAFF notification is required.	Watercourse supports riparian vegetation and sustains ecological processes to maintain additional biodiversity.

<u>Summary is required for how determination was made of the water feature:</u>

This mapped S04 was field verified as a watercourse and demarcated between the outer banks (Polygon #30) including the high bank of the main channel on the eastern side and the local anabranch top of bank on the western side. A small island predominantly supporting riparian vegetation below the floodplain level is present between the outer banks.

This Assessment worksheet has been prepared to assist with ensuring QGC reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which QGC operates.

Water Features – Pre-works Notification Photos

Survey sketch point #: TB3003, Polygon #30

Photo (A) – Looking across the main channel of waterway at the centre of RoW (from east to west).
Across the watercourse at the proposed site of the bed-level crossing.

Photo (B) – Looking upstream of main channel from centre of RoW.
Standing at the point of the crossing, and looking downstream.

Photo (C) – Looking downstream of main channel from centre of RoW.
Standing at the point of the crossing, and looking upstream.

This Assessment worksheet has been prepared to assist with ensuring QGC reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which QGC operates.

SSMP- Likelihood of Occurrence Matrix - 37DY81

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** in column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence**(LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Timbered watercourses with river she-oak or Casuarina species in REs 11.3.14, 11.3.17, 11.3.18, 11.3.25 and 11.3.27a.	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	Poplar box, gum-topped box, or forest red gum over ground cover of native grasses	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #14, #29.	Microhabitat features for this species for feeding, survival and egg-laying observed throughout survey area such as decaying logs and woody debris, leaf litter, and dense overstorey cover of shrubs and trees.	Likely	Yes
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Timbered watercourses and palustrine wetlands with river red gum, forest red gum and she-oak in RE 11.3.25 / 11.3.25a and 11.3.27f.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Not Mapped as Essential Habitat (No)	No		Polygons #14, #29, #32.	Timbered watercourse parto of a large patch of suitable foraging and nesting habitat	Likely	Yes
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Woodland and scrub on alluvial or sand plains in all REs from land zones 3, 4 and 5 (excluding wetlands such as 11.3.25f and 11.3.27).	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types									Unlikely	No
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types									Unlikely	No
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Timbered watercourses with river she-oak or Casuarina species.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	Timbered watercourses with Casuarina spp. associated with permanent water.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygon #29.	Potential feed trees (Casuarina spp.) and multiple large trees with hollows present.	Likely	Yes
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Mapped and Validated (Yes)		Yes	Polygons #14, #29, #32, #35.	Trees with loose and peeling bark common throughout.	Known	Yes
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E. acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	High density of hollow-bearing trees, particularly trees with large (150-300mm) to very-large (>300mm) hollows	Presence of very large and mature trees, particularly those with a DBH greater than 50cm	Not Mapped as Essential Habitat (No)	No		Polygons #14, #29.	Diverse and abundant food trees and large trees bearing hollows suitable as den trees.	Likely	Yes
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	River red gum Eucalyptus camaldulensis and coolibah forest red gum E. tereticornis-lined watercourses	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Riverine woodlands.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Hooded robin (south-eastern)	The Hooded Robin (south-eastern) occurs in south-eastern Australia from far southern Queensland to Yorke Peninsula,	Not listed in vegetation types									Unlikely	No
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Timbered watercourses with river red gum, forest red gum, poplar box and coolabah.	Primary feed trees, bieng E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada and E. tereticornis ssp. tereticornis represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #14, #29, #32, #35.	Canopy dominated by Eucalyptus tereticornis (primary feed tree) adjacent S04 watercourse (Wambo Creek); located within large tract of intact vegetation; permanent water source within 1km.	Likely	Yes
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Timbered watercourses with river red gum in REs 11.3.14, 11.3.17 and 11.3.25 / 11.3.25a, containing mistletoes of the genus Amyema.	Forest and woodland eucalypts containing mistletoes of the genus Amyema.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types									Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Timbered watercourses with mixed eucalypt species REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	Large intact, extensive stands of vegetation with old-growth vegetation.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types									Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on plains in Land Zones 3 and 4	High, open spaces above open wooded areas	Large tracts of native vegetation	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Entire survey area within this property.	As this is a fly over species, it was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context.	Likely	Yes
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types									Unlikely	No
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No

SUMMARY of PROJECT ENVIRONMENTAL CLEARANCE (PEC) REPORT

SURVEY DETAILS			
PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 28DY81, Off-tenure Pipeline Ecology Resurvey		
Type of Survey:	Ecological survey - general		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Ecological survey of approximately 1,800m x 50m (9 hectares) of pipeline Right-of-Way (RoW).		
Lot Plan:	28DY81	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	29,30/10/2024
Survey Revision (Numerical)	Resurvey	**Report Revision (Roman Numeral)**	Rev iii
Description of Revision Changes			

Facility Type / Activity:			
Wells	☐ Core	☐ Exploration
☐ Appraisal	☐ Development / Production	☐ Monitoring
☐ Microseismic	☐ Directional	☐ Tiltmeter Array
☐ Gravel Pit	☐ Campsite	☐ Access Track
☐ Seismic	☐ Gathering System	☐ Security Hut
☐ Trunkline	☐ Gas Pipeline	✓ Water Pipeline
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)
☐ Other:		☐ Frac Pond

RECOMMENDATIONS:		
☐ No Environmental issues on site	✓ Environmental issues identified & surveyed	☐ EA amendment required
☐ Protected Flora Trigger Map Survey required	☐ Reforestation triggered	✓ Fauna spotter required
☐ Other:		

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Fauna

- Biodiversity offsets for diamond firetail and koala habitat may be required.
- Fauna Spotter Catcher required for clearing activities.

SUMMARY OF ENVIRONMENTAL CONSTRAINTS (DETAILED IN OTHER REPORT ELEMENTS)	
Brief description of broader vegetation / land use:	The property comprised remnant woodland, regrowth and open paddocks dissected by access tracks and encompassing CSG infrastructure.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	State mapping showed most of the survey area is non-remnant vegetation except for a small section in the southeast lies within remnant RE 11.5.1 / 11.5.20 in 70:30 ratio (Least Concern [VM Act]; No Concern at Present [BDS]). Ground truthing recorded that the linear infrastructure predominantly traversed remnant vegetation of the following RE types that are (Least Concern [VM Act]; No Concern at Present [BDS]) vegetation communities. • RE 11.5.1 (Polygons #13, #8, #9, #28) • RE 11.5.4 (Polygons #13) • RE 11.5.20 (Polygons #1, #10, #21, #34) Ecotonal areas of RE types were also observed. Advanced regrowth was recorded at an area south of the Kenya East compression station comprised of RE 11.5.20 (Polygon #11) and at Polygon #15 which comprised mixed RE 11.5.1/ 11.5.4. Both areas did not-meet the structural criteria for remnant status. Non-remnant vegetation was recorded in areas associated with existing cleared access tracks shown by Polygons #4, #16, #20. Varying levels of disturbance by fire, selective clearing and broadscale clearing were observed throughout the remnant and regrowth vegetation communities.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	The following areas lie within mapped Significant Vegetation or their buffers, associated with mapped Category C ESA triggered by Essential Habitat mapping for golden-tailed gecko (*Strophurus taenicauda)*. 1. The western extent of the survey area lies within the Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ). 2. The survey area in the eastern extent traverses the Category C ESA and buffers (PPZ and SPZ). Whilst the golden-tailed gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch Note: If impacted by or adjoining infrastructure attach *Quantification Report.*	No TECs mapped or recorded on or near site.
DoR-mapped High-value Regrowth present / impacted:	There was no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	Advanced regrowth was recorded, at an area south of the Kenya East compression station comprised of RE 11.5.20 (Polygon #11), and at Polygon #15 which comprised mixed RE 11.5.1/ 11.5.4. Both areas did not-meet the structural criteria for remnant status (clearing within past 10 years).
EVNT Flora species present / impacted (EPBC or NCA): Note: If impacted by or adjoining infrastructure complete Quantification Report. Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement	No threatened flora species were detected in the survey area. The proposed infrastructure did not lie in a High-Risk area according to latest Flora Trigger mapping.

for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA) (from the LoOM assessment) 2. If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 4. If no suitable habitat for any threatened species is detected, provide summary of how site conditions are unsuitable. Attach completed *Likelihood of Occurrence Matrix (LoOM)* to report	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that *Stagonopleura guttata* (diamond firetail) (vulnerable under the EPBC and NCA), *Phascolarctos cinereus* (koala) ('endangered' under the EPBC and NCA) and *Hirundapus caudacutus* (white-throated needletail) ('vulnerable' under the EPBC and NCA) were assessed as 'likely' to occur in the survey area. *Strophurus taenicauda* (golden-tailed gecko) ('near threatened' under the NCA) was assessed as 'known' in the survey area. Under the LoOM assessment process, additional fauna survey work would be required to determine if the 'likelihood of occurrence' for diamond firetail and koala is increased to 'known'. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The clearing of woodland at the site may require offsetting for diamond firetail and koala habitat. Any diamond firetail nests or koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.
Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers Attach completed *Water Features Checklist / Wetland Features Report*	A Stream Order 1 (SO1) watercourse was mapped adjacent the proposed linear infrastructure. The area mapped and immediate adjoining areas were surveyed, and no watercourses or drainage features were detected (see Photo 6 in EFAL). There were no wetlands mapped or detected within 200m of linear infrastructure.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations occasionally occurring. See EFAL species list for other non-native flora recorded.
Additional Considerations:	There were potential habitat features recorded including, scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.
Attachments Included:	✓ Sketch ✓ QA mark-up map ✓ LoOM ✓ ESPT ☐ Water Feature Checklist(s) ☐ Habitat Checklist(s) (SBAD) ☐ Other:

This report has been prepared in accordance with DSEWPAC Condition 7a for EPBC Approval 2010/5344.
This survey has been completed by a qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.
Features of ecological and environmental significance were identified and mapped where present in accordance with QGC's Environmental Field Constraints Assessment Guidelines.

Lincoln Smith revised reviii Gerry Callahan (edits)	15/02/2025 3/02/2025
Completed By	**Date**

[1]*Detail the rapid Fauna assessment: I.e., methodology and/or if a detailed, in-depth fauna survey is required prior to construction works.*
[2]*Quantification Methodology: I.e., individual counting, radius method, defining density/m^2 and multiply by total area*

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Kenya East, 28DY81, Off-tenure Pipeline Ecology Resurvey
ATP / PL number:	PL278
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	No realignments were necessary due to environmental constraints.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	The property comprised remnant woodland, regrowth and open paddocks dissected by access tracks and encompassing CSG infrastructure.

Confirm REs present:
• What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as?
• Survey new/correct extents of REs.
  ○ Fully survey polygons, if practicable;
  ○ Buffer partially-surveyed edges; and
• Provide reference survey points and site photos.
	State mapping showed most of the survey area is non-remnant vegetation except for a small section in the southeast lies within remnant RE 11.5.1 / 11.5.20 in 70:30 ratio (Least Concern [VM Act]; No Concern at Present [BDS]).
	
	Ground truthing recorded that the linear infrastructure predominantly traversed remnant vegetation of the following RE types that are (Least Concern [VM Act]; No Concern at Present [BDS]) vegetation communities.
	• RE 11.5.1 (Polygons #13, #8, #9, #28)
	• RE 11.5.4 (Polygons #13)
	• RE 11.5.20 (Polygons #1, #10, #21, #34)
	
	Ecotonal areas of RE types were also observed.
	
	Advanced regrowth was recorded at an area south of the Kenya East compression station comprised of RE 11.5.20 (Polygon #11) and at Polygon #15 which comprised mixed RE 11.5.1/ 11.5.4. Both areas did not-meet the structural criteria for remnant status.
	
	Non-remnant vegetation was recorded in areas associated with existing access tracks shown by Polygons #4, #16, #20.
	
	Varying levels of disturbance by fire, selective clearing and broadscale clearing were observed throughout the remnant and regrowth vegetation communities.

Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The following areas lie within mapped Significant Vegetation or their buffers, associated with mapped Category C ESA triggered by Essential Habitat mapping for Golden-tailed Gecko (*Strophurus taenicauda)*. 1. The western extent of the survey area lies within the Primary Protection Zone (PPZ) and Secondary Protection Zone (SPZ). 2. The survey area in the eastern extent traverses the Category C ESA and buffers (PPZ and SPZ). Whilst the Golden-tailed Gecko is likely to occur in the study area, habitat for Near Threatened species does not constitute an ESA under the EA for the subject tenement.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	No TECs mapped or recorded on or near site.
EVNT Flora present/impacted:	No EVNT flora recorded on site.

(If impacted by or adjoining infrastructure complete *Quantification Report.)*	
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping?	Site is not in a High-Risk area according to latest Flora Trigger mapping.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 344 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM assessment indicated that Stagonopleura guttata (diamond firetail) ('vulnerable' under the EPBC and NCA), Phascolarctos cinereus (koala) ('endangered' under the EPBC and NCA) and Hirundapus caudacutus (white-throated needletail) ('vulnerable' under the EPBC and NCA) to occur in the survey area. Strophurus taenicauda (golden-tailed gecko) ('near threatened' under the NCA), was 'known' to occur in the survey area as the RoW traversed essential habitat for the species that was validated during the survey. It was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context. The clearing of woodland at the site may require offsetting fordiamond firetail and koala habitat. Any koalas detected before or during clearing should be managed as per the requirements in the Arrow Energy Species Management Program (SMP). A licensed fauna spotter should search all suitable habitat features on the site, prior to and during clearing, to salvage any golden-tailed geckos, along with other displaced fauna.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	A Stream Order 1 (SO1) watercourse was mapped adjacent the proposed linear infrastructure. The area mapped and immediate adjoining areas were surveyed, and no watercourses or drainage features were detected (see Photo 6). There were no wetlands mapped or detected within 200m of linear infrastructure.
Current road access to proposed site: Existing / to be upgraded / new	Access is via Montrose Road
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	* Denotes non-native species **Trees** *Allocasuarina luehmannii* (bull oak) *Angophora leiocarpa* (smooth-barked apple) *Callitris glaucophylla* (white cypress pine) *Eucalyptus crebra* (narrow-leaved ironbark) *Eucalyptus woollsiana* (grey box) *Melaleuca decora* (white feather honey myrtle) **Shrubs** *Acacia ixiophylla* (sticky wattle) *A. deanii* (Deane's wattle) *A. leiocalyx* (early flowering black wattle) *A. spectabilis* (glory wattle) *Petalostigma pubescens* (quinine bush) **Forbs** *Brunoniella australis* (blue trumpet) *Cheilanthes sieberi* (rock fern) *Chrysocephalum apiculatum* (yellow buttons) *Evolvulus alsinoides* (bindweed) *Goodenia glabra* (smooth goodenia) *Murdannea graminea* (grass lily) **Grasses and Associates** *Aristida caput-medusae* (many-headed wiregrass), *A. leichhardtiana* (a wiregrass), *A. ramosa* (cane speargrass), *A. vagans* (wire grass), *Cymbopogon refractus* (barb-wire grass), *Dianella sp.* (a flax lily), *Entolasia stricta* (wiry panic), *Eragrostis lacunaria* (purple lovegrass), *E. elongata* (clustered lovegrass), *E. sororia* (woodland lovegrass), *Fimbristylis dichotoma* (common fringe-rush), *Gahnia aspera* (rough saw-sedge), *Laxmannia gracilis* (wire lily), *Lomandra filiformis* (wattle matrush), *Melinis repens** (red

	natal), *Murdannea graminea* (grass lily), *Panicum decompositum* (native millet), *Panicum effusum* (hairy panic), *Paspalidium caespitosum* (brigalow grass)
Vegetation disturbance size: *(Area – m^2)*	Disturbance would be as per the final sketch. Approximately 9 hectares (1,800m x 50m) surveyed.
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	Trees and shrubs; 25-50, Ground cover species; 25-50.
Soil type & erodibility (Sodic: Y/N):	Sandy clay loam; moderate erodibility.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	No significant erosion zones noted; relatively flat site.
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	Relatively flat ~ 1%.
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds * Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High risk (1). Biosecurity Act restricted invasive weeds recorded: 1. Velvety tree pear (*Opuntia tomentosa*) as rarely occurring. 2. Mother-of-millions (*Bryophyllum delagoense*) infestations occasionally occurring.
Notes:	There were potential habitat features recorded including, scattered trees bearing hollows, trees with decorticating bark, hollow logs, and course woody debris. Where practicable, these features should be avoided. Any that can't be avoided should be inspected by a licenced fauna spotter before and during clearing.

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Nil				

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
No watercourses or drainage features detected near mapped SO1.				

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Potential fauna habitat throughout survey area and restricted invasive weeds were present at low densities.				

Photography - Linear Infrastructure

Photo 1: Remnant RE 11.5.20 adjoining access track at western extent of survey area.

Photo 2: Sparse – moderate canopy cover of remnant RE 11.5.20 disturbed by historical clearing and fire within past two years.

Photo 3: Non-remnant patch highly disturbed by recent fire and dieback within canopy.

Photos 4: Mixed remnant RE 11.5.1/ 11.5.4.

Photo 6: Very insignificant drainage feature within vicinity of mapped SO1 as no other potential watercourses/ drainage features were detected.

Photo 7 and 8: Mature grey box with decorticating and stripping bark providing potential Golden-tailed Gecko habitat and dead tree bearing hollows.

Photo 8: Windrow of felled timber along access track near Kenya East compression station.

SSMP- Likelihood of Occurrence Matrix - Kenya East 28DY81

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points:** in column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence**(LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types									Unlikely	No
View Map	Black-breasted button-quail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Poplar box/gum, cypress pine and bull-oak country in REs 11.3.2, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.5.1, 11.5.4 and 11.5.20.	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Brown treecreeper (south-eastern	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Ironbark / smooth-barked apple / box woodland in REs 11.5.1, 11.5.4, 11.5.20 and 11.5.21.	No Habitat Attribute Present	No Habitat Attribute Present	No Habitat Attribute Present						Unlikely	No
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Open grassy forests and woodlands, dry pastures at wooded edges and occasionally in farmlands and grasslands with scattered trees.	Landforms 3, 4, 5 and possibly 9.	Eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats.	Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Not Mapped as Essential Habitat (No)	No		Polygons #1, #8, #9, #10, #11, #13, #15, #21, #28, #34..	QGC 2019 diamond firetail record approximately 8.5km NE of preferred habitat on 28DY81 crossed by RoW	Likely	Yes
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types									Unlikely	No
View Map	Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Mapped and Validated (Yes)		Yes	Polygons #1, #8, #9, #10, #11, #13, #15, #21, #28, #34.	Field validated GTG essential habitat travesred by proposed RoW	Known	Yes
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types									Unlikely	No
View Map	Hooded robin (south-eastern)	The Hooded Robin (south-eastern) occurs in south-eastern Australia from far southern Queensland to Yorke Peninsula,	Occur in lightly timbered woodlands and shrublands dominated by eucalypts and/or wattles.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypt/box woodlands and semi-arid areas with gum/box.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No		Polygons #1, #8, #9, #10, #11, #13, #15, #21, #28, #34.	Canopy dominated by Eucalyptus crebra (secondary feed tree); located within large tract of intact vegetation; permanent water source within 1km.	Likely	Yes
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Bull-oak Woodland on in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types									Unlikely	No
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Dry ironbark and cypress pine, bull-oak or gum/box country in REs 11.4.7, 11.5.1, 11.5.4, 11.5.5, 11.5.20, 11.5.21, 11.9.9 and 11.9.10	Poplar box, ironbark, cypress pine, buloke woodlands.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No
View Map	Swift parrot	Not in the Broad Area of Occurrence										Unlikely	No
View Map	White-throated needletail	Distribution includes all coastal regions in QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on sand plains in Land Zone 5	High, open spaces above open wooded areas	Large tracts of native vegetation	Large tracts of native vegetation	Not Mapped as Essential Habitat (No)	No		Entire survey area within this property.	As this is a fly over species, it was assessed that the proposed disturbance would have negligible impact on the white-throated needletail in the local context.	Likely	Yes
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Dry ironbark and cypress pine scrub or gum/box country.	Log piles, scattered large hollow logs associated with fallen trees, dense woody debris, stick-raked windrows and abandoned animal burrows.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No

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Appendix E

LFC tool results

Department of Environment and Heritage Protection (DEHP)
Landscape Fragmentation and Connectivity (LFC) Tool version 1.4 LOGFILE
Process started at 17-02-2025 08:13:30 AM
Python version: 2.7.18 (v2.7.18:8d21aa21f2, Apr 20 2020, 13:19:08) [MSC v.1500 32 bit (Intel)]
Arcpy version: 10.8.1
Username: tstringer

INPUT PARAMETERS
Output Workspace: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow
Threshold lookup table:
R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\scripts\lfc_v1p06_catalog\LFC_data.gdb\tbl_Regional_frag_local_threshold
Remnant cover layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\LFC_data.gdb\ArrowRegVeg
Remnant cover layer edited: False
Regional buffer extent: 20 kilometres
Local buffer extent: 5 kilometres
Impact layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Disturbance\New File Geodatabase.gdb\Disturbance_
layer projection: GDA_2020_Queensland_Albers
Raster cell resolution for analysis: 10 metres
Edge Width: 50 metres
(The distance from non-remnant landscapes through to the core ecosystem - the edge of remnant ecosystems)
Default projection: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\GDA 2020 Queensland AlbersOFFSET.prj

08:13:31 Checking out the spatial analyst tool - required for LFC

08:13:31 _____BEGINNING LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

08:13:31 This tool will categorise the landscape into:
{0: 'non-rem', 1: 'patch', 2: 'edge', 3: 'perforated', 4: 'core (< 100 hectares)', 5: 'core (100-500 hectares)', 6: 'core (> 500 hectares)', 7: 'water'}

08:13:41 R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow\lyr_file does not exist, creating it now.
08:13:41 Copying across impact site feature(s) and calculating area in hectares (AreaHA)
08:13:47 Making a local copy of the impact site
08:13:53 Preparing remnant cover layer for analysis
08:13:55 Created regional scale buffer of 20 kilometres
08:13:57 Created local scale buffer of 5 kilometres
08:14:15 Clipped the remnant cover to the regional buffer extent
08:14:19 Unioned the pre impact remnant layer with the impact site
08:14:27 Attributed the impact area as not RVM Cat B
08:14:28 Area of RVM Cat B clearing is 17.86 hectares
08:14:28 SQL selection used is "RVM_CAT" = 'B' and "Cover" = 'Not RVM Cat B' on shapefile R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow\main_output\clip_remcover_post.shp

08:14:33 Categorised the cover attributes in clip_remcover_pre.shp ready for raster conversion
08:15:09 Converted clip_remcover_pre.shp to raster

08:15:15 Categorised the cover attributes in clip_remcover_post.shp ready for raster conversion

08:15:51 Converted clip_remcover_post.shp to raster

08:15:51 Run Landscape fragmentation analysis on the pre impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 13.5 MINUTES)

08:29:24 Run Landscape fragmentation analysis on the post impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 13.3 MINUTES)

Extracting a local subset of lfc_regional_pre_impact
Extracting a local subset of lfc_regional_post_impact

Collating pre and post impact statistics and trigger assessment
08:43:37 Summarising area statistics for: lfc_localmsk_pre_impact
08:43:37 Summarising area statistics for: lfc_localmsk_post_impact
08:43:37 Summarising area statistics for: lfc_regional_pre_impact
08:43:39 Summarising patch count for lfc_localmsk_pre_impact
08:43:55 Summarising patch count for lfc_localmsk_post_impact

Analysing impact on Connectivity Areas

SIGNIFICANCE TEST ONE

The regional total area is 169203.33
The regional extent of core remnant is 49989.60
The regional extent of core remnant is 29.54 percent
This level of regional fragmentation sets a local impact threshold of: 5.0 percent

The table below lists the local impact thresholds for categories of regional core remnant extent:

REGIONAL CORE CATEGORY	LOCAL IMPACT THRESHOLD
< 10	2.0
10 - 30	5.0
30 - 50	10.0
50 - 70	20.0
70 - 90	30.0
>90	50.0

Area of core at the local scale (pre impact): 7264.57
Area of core at the local scale (post impact): 7243.81
Percent change of core at the local scale (post impact): 0.29 percent

SIGNIFICANCE TEST TWO

The number of core remnant areas occurring on the site: 7
The number of core remnant areas remaining on the site post impact: 6
(Only core polygons greater than or equal to 1 hectare are included)

RESULT

08:44:29 This analysis has determined a SIGNIFICANT impact on connectivity areas
(A significant reduction in core remnant at the local scale is False OR a change from core to non-core remnant at the site scale is True)
(Total area of RVM Cat B clearing is 17.86 hectares)

The significance table has been written to: ..\main_output\lfc_significance_assessment.csv
The local scale summary table has been written to: ..\main_output\lfc_local_scale_summary.csv
The site scale summary table has been written to: ..\main_output\lfc_site_scale_summary.csv
GIS layer files copied into folder \lyr_file within the project folder.
View layers in ArcMAP
using..\R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow\lyr_file\lyr_file\Connectivity Area Impact Assessment.lyr

Please scrutinise the output tables and spatial layers to confirm the desktop modelling of connectivity area impact

This analysis used an unedited copy of the Regulated Vegetation layer.

08:51:13 _____COMPLETED LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

Department of Environment and Heritage Protection (DEHP)
Landscape Fragmentation and Connectivity (LFC) Tool version 1.4 LOGFILE
Process started at 09-02-2025 01:20:17 PM
Python version: 2.7.18 (v2.7.18:8d21aa21f2, Apr 20 2020, 13:19:08) [MSC v.1500 32 bit (Intel)]
Arcpy version: 10.8.1
Username: tstringer

INPUT PARAMETERS
Output Workspace: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov
Threshold lookup table:
R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\scripts\lfc_v1p06_catalog\LFC_data.gdb\tbl_Regional_frag_local_threshold
Remnant cover layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\LFC_data.gdb\GovRegVeg
Remnant cover layer edited: False
Regional buffer extent: 20 kilometres
Local buffer extent: 5 kilometres
Impact layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Disturbance\New File Geodatabase.gdb\Disturbance_
layer projection: GDA2020
Raster cell resolution for analysis: 10 metres
Edge Width: 50 metres
(The distance from non-remnant landscapes through to the core ecosystem - the edge of remnant ecosystems)
Default projection: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\GDA 2020 Queensland AlbersOFFSET.prj

13:20:19 Checking out the spatial analyst tool - required for LFC

13:20:19 _____BEGINNING LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

13:20:19 This tool will categorise the landscape into:
{0: 'non-rem', 1: 'patch', 2: 'edge', 3: 'perforated', 4: 'core (< 100 hectares)', 5: 'core (100-500 hectares)', 6: 'core (> 500 hectares)', 7: 'water'}

13:20:31 R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov\lyr_file does not exist, creating it now.
13:20:31 Copying across impact site feature(s) and calculating area in hectares (AreaHA)
13:20:38 Making a local copy of the impact site
13:20:46 Preparing remnant cover layer for analysis
13:20:48 Created regional scale buffer of 20 kilometres
13:20:50 Created local scale buffer of 5 kilometres
13:21:03 Clipped the remnant cover to the regional buffer extent
13:21:05 Unioned the pre impact remnant layer with the impact site
13:21:09 Attributed the impact area as not RVM Cat B
13:21:09 Area of RVM Cat B clearing is 3.31 hectares
13:21:09 SQL selection used is "RVM_CAT" = 'B' and "Cover" = 'Not RVM Cat B' on shapefile R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov\main_output\clip_remcover_post.shp

13:21:11 Categorised the cover attributes in clip_remcover_pre.shp ready for raster conversion
13:21:57 Converted clip_remcover_pre.shp to raster

13:22:00 Categorised the cover attributes in clip_remcover_post.shp ready for raster conversion

13:22:46 Converted clip_remcover_post.shp to raster

13:22:46 Run Landscape fragmentation analysis on the pre impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 10.5 MINUTES)

13:33:20 Run Landscape fragmentation analysis on the post impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 11.2 MINUTES)

Extracting a local subset of lfc_regional_pre_impact
Extracting a local subset of lfc_regional_post_impact

Collating pre and post impact statistics and trigger assessment
13:45:28 Summarising area statistics for: lfc_localmsk_pre_impact
13:45:28 Summarising area statistics for: lfc_localmsk_post_impact
13:45:29 Summarising area statistics for: lfc_regional_pre_impact
13:45:31 Summarising patch count for lfc_localmsk_pre_impact
13:45:52 Summarising patch count for lfc_localmsk_post_impact

Analysing impact on Connectivity Areas

SIGNIFICANCE TEST ONE

The regional total area is 169203.32
The regional extent of core remnant is 51705.82
The regional extent of core remnant is 30.56 percent
This level of regional fragmentation sets a local impact threshold of: 10.0 percent

The table below lists the local impact thresholds for categories of regional core remnant extent:

REGIONAL CORE CATEGORY	LOCAL IMPACT THRESHOLD
< 10	2.0
10 - 30	5.0
30 - 50	10.0
50 - 70	20.0
70 - 90	30.0
>90	50.0

Area of core at the local scale (pre impact): 7471.59
Area of core at the local scale (post impact): 7464.65
Percent change of core at the local scale (post impact): 0.09 percent

SIGNIFICANCE TEST TWO

The number of core remnant areas occurring on the site: 2
The number of core remnant areas remaining on the site post impact: 2
(Only core polygons greater than or equal to 1 hectare are included)

RESULT

13:46:35 This analysis has determined any impact on connectivity areas is NOT significant
(A significant reduction in core remnant at the local scale is False OR a change from core to non-core remnant at the site scale is False)

The significance table has been written to: ..\main_output\lfc_significance_assessment.csv
The local scale summary table has been written to: ..\main_output\lfc_local_scale_summary.csv
The site scale summary table has been written to: ..\main_output\lfc_site_scale_summary.csv
GIS layer files copied into folder \lyr_file within the project folder.
View layers in ArcMAP
using..\R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov\lyr_file\lyr_file\Connectivity Area Impact Assessment.lyr

Please scrutinise the output tables and spatial layers to confirm the desktop modelling of connectivity area impact

This analysis used an unedited copy of the Regulated Vegetation layer.

13:54:55 _____COMPLETED LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

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